

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of: Job Cornelis Oostveen et al.

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER  
MARKER IN A MULTIMEDIA SIGNAL

Attorney Docket No.: 2167.052US3

Customer No.: 21186

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**PATENT APPLICATION TRANSMITTAL**

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We are transmitting herewith the following attached items and information (as indicated with an "X"):

**X CONTINUATION under 37 CFR 1.53(b) of prior Patent Application No. 13/220,267 comprising:**

**X Specification (12 pgs, including claims numbered 1 through 1 and a 1 page Abstract).**

**X Formal Drawing(s) (3 sheets).**

**X Application Data Sheet (6 pgs).**

**X Authorization to charge Deposit Account 19-0743 in the amount of \$1,600.00 to pay the filing fee.**

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[ ] MULTIPLE DEPENDENT CLAIMS PRESENTED				\$0.00
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APPLICATION SIZE FEE	( 11 - 100 ) / 50	0	\$400.00	\$0.00
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By: 

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Date of Deposit: January 10, 2014

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<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	2167.052US3
	<b>Application Number</b>	Unknown
<b>Title of Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL	
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>		

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<input type="checkbox"/> Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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<b>Customer Number</b>	21186
<b>Email Address</b>	request@slwip.com

<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	2167.052US3
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### Application Information:

<b>Title of the Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		
<b>Attorney Docket Number</b>	2167.052US3	<b>Small Entity Status Claimed</b>	<input type="checkbox"/>
<b>Application Type</b>	Non-Provisional		
<b>Subject Matter</b>	Utility - CON		
<b>Suggested Class (if any)</b>		<b>Sub Class (if any)</b>	
<b>Suggested Technology Center (if any)</b>			
<b>Total Number of Drawing Sheets (if any)</b>	3	<b>Suggested Figure for Publication (if any)</b>	
<b>Filing By Reference:</b>			
<p>Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").</p> <p>For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).</p>			
<b>Application number of the previously filed application</b>	<b>Filing date (YYYY-MM-DD)</b>	<b>Intellectual Property Authority or Country Publication</b>	

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<input type="checkbox"/> <b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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<b>Please Select One:</b>	<input checked="" type="checkbox"/> <b>Customer Number</b>	<input type="checkbox"/> <b>US Patent Practitioner</b>	<input type="checkbox"/> <b>Limited Recognition (37 CFR 11.9)</b>
<b>Customer Number</b>	21186		



<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	2167.052US3
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### Domestic Benefit/National Stage Information:

<p>This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.</p>			
<b>Prior Application Status</b>	Pending		
<b>Application Number</b>	<b>Continuity Type</b>	<b>Prior Application Number</b>	<b>Filing Date (YYYY-MM-DD)</b>
This application	continuation of	13/220,267	2011-08-29
<b>Prior Application Status</b>	Patented		
<b>Application Number</b>	<b>Continuity Type</b>	<b>Prior Application Number</b>	<b>Filing Date (YYYY-MM-DD)</b>
13/220,267	continuation of	10/564,297	2006-01-10
<b>Prior Application Status</b>	Expired		
<b>Application Number</b>	<b>Continuity Type</b>	<b>Prior Application Number</b>	<b>Filing Date (YYYY-MM-DD)</b>
10/564,297	a 371 of international	PCT/IB2004/051128	2004-07-05

### Foreign Priority Information:

<p>This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the POX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).</p>			
<b>Application Number</b>	<b>Country</b>	<b>Parent Filing Date (YYYY-MM-DD)</b>	<b>Access Code (if applicable)</b>
03102116.5	European Patent Office	2003-07-11	

<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	2167.052US3
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<input checked="" type="checkbox"/> <b>Authorization to Permit Access to the Instant Application by the Participating Offices</b>
<p>If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.</p> <p>In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.</p> <p>In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.</p>

### Applicant Information:

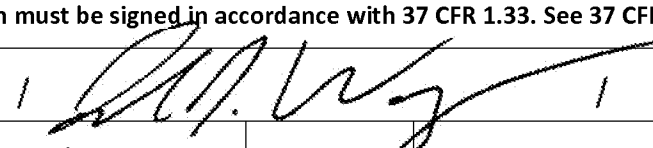
Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
<b>Applicant:</b> Koninklijke Philips Electronics N.V.				
<p><u>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed.</u> The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p>				
<input checked="" type="checkbox"/> Assignee	<input type="checkbox"/> Legal Representative under 35 U.S.C. 117	<input type="checkbox"/> Joint Inventor		
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<input type="checkbox"/> Deceased	<input type="checkbox"/> Legally incapacitated			
Name of the Deceased or Legally Incapacitated Inventor :				
If the Applicant is an Organization check here: <input checked="" type="checkbox"/>				
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<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	2167.052US3
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**Signature:**

<b>NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications</b>					
<b>Signature</b>			<b>Date (YYYY-MM-DD)</b>	10 Jan. 2014	
<b>First Name</b>	Joseph	<b>Last Name</b>	Wang	<b>Registration Number</b>	61,123

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-14**

METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

5 This application is a Continuation of U.S. Application No. 10/564,297, which is a U.S. National  
Stage Filing under 35 U.S.C. 371 from International Patent Application Serial No.  
PCT/IB2004/051128, filed July 5, 2004, and published on January 20, 2005 as WO 2005/006758,  
which claims priority to EP Application No. 03102116.5, filed July 11, 2003, which applications are  
incorporated by reference herein in their entirety.

10 The invention relates to a method, and a corresponding device, of detecting trigger  
instants/information in a multimedia signal. The invention also relates to a method, and a  
corresponding device, of associating trigger information with a multimedia signal. Further, the  
invention relates to a computer readable medium having stored thereon instructions for causing one  
or more processing units to execute the method according to the invention.

15 A current trend is to enhance passive television viewing and/or music listening on a given playback  
device by creating more interactive programs and/or listening experiences or by "connecting"  
external actions to a piece of video and/or audio content. As one simple example, a commercial can  
be enhanced by embedding a URL to a web site with further information, where the URL can be  
20 extracted and retrieved by the playback device. In order to facilitate such a function it is necessary to  
enable a reliable detection of time points in a television program, a movie, a music piece, etc. where  
such additional information is relevant.

Examples of situations where such additional information is useful or interesting in connection with a  
25 broadcast program are:

- trigg&link: (see e.g. W. ten Kate et.al. "trigg&link - A new dimension in television  
program making", Lecture Notes in computer Science, vol. 1242, pp51-65, Springer,  
1997) trigg&link allows interactivity in television programs. In addition to the normal  
30 program, additional information concerning specific segments of the program is  
available to the viewer through a different distribution channel. At the start of a given  
segment that is associated with an enhancement (additional information) an icon is  
displayed, alerting the viewer that additional information may be viewed on his TV. For  
instance, at the appearance of an actor in a movie, some biographic data of the actor  
35 may be made available. In the user terminal (e.g. a set top box, etc.) the icons

are overlayed on the video at the relevant time instants, thereby requiring these instants to have been indicated in the video stream.

- Local Insertion: During a national broadcast, specific parts of the program may be replaced by a regional program in some regions. For instance, some advertisements may be replaced by advertisements for local shops, or, in a news show some regions may have their local weather forecast rather than the national one. The national program producer can indicate which segments are suitable for such local insertion. At the local redistribution site (e.g. at the cable head-end), the indicated segments may be replaced by local content.

10 In both of the above situations, it is necessary to mark or associate specific time instants in the video stream at which additional information should be available. At these time instants the receiver should be triggered to perform or provide some kind of action. This may be done by such mechanisms as DSM-CC in MPEG/DVB. However, this requires the broadcaster's cooperation to insert these triggers thereby making an  
15 enhancement service provider dependent on the broadcaster.

One previously known way of performing time marking in a video stream is e.g. using fields of the MPEG transport stream structure that can be used to hold the marking information.

20 Another previously known way is using a blanking interval. In analog distribution, the marking information can be embedded in the vertical blanking interval or in the inactive video lines.

Both of the above known ways need the cooperation of all actors in the broadcast chain to make sure that the marking information is not destroyed before the signal arrives at its destination. For instance, in case of the MPEG solution, a re-multiplexing  
25 operation could easily remove information that is written in the user data fields in the stream. Moreover, every decoding and successive re-encoding step would certainly not retain this information. In case of the use of the vertical blanking for carrying the trigger information, the situation is even more difficult, as actors in the broadcast chain might write other information at the same position (the vertical blanking is used for many things and there is no  
30 uniform agreement about the control over usage of the blanking interval). Also, standards converters (like PAL-NTSC) and other equipment in the broadcast chain may not retain all information in the vertical blanking interval.

Yet another way is using watermarking. A watermark may be embedded in the video frames at the relevant time instants. The Philips Watercast System is, among others,

being sold for this purpose. A disadvantage of watermarking is the fact that it necessarily changes the video/audio.

5 It is an object of the invention to provide a method and corresponding device of relating one or more trigger actions with a multimedia signal and corresponding method and device for detecting one or more trigger actions in a multimedia signal that solves the above-mentioned problems. A further object is to provide this in a simple and efficient way. Another object is to enable simple, reliable and accurate localisation of a given part of a  
10 multimedia signal. A further object is to enable detection of trigger actions without modifying the multimedia signal.

This is achieved by a method (and corresponding device) of relating one or more trigger actions with a multimedia signal, the method comprising the steps of

- providing at least one trigger time point and for each trigger time point providing at  
15 least one representation of least one associated trigger action, where each trigger time point indicates a time point of the multimedia signal for which the at least one associated trigger action is to be available during playback of the multimedia signal, and
- for each given trigger time point deriving a fingerprint on the basis of a segment of  
20 the multimedia signal, where the segment of the multimedia signal is unambiguously related with the given trigger time point,
- and by a method (and corresponding device) of detecting one or more trigger actions in a multimedia signal, the method comprising the steps of:
  - generating a fingerprint stream on the basis of the multimedia signal,
  - 25 - comparing a segment of the fingerprint stream with one or more fingerprints stored in a second database in order to determine if a match exists or not between the segment and a fingerprint in the second database, the second database further comprising for each stored fingerprint at least one representation of at least one associated action, and
  - 30 - if a match exists retrieving the at least one representation of the at least one associated action associated with the matching fingerprint.

In this way, a simple and efficient way of handling time markers in a multimedia signal for given actions is obtained. A fingerprint thereby serves as a trigger of a particular action, event, etc. associated with a particular point in time of the multimedia

signal. Further, this is enabled without the multimedia signal needing to be modified. Additionally, the time marking detection is time independent as it is dependent on the specific content of the multimedia signal only thereby avoiding problems if a multimedia signal being a television program or the like is delayed.

5           A fingerprint of a multimedia object/content/signal is a representation of perceptual features of the object/content/signal part in question. Such fingerprints are sometimes also known as "(robust) hashes". More specifically, a fingerprint of a piece of audio or video is an identifier which is computed over that piece of audio or video and which does not change even if the content involved is subsequently transcoded, filtered or otherwise  
10   modified.

          Preferably, the derived fingerprint is an audio and/or video fingerprint. Alternatively, animations and/or streaming text, etc. is used as a source for creating a fingerprint.

          Advantageous embodiments of the methods and devices according to the  
15   present invention are defined in the sub-claims.

          Further, the invention also relates to a computer readable medium having stored thereon instructions for causing one or more processing units to execute the method according to the present invention.

20           Figure 1a schematically illustrates generation of fingerprint(s) used as trigger marker(s) according to the present invention.

          Figure 1b schematically illustrates detection and use of fingerprint(s) as trigger marker(s) according to the present invention.

25           Figure 2 illustrates a schematic block diagram of a fingerprint generation device according to the present invention;

          Figure 3 illustrates a schematic block diagram of a playback device detecting and using fingerprints according to the present invention;

          Figure 4 illustrates one example of tables/records according to the present  
30   invention.

          Figure 1a schematically illustrates generation of fingerprint(s) used as trigger marker(s) according to the present invention.

Shown is a digital or analog multimedia signal (101) comprising video and/or audio information/content, where one or more 'trigger' actions (forth denoted actions) is to be associated/related with the multimedia signal (101) at certain given 'trigger' time points (forth denoted time points). The one or more actions associated with each time point is to be available, i.e. triggered, at that given particular time point ( $T_n; T_{n+1}$ ) during playback on a playback device. The notation ' $(T_n; T_{n+1})$ ' for a given time point signifies that the time point may be either the shown time point  $T_n$  or the shown time point  $T_{n+1}$  or in general any suitable (not shown) time point of the signal (101). The associated actions of multiple time points may be the same, different and/or a mix thereof.

The action(s) to be presented/triggered at a given time point may e.g. comprise retrieving and displaying additional information on a display (e.g. presenting biography data for an actor being shown by the multimedia signal, presenting a selectable URL to a web site containing additional information, etc.), retrieving and playing additional information via a speaker, playing another multimedia signal instead of said multimedia signal (101) for a predetermined or variable period of time (e.g. a local weather forecast, a local commercial, etc.) and/or the like. Other examples of action(s) are e.g. stopping/pausing, e.g. temporarily, display/play, executing other control commands, and/or preparing the system for user input(s), e.g. once the trigger action is executed the system waits (for some time) for a specific action of the user. If the trigger action was not executed, the user input will not have any influence. For example, in interactive games the user may only submit his answer after the trigger action has fired/been executed.

For each time point ( $T_n; T_{n+1}$ ) a fingerprint (102) is generated on the basis of a part, segment, etc. (forth denoted segment) of the multimedia signal (101), where the segment of the multimedia signal (101) is unambiguously related with the given time point ( $T_n; T_{n+1}$ ). Preferably, the segment of the multimedia signal (101) is unambiguously related with the given time point ( $T_n; T_{n+1}$ ) by letting the segment of the multimedia signal (101) ending substantially at the given time point ( $T_n; T_{n+1}$ ). In alternative embodiments, the segment of the multimedia signal (101) may start substantially at the given time point ( $T_n; T_{n+1}$ ), the segment of the multimedia signal (101) is starting or ending at a predetermined distance before or after the given trigger time point ( $T_n; T_{n+1}$ ), or the given time point ( $T_n; T_{n+1}$ ) may be at a predetermined time point between a start and an end of the segment of the multimedia signal (101).

The size of the fingerprints and/or the segments may both be of a predetermined fixed size or alternatively of a variable size.



One method for computing a robust fingerprint is described in European patent application 01200505.4, although of course any method for computing a robust fingerprint can be used.

European patent application 01200505.4 describes a method that generates  
 5 robust fingerprints for multimedia content such as, for example, audio clips, where the audio clip is divided in successive (preferably overlapping) time intervals. For each time interval, the frequency spectrum is divided in bands. A robust property of each band (e.g. energy) is computed and represented by a respective fingerprint bit.

Multimedia content is thus represented by a fingerprint comprising a  
 10 concatenation of binary values, one for each time interval. The fingerprint does not need to be computed over the whole multimedia content, but can be computed when a portion of a certain length has been received. There can thus be plural fingerprints for one multimedia content, depending on which portion is used to compute the fingerprint over.

Further, video fingerprinting algorithms are known, e.g. from the following  
 15 disclosure: Job Oostveen, Ton Kalker, Jaap Haitsma: "Feature Extraction and a Database Strategy for Video Fingerprinting". 117-128. IN: Shi-Kuo Chang, Zhe Chen, Suh-Yin Lee (Eds.): Recent Advances in Visual Information Systems, 5th International Conference, VISUAL 2002 Hsin Chu, Taiwan, March 11-13, 2002, Proceedings. Lecture Notes in Computer Science 2314 Springer 2002.

20 According to the present invention, a fingerprint (102) is generated for each time point on the basis of a given segment of the multimedia signal (101) at or near the specific time point.

In this way, a given fingerprint (102) is a trigger marker enabling a very accurate and very precise location of a given time point of the signal (101) without using the  
 25 specific time point but instead using (a segment of) the signal. Further, this is enabled without changing the signal. For video fingerprinting the localisation is typically frame accurate, at least as long as any distortion of the video signal is not too severe.

After a fingerprint (102) has been generated it is stored for later use in a database, memory, storage and/or the like.

30 There are several advantages in storing fingerprints (102) for a multimedia signal (101) in a database instead of the multimedia signal itself. To name a few: The memory/storage requirements for the database are reduced.

The comparison of fingerprints is more efficient than the comparison of the multimedia signals themselves, as fingerprints are substantially shorter than the signals.

Searching in a database for a matching fingerprint is more efficient than searching for a complete multimedia signals, since it involves matching shorter items.

Searching for a matching fingerprint is more likely to be successful, as small changes to a multimedia signal (such as encoding in a different format or changing the bit rate) do not affect the fingerprint.

Alternatively, if the multimedia content is in the form of more than a single signal, e.g. a separate audio signal and a separate video signal, the fingerprint(s) (102) may be generated on the basis of a single of them (audio or video) or on both.

The generated fingerprints (102) stored in the database may then be distributed to playback devices via the Internet or in a side-channel of a broadcast channel or via some other channel or other means for use during playback according to the present invention. As other examples of distribution is e.g. physical distribution on a storage medium or in a non-electronic way, e.g. requiring the user to enter the fingerprints and actions manually into the playback device.

In a preferred embodiment, a representation of the associated action(s) is also stored for each fingerprint in the database. These representations are preferably also sent to the playback devices. In an alternative embodiment, representations are not stored in the database or used at all when generating the fingerprints. Another party may then provide the representations to the relevant playback devices as well as a relationship between each fingerprint and its associated action(s).

Figure 1b schematically illustrates detection and use of fingerprint(s) as trigger marker(s) according to the present invention. Shown is a digital or analog multimedia signal (101) comprising video and/or audio information/content, where the signal (101) is played back by a suitable playback device. Further shown is a fingerprint stream (104) that is generated continuously or substantially continuously on the basis of the multimedia signal (101). Alternatively, the fingerprint stream (104) is generated in segments. The fingerprint stream (104) (or segments) is compared with fingerprints (102) stored in a database. The stored fingerprints (102) generated as explained in connection with Figure 1a at a production site. The database preferably also comprises representations of the one or more associated actions (105) for each stored fingerprint (102). The stored fingerprints (102) are e.g. received via the Internet or in a side-channel of a broadcast channel or via some other channel or other means from the distribution site. The representations of the associated action(s) (105) may also be received like this. In an alternative embodiment, the representations as well as a

relationship between each fingerprint and its associated action(s) (105) are provided by another party.

When a match between a segment of the fingerprint stream (104) and a given fingerprint (102) in the database is found the representation(s) of the associated action(s) (105) of that particular fingerprint (102) is retrieved and executed at the appropriate time point ( $T_n; T_{n+1}$ ). When a match between a segment of the fingerprint stream (104) and a fingerprint (102) in the database, the appropriate time point ( $T_n; T_{n+1}$ ) is also determined when the fingerprints (102) have been generated as explained in connection with Figure 1a. Preferably, the given time point ( $T_n; T_{n+1}$ ) is determined by letting the segment of the multimedia signal (101) that the matching fingerprint originally has been based on during generation (according to Figure 1a) ending substantially at the given time point ( $T_n; T_{n+1}$ ). In alternative embodiments, the segment of the multimedia signal (101) may start substantially at the given time point ( $T_n; T_{n+1}$ ), the segment of the multimedia signal (101) is starting or ending at a predetermined distance before or after the given trigger time point ( $T_n; T_{n+1}$ ) or the given time point ( $T_n; T_{n+1}$ ) may be at a predetermined time point between a start and an end of the segment of the multimedia signal (101). The playback device simply needs to be aware of the relationship between a given fingerprint and the given time point used during generation.

When a matching fingerprint (102) is determined, the associated one or more actions is also retrieved. The playback device may then execute these actions or present them to a user e.g. awaiting user confirmation before executing them.

The above-mentioned European patent application 01200505.4 describes various matching strategies for matching fingerprints computed for an audio clip with fingerprints stored in a database.

Further European patent application 01202720.7 describes an efficient method of matching a fingerprint representing an unknown information signal with a plurality of fingerprints of identified information signals stored in a database to identify the unknown signal. This method uses reliability information of the extracted fingerprint bits. The fingerprint bits are determined by computing features of an information signal and thresholding said features to obtain the fingerprint bits. If a feature has a value very close to the threshold, a small change in the signal may lead to a fingerprint bit with opposite value. The absolute value of the difference between feature value and threshold is used to mark each fingerprint bit as reliable or unreliable. The reliabilities are subsequently used to improve the actual matching procedure.

A further advantage of the present invention is that if for any reason the broadcast is delayed, the fingerprint matching ensures that the trigger actions still appear at the correct corresponding moment in the broadcast since the invention is time-independent but content-dependent.

5           Figure 2 illustrates a schematic block diagram of a fingerprint generation device according to the present invention. Shown is fingerprint generation device (200) comprising a multi-media signal input module (201), a fingerprinting module (202), a data base, memory storage and/or the like (203) communicating via a bus (205) or the like under the control of one or more microprocessors (not shown). The fingerprint generation device  
10       (200) may in one embodiment optionally also comprise a transmitter and receiver (204) for communicating with other systems, devices, etc. via a wired and/or wireless network e.g. like the Internet.

          The multi-media signal input module (201) receives multimedia content e.g. in the form of an analog or digital audio and/or video signal and feeds the multimedia content to  
15       the fingerprinting module (202). The fingerprinting module (202) computes a fingerprint on the basis of the received multi-media content. A fingerprint may be derived for the entire content or for a part of the content. Alternatively, several fingerprints may be derived each from a different part. According to the present invention, a fingerprint is derived each time that a trigger action is needed, i.e. for each time point ( $T_n$ ;  $T_{n+1}$ ), as explained in connection  
20       with Figure 1a. A representation of the time point(s) is also supplied to the fingerprinting module (202).

          The fingerprinting module (202) then supplies the computed fingerprint(s) to the database (203) preferably together with the associated one or more actions for each fingerprint. As shown in Figure 4, the database (203) comprises fingerprints 'FP1', 'FP2',  
25       'FP3', 'FP4', 'FP5', etc. and respective associated actions 'A1', 'A2', 'A3', 'A4', 'A2, A1', etc.

          The database (203) can be organized in various ways to optimize query time and/or data organization. The output of the fingerprinting module (202) should be taken into account when designing the tables in the database (203). In the embodiment shown in Figure  
30       4, the database (203) comprises a single table with entries (records) comprising respective fingerprints and associated (sets) of actions.

          Figure 3 illustrates a schematic block diagram of a playback device detecting and using fingerprints according to the present invention. Shown is a playback device (300) comprising a multimedia signal receiver (301), a fingerprint detector (302), a display/play

circuit (303), a data base, memory storage and/or the like (203') communicating via a bus (205) or the like under the control of one or more microprocessors (not shown). The playback device (300) may in one embodiment optionally also comprise a transmitter and receiver (204) for communicating with other systems, devices, etc. via a wired and/or wireless network e.g. like the Internet.

The multimedia signal receiver (301) receives the multimedia signal e.g. in the form of an analog or digital audio and/or video signal to be displayed and/or played e.g. from a broadcasting cable, antenna, satellite dish, etc. arrangement (not shown). The received multimedia signal is fed to the fingerprint detector (302) that derives a fingerprint stream or segments thereof and determines if there are any matches with fingerprints stored in the database as explained in connection with Figure 1b. If a match is found then a representation of the associated action(s) is also retrieved. The appropriate time point for the associated action(s) is given by the matching fingerprint as described above.

The received multimedia signal is displayed and/or played by the a display/play circuit (303) and at the appropriate time point(s) the associated action(s) is executed or presented to a user e.g. awaiting user confirmation before executing the action(s).

Preferably, the data layout of the database (203') corresponds to the one shown in Figure 4.

The playback device (300) may also comprise a buffer mechanism (not shown) for buffering a part of the multimedia signal before displaying/playing it.

Figure 4 illustrates one example of tables/records according to the present invention. Shown is a table comprising fingerprints (102) 'FP1', 'FP2', 'FP3', 'FP4', 'FP5', etc. and respective associated actions (105) 'A1', 'A2', 'A3', 'A4', 'A2, A1', etc. One or more actions (105) are stored for each fingerprint (102). A given fingerprint (102) is only stored in the table once.

In the claims, any reference signs placed between parentheses shall not be constructed as limiting the claim. The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements.

The invention can be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer. In the device claim enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different

dependent claims does not indicate that a combination of these measures cannot be used to advantage.

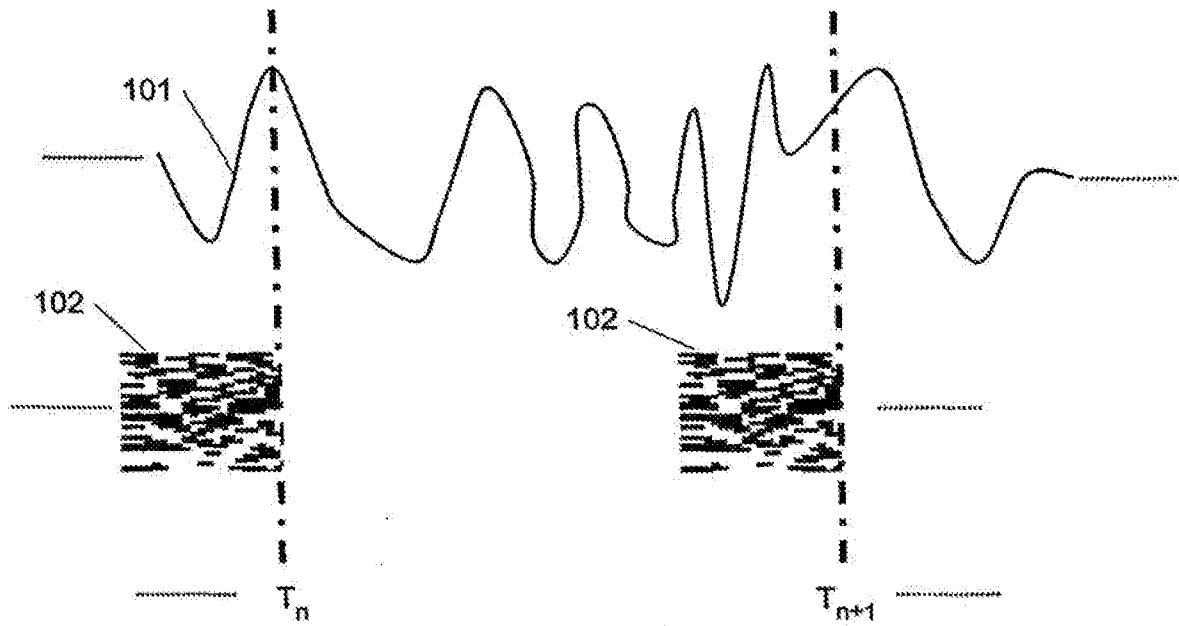
## CLAIMS

1. A method of relating one or more trigger actions with a multimedia signal, the method comprising:
  - providing at least one trigger time point ( $T_n; T_{n+1}$ ) and for each trigger time point ( $T_n; T_{n+1}$ ) providing at least one representation of least one associated trigger action, where each trigger time point ( $T_n; T_{n+1}$ ) indicates a time point of the multimedia signal for which the at least one associated trigger action is to be available during playback of the multimedia signal,
  - for each given trigger time point ( $T_n; T_{n+1}$ ) deriving a fingerprint on the basis of a segment of the multimedia signal, where the segment of the multimedia signal is associated with the given trigger time point ( $T_n; T_{n+1}$ ), and
  - associating the derived fingerprint with the at least one associated trigger action.

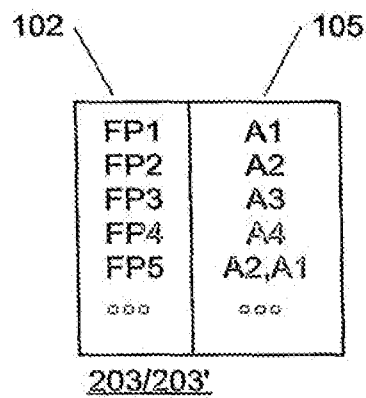
**ABSTRACT**

A device is configured to perform a method that detects a trigger marker for an action corresponding to a segment of a multimedia signal. A fingerprint is generated based on the segment of the multimedia signal at a trigger time point. The generated fingerprint is stored in a database and communicated to the device. During playback of the multimedia signal, fingerprints of segments of the multimedia signal are generated and matched against fingerprints in the database. When a match is found, one or more associated actions for the segment are retrieved by the device. The trigger time point may be determined as a time point near or at the segment of the multimedia signal with the matched fingerprint. In this way, trigger markers for actions may be enabled without modifying the multimedia signal.





**Figure 1a**



**Figure 4**

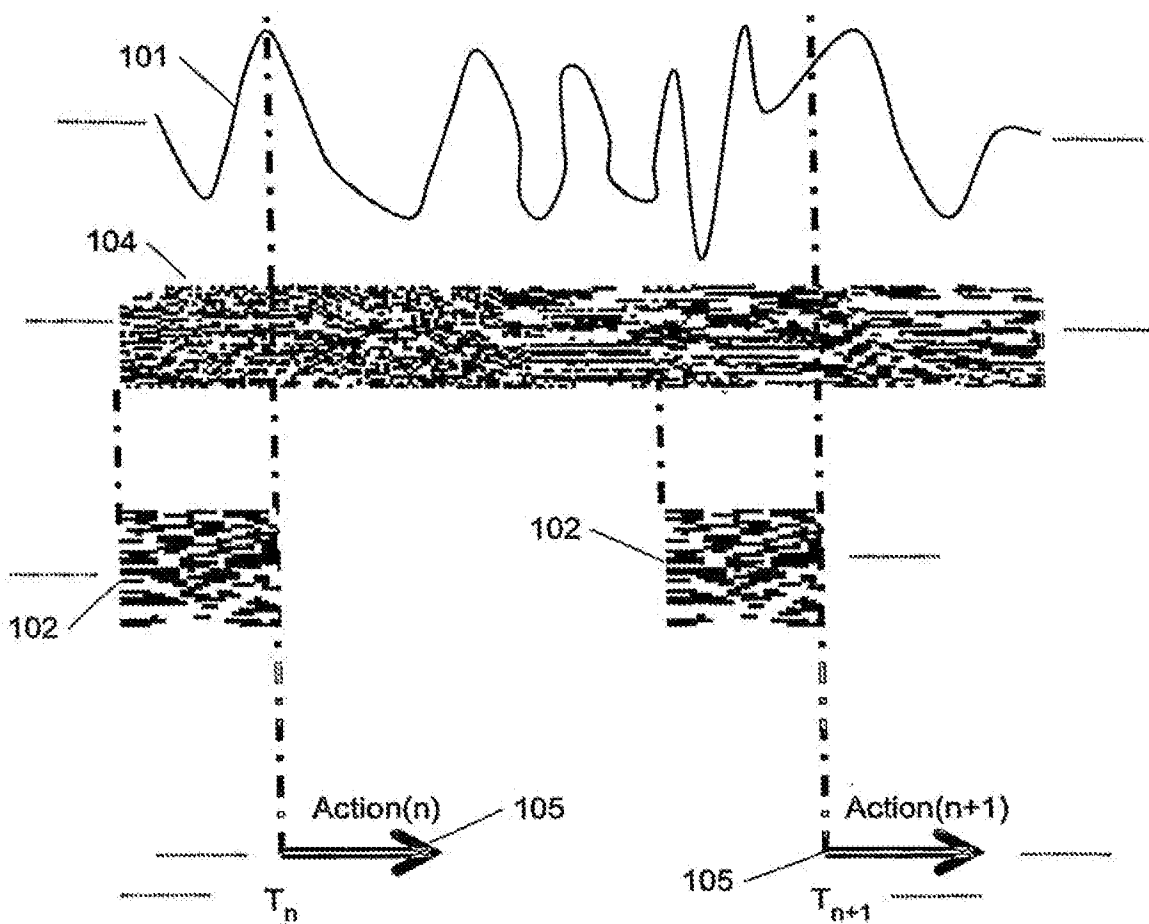
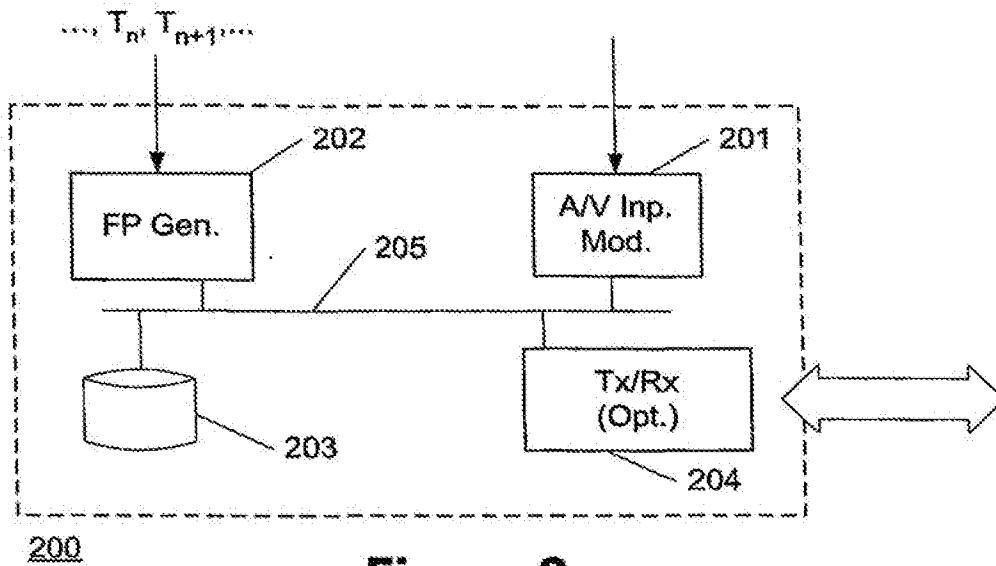
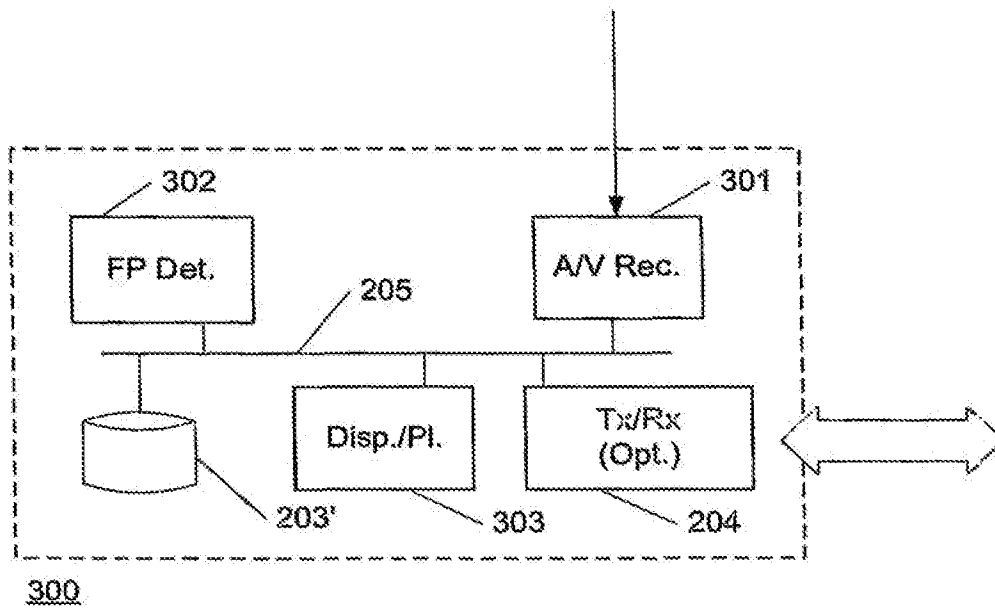


Figure 1b

**Figure 2****Figure 3**

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL			
<b>First Named Inventor/Applicant Name:</b>	Job Cornelius Oostveen			
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall			
<b>Attorney Docket Number:</b>	2167.052US3			
Filed as Large Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
Late Filing Fee for Oath or Declaration	1051	1	140	140
<b>Petition:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1740</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	17875064
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelius Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall
<b>Filer Authorized By:</b>	Gregory M. Stark
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	10-JAN-2014
<b>Filing Date:</b>	
<b>Time Stamp:</b>	09:43:14
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1740
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	Transmittal of New Application		1	1	
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	Claims		19	19	
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/151,879	01/10/2014	2178	1740	2167.052US3	1	1

CONFIRMATION NO. 4055

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## FILING RECEIPT



\*OC000000066231845\*

Date Mailed: 01/27/2014

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### Assignment For Published Patent Application

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**Power of Attorney:** None

### Domestic Priority data as claimed by applicant

This application is a CON of 13/220,267 08/29/2011  
which is a CON of 10/564,297 01/10/2006 PAT 8020000  
which is a 371 of PCT/IB2004/051128 07/05/2004

**Foreign Applications** (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)  
EUROPEAN PATENT OFFICE (EPO) 03102116.5 07/11/2003

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/151,879**

**Projected Publication Date:** 05/08/2014

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING  
AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

**Preliminary Class**

715

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875						Application or Docket Number 14/151,879				
<b>APPLICATION AS FILED - PART I</b>										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720			
TOTAL CLAIMS (37 CFR 1.16(j))	1	minus 20 = *			OR	x 80 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *				x 420 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	1600			
<b>APPLICATION AS AMENDED - PART II</b>										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3

**CONFIRMATION NO. 4055**

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## NOTICE



Date Mailed: 01/27/2014

## INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):  
Job Cornelis Oostveen  
Warner Rudolph Theophile Ten Kate  
Adrianus Johannes Maria Denissen  
David K. Roberts



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**Bescheinigung**

**Certificate**

**Attestation**

Die angehefteten Unterlagen stimmen mit der ursprünglich eingereichten Fassung der auf dem nächsten Blatt bezeichneten europäischen Patentanmeldung überein.

The attached documents are exact copies of the European patent application described on the following page, as originally filed.

Les documents fixés à cette attestation sont conformes à la version initialement déposée de la demande de brevet européen spécifiée à la page suivante.

**Patentanmeldung Nr.    Patent application No.    Demande de brevet n°**

03102116.5

Der Präsident des Europäischen Patentamts;  
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets  
p.o.

**R C van Dijk**



Anmeldung Nr:  
Application no.: 03102116.5  
Demande no:

Anmeldetag:  
Date of filing: 11.07.03  
Date de dépôt:

Anmelder/Applicant(s)/Demandeur(s):

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PAYS-BAS

Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:  
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.  
If no title is shown please refer to the description.  
Si aucun titre n'est indiqué se référer à la description.)

Method and device for generating and detecting a fingerprint functioning as a  
trigger marker in a multimedia signal

In Anspruch genommene Priorität(en) / Priority(ies) claimed /Priorité(s)  
revendiquée(s)  
Staat/Tag/Aktenzeichen/State/Date/File no./Pays/Date/Numéro de dépôt:

Internationale Patentklassifikation/International Patent Classification/  
Classification internationale des brevets:

H04N7/00

Am Anmeldetag benannte Vertragstaaten/Contracting states designated at date of  
filing/Etats contractants désignées lors du dépôt:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL  
PT RO SE SI SK TR LI



Method and device for generating and detecting a fingerprint functioning as a trigger marker in a multimedia signal

5 The invention relates to a method, and a corresponding device, of detecting trigger instants/information in a multimedia signal. The invention also relates to a method, and a corresponding device, of associating trigger information with a multimedia signal. Further, the invention relates to a computer readable medium having stored thereon instructions for causing one or more processing units to execute the method according to the invention.

10

A current trend is to enhance passive television viewing and/or music listening on a given playback device by creating more interactive programs and/or listening experiences or by “connecting” external actions to a piece of video and/or audio content. As one simple example, a commercial can be enhanced by embedding a URL to a web site with further information, where the URL can be extracted and retrieved by the playback device. In order to facilitate such a function it is necessary to enable a reliable detection of time points in a television program, a movie, a music piece, etc. where such additional information is relevant.

20 Examples of situations where such additional information is useful or interesting in connection with a broadcast program are:

25 - trigg&link: (see e.g. W. ten Kate et.al. “trigg&link – A new dimension in television program making”, Lecture Notes in computer Science, vol. 1242, pp51-65, Springer, 1997) trigg&link allows interactivity in television programs. In addition to the normal program, additional information concerning specific segments of the program is available to the viewer through a different distribution channel. At the start of a given segment that is associated with an enhancement (additional information) an icon is displayed, alerting the viewer that additional information may be viewed on his TV. For instance, at the appearance of an actor in a movie, some biographic data of the actor may be made available. In the user terminal (e.g. a set top box, etc.) the icons

are overlayed on the video at the relevant time instants, thereby requiring these instants to have been indicated in the video stream.

- Local Insertion: During a national broadcast, specific parts of the program may be replaced by a regional program in some regions. For instance, some advertisements may be replaced by advertisements for local shops, or, in a news show some regions may have their local weather forecast rather than the national one. The national program producer can indicate which segments are suitable for such local insertion. At the local redistribution site (e.g. at the cable head-end), the indicated segments may be replaced by local content.

10 In both of the above situations, it is necessary to mark or associate specific time instants in the video stream at which additional information should be available. At these time instants the receiver should be triggered to perform or provide some kind of action. This may be done by such mechanisms as DSM-CC in MPEG/DVB. However, this requires the broadcaster's cooperation to insert these triggers thereby making an  
15 enhancement service provider dependent on the broadcaster.

One previously known way of performing time marking in a video stream is e.g. using fields of the MPEG transport stream structure that can be used to hold the marking information.

20 Another previously known way is using a blanking interval. In analog distribution, the marking information can be embedded in the vertical blanking interval or in the inactive video lines.

Both of the above known ways need the cooperation of all actors in the broadcast chain to make sure that the marking information is not destroyed before the signal arrives at its destination. For instance, in case of the MPEG solution, a re-multiplexing  
25 operation could easily remove information that is written in the user data fields in the stream. Moreover, every decoding and successive re-encoding step would certainly not retain this information. In case of the use of the vertical blanking for carrying the trigger information, the situation is even more difficult, as actors in the broadcast chain might write other information at the same position (the vertical blanking is used for many things and there is no  
30 uniform agreement about the control over usage of the blanking interval). Also, standards converters (like PAL-NTSC) and other equipment in the broadcast chain may not retain all information in the vertical blanking interval.

Yet another way is using watermarking. A watermark may be embedded in the video frames at the relevant time instants. The Philips Watercast System is, among others,

being sold for this purpose. A disadvantage of watermarking is the fact that it necessarily changes the video/audio.

5                   It is an object of the invention to provide a method and corresponding device of relating one or more trigger actions with a multimedia signal and corresponding method and device for detecting one or more trigger actions in a multimedia signal that solves the above-mentioned problems. A further object is to provide this in a simple and efficient way. Another object is to enable simple, reliable and accurate localisation of a given part of a  
10 multimedia signal. A further object is to enable detection of trigger actions without modifying the multimedia signal.

                  This is achieved by a method (and corresponding device) of relating one or more trigger actions with a multimedia signal, the method comprising the steps of

- providing at least one trigger time point and for each trigger time point providing at  
15 least one representation of least one associated trigger action, where each trigger time point indicates a time point of the multimedia signal for which the at least one associated trigger action is to be available during playback of the multimedia signal, and
- for each given trigger time point deriving a fingerprint on the basis of a segment of  
20 the multimedia signal, where the segment of the multimedia signal is unambiguously related with the given trigger time point,
- and by a method (and corresponding device) of detecting one or more trigger actions in a multimedia signal, the method comprising the steps of:
  - generating a fingerprint stream on the basis of the multimedia signal,
  - 25 - comparing a segment of the fingerprint stream with one or more fingerprints stored in a second database in order to determine if a match exists or not between the segment and a fingerprint in the second database, the second database further comprising for each stored fingerprint at least one representation of at least one associated action, and
  - 30 - if a match exists retrieving the at least one representation of the at least one associated action associated with the matching fingerprint.

                  In this way, a simple and efficient way of handling time markers in a multimedia signal for given actions is obtained. A fingerprint thereby serves as a trigger of a particular action, event, etc. associated with a particular point in time of the multimedia

signal. Further, this is enabled without the multimedia signal needing to be modified. Additionally, the time marking detection is time independent as it is dependent on the specific content of the multimedia signal only thereby avoiding problems if a multimedia signal being a television program or the like is delayed.

5                   A fingerprint of a multimedia object/content/signal is a representation of perceptual features of the object/content/signal part in question. Such fingerprints are sometimes also known as “(robust) hashes”. More specifically, a fingerprint of a piece of audio or video is an identifier which is computed over that piece of audio or video and which does not change even if the content involved is subsequently transcoded, filtered or otherwise  
10                   modified.

                  Preferably, the derived fingerprint is an audio and/or video fingerprint. Alternatively, animations and/or streaming text, etc. is used as a source for creating a fingerprint.

                  Advantageous embodiments of the methods and devices according to the  
15                   present invention are defined in the sub-claims.

                  Further, the invention also relates to a computer readable medium having stored thereon instructions for causing one or more processing units to execute the method according to the present invention.

20

                  Figure 1a schematically illustrates generation of fingerprint(s) used as trigger marker(s) according to the present invention.

                  Figure 1b schematically illustrates detection and use of fingerprint(s) as trigger marker(s) according to the present invention.

25                   Figure 2 illustrates a schematic block diagram of a fingerprint generation device according to the present invention;

                  Figure 3 illustrates a schematic block diagram of a playback device detecting and using fingerprints according to the present invention;

                  Figure 4 illustrates one example of tables/records according to the present  
30                   invention.

                  Figure 1a schematically illustrates generation of fingerprint(s) used as trigger marker(s) according to the present invention.

Shown is a digital or analog multimedia signal (101) comprising video and/or audio information/content, where one or more 'trigger' actions (forth denoted actions) is to be associated/related with the multimedia signal (101) at certain given 'trigger' time points (forth denoted time points). The one or more actions associated with each time point is to be available, i.e. triggered, at that given particular time point ( $T_n; T_{n+1}$ ) during playback on a playback device. The notation ' $(T_n; T_{n+1})$ ' for a given time point signifies that the time point may be either the shown time point  $T_n$  or the shown time point  $T_{n+1}$  or in general any suitable (not shown) time point of the signal (101). The associated actions of multiple time points may be the same, different and/or a mix thereof.

The action(s) to be presented/triggered at a given time point may e.g. comprise retrieving and displaying additional information on a display (e.g. presenting biography data for an actor being shown by the multimedia signal, presenting a selectable URL to a web site containing additional information, etc.), retrieving and playing additional information via a speaker, playing another multimedia signal instead of said multimedia signal (101) for a predetermined or variable period of time (e.g. a local weather forecast, a local commercial, etc.) and/or the like. Other examples of action(s) are e.g. stopping/pausing, e.g. temporarily, display/play, executing other control commands, and/or preparing the system for user input(s), e.g. once the trigger action is executed the system waits (for some time) for a specific action of the user. If the trigger action was not executed, the user input will not have any influence. For example, in interactive games the user may only submit his answer after the trigger action has fired/been executed.

For each time point ( $T_n; T_{n+1}$ ) a fingerprint (102) is generated on the basis of a part, segment, etc. (forth denoted segment) of the multimedia signal (101), where the segment of the multimedia signal (101) is unambiguously related with the given time point ( $T_n; T_{n+1}$ ). Preferably, the segment of the multimedia signal (101) is unambiguously related with the given time point ( $T_n; T_{n+1}$ ) by letting the segment of the multimedia signal (101) ending substantially at the given time point ( $T_n; T_{n+1}$ ). In alternative embodiments, the segment of the multimedia signal (101) may start substantially at the given time point ( $T_n; T_{n+1}$ ), the segment of the multimedia signal (101) is starting or ending at a predetermined distance before or after the given trigger time point ( $T_n; T_{n+1}$ ), or the given time point ( $T_n; T_{n+1}$ ) may be at a predetermined time point between a start and an end of the segment of the multimedia signal (101).

The size of the fingerprints and/or the segments may both be of a predetermined fixed size or alternatively of a variable size.

One method for computing a robust fingerprint is described in European patent application 01200505.4, although of course any method for computing a robust fingerprint can be used.

European patent application 01200505.4 describes a method that generates  
5 robust fingerprints for multimedia content such as, for example, audio clips, where the audio clip is divided in successive (preferably overlapping) time intervals. For each time interval, the frequency spectrum is divided in bands. A robust property of each band (e.g. energy) is computed and represented by a respective fingerprint bit.

Multimedia content is thus represented by a fingerprint comprising a  
10 concatenation of binary values, one for each time interval. The fingerprint does not need to be computed over the whole multimedia content, but can be computed when a portion of a certain length has been received. There can thus be plural fingerprints for one multimedia content, depending on which portion is used to compute the fingerprint over.

Further, video fingerprinting algorithms are known, e.g. from the following  
15 disclosure: Job Oostveen, Ton Kalker, Jaap Haitsma: "Feature Extraction and a Database Strategy for Video Fingerprinting". 117-128. IN: Shi-Kuo Chang, Zhe Chen, Suh-Yin Lee (Eds.): Recent Advances in Visual Information Systems, 5th International Conference, VISUAL 2002 Hsin Chu, Taiwan, March 11-13, 2002, Proceedings. Lecture Notes in Computer Science 2314 Springer 2002.

20 According to the present invention, a fingerprint (102) is generated for each time point on the basis of a given segment of the multimedia signal (101) at or near the specific time point.

In this way, a given fingerprint (102) is a trigger marker enabling a very accurate and very precise location of a given time point of the signal (101) without using the  
25 specific time point but instead using (a segment of) the signal. Further, this is enabled without changing the signal. For video fingerprinting the localisation is typically frame accurate, at least as long as any distortion of the video signal is not too severe.

After a fingerprint (102) has been generated it is stored for later use in a database, memory, storage and/or the like.

30 There are several advantages in storing fingerprints (102) for a multimedia signal (101) in a database instead of the multimedia signal itself. To name a few: The memory/storage requirements for the database are reduced.

The comparison of fingerprints is more efficient than the comparison of the multimedia signals themselves, as fingerprints are substantially shorter than the signals.

Searching in a database for a matching fingerprint is more efficient than searching for a complete multimedia signals, since it involves matching shorter items.

Searching for a matching fingerprint is more likely to be successful, as small changes to a multimedia signal (such as encoding in a different format or changing the bit rate) do not affect the fingerprint.

Alternatively, if the multimedia content is in the form of more than a single signal, e.g. a separate audio signal and a separate video signal, the fingerprint(s) (102) may be generated on the basis of a single of them (audio or video) or on both.

The generated fingerprints (102) stored in the database may then be distributed to playback devices via the Internet or in a side-channel of a broadcast channel or via some other channel or other means for use during playback according to the present invention. As other examples of distribution is e.g. physical distribution on a storage medium or in a non-electronic way, e.g. requiring the user to enter the fingerprints and actions manually into the playback device.

In a preferred embodiment, a representation of the associated action(s) is also stored for each fingerprint in the database. These representations are preferably also sent to the playback devices. In an alternative embodiment, representations are not stored in the database or used at all when generating the fingerprints. Another party may then provide the representations to the relevant playback devices as well as a relationship between each fingerprint and its associated action(s).

Figure 1b schematically illustrates detection and use of fingerprint(s) as trigger marker(s) according to the present invention. Shown is a digital or analog multimedia signal (101) comprising video and/or audio information/content, where the signal (101) is played back by a suitable playback device. Further shown is a fingerprint stream (104) that is generated continuously or substantially continuously on the basis of the multimedia signal (101). Alternatively, the fingerprint stream (104) is generated in segments. The fingerprint stream (104) (or segments) is compared with fingerprints (102) stored in a database. The stored fingerprints (102) generated as explained in connection with Figure 1a at a production site. The database preferably also comprises representations of the one or more associated actions (105) for each stored fingerprint (102). The stored fingerprints (102) are e.g. received via the Internet or in a side-channel of a broadcast channel or via some other channel or other means from the distribution site. The representations of the associated action(s) (105) may also be received like this. In an alternative embodiment, the representations as well as a

relationship between each fingerprint and its associated action(s) (105) are provided by another party.

When a match between a segment of the fingerprint stream (104) and a given fingerprint (102) in the database is found the representation(s) of the associated action(s) (105) of that particular fingerprint (102) is retrieved and executed at the appropriate time point ( $T_n; T_{n+1}$ ). When a match between a segment of the fingerprint stream (104) and a fingerprint (102) in the database, the appropriate time point ( $T_n; T_{n+1}$ ) is also determined when the fingerprints (102) have been generated as explained in connection with Figure 1a. Preferably, the given time point ( $T_n; T_{n+1}$ ) is determined by letting the segment of the multimedia signal (101) that the matching fingerprint originally has been based on during generation (according to Figure 1a) ending substantially at the given time point ( $T_n; T_{n+1}$ ). In alternative embodiments, the segment of the multimedia signal (101) may start substantially at the given time point ( $T_n; T_{n+1}$ ), the segment of the multimedia signal (101) is starting or ending at a predetermined distance before or after the given trigger time point ( $T_n; T_{n+1}$ ) or the given time point ( $T_n; T_{n+1}$ ) may be at a predetermined time point between a start and an end of the segment of the multimedia signal (101). The playback device simply needs to be aware of the relationship between a given fingerprint and the given time point used during generation.

When a matching fingerprint (102) is determined, the associated one or more actions is also retrieved. The playback device may then execute these actions or present them to a user e.g. awaiting user confirmation before executing them.

The above-mentioned European patent application 01200505.4 describes various matching strategies for matching fingerprints computed for an audio clip with fingerprints stored in a database.

Further European patent application 01202720.7 describes an efficient method of matching a fingerprint representing an unknown information signal with a plurality of fingerprints of identified information signals stored in a database to identify the unknown signal. This method uses reliability information of the extracted fingerprint bits. The fingerprint bits are determined by computing features of an information signal and thresholding said features to obtain the fingerprint bits. If a feature has a value very close to the threshold, a small change in the signal may lead to a fingerprint bit with opposite value. The absolute value of the difference between feature value and threshold is used to mark each fingerprint bit as reliable or unreliable. The reliabilities are subsequently used to improve the actual matching procedure.



A further advantage of the present invention is that if for any reason the broadcast is delayed, the fingerprint matching ensures that the trigger actions still appear at the correct corresponding moment in the broadcast since the invention is time-independent but content-dependent.

5                Figure 2 illustrates a schematic block diagram of a fingerprint generation device according to the present invention. Shown is fingerprint generation device (200) comprising a multi-media signal input module (201), a fingerprinting module (202), a data base, memory storage and/or the like (203) communicating via a bus (205) or the like under the control of one or more microprocessors (not shown). The fingerprint generation device  
10 (200) may in one embodiment optionally also comprise a transmitter and receiver (204) for communicating with other systems, devices, etc. via a wired and/or wireless network e.g. like the Internet.

              The multi-media signal input module (201) receives multimedia content e.g. in the form of an analog or digital audio and/or video signal and feeds the multimedia content to  
15 the fingerprinting module (202). The fingerprinting module (202) computes a fingerprint on the basis of the received multi-media content. A fingerprint may be derived for the entire content or for a part of the content. Alternatively, several fingerprints may be derived each from a different part. According to the present invention, a fingerprint is derived each time that a trigger action is needed, i.e. for each time point ( $T_n$ ;  $T_{n+1}$ ), as explained in connection  
20 with Figure 1a. A representation of the time point(s) is also supplied to the fingerprinting module (202).

              The fingerprinting module (202) then supplies the computed fingerprint(s) to the database (203) preferably together with the associated one or more actions for each fingerprint. As shown in Figure 4, the database (203) comprises fingerprints 'FP1', 'FP2',  
25 'FP3', 'FP4', 'FP5', etc. and respective associated actions 'A1', 'A2', 'A3', 'A4', 'A2, A1', etc.

              The database (203) can be organized in various ways to optimize query time and/or data organization. The output of the fingerprinting module (202) should be taken into account when designing the tables in the database (203). In the embodiment shown in Figure  
30 4, the database (203) comprises a single table with entries (records) comprising respective fingerprints and associated (sets) of actions.

              Figure 3 illustrates a schematic block diagram of a playback device detecting and using fingerprints according to the present invention. Shown is a playback device (300) comprising a multimedia signal receiver (301), a fingerprint detector (302), a display/play

circuit (303), a data base, memory storage and/or the like (203') communicating via a bus (205) or the like under the control of one or more microprocessors (not shown). The playback device (300) may in one embodiment optionally also comprise a transmitter and receiver (204) for communicating with other systems, devices, etc. via a wired and/or wireless  
5 network e.g. like the Internet.

The multimedia signal receiver (301) receives the multimedia signal e.g. in the form of an analog or digital audio and/or video signal to be displayed and/or played e.g. from a broadcasting cable, antenna, satellite dish, etc. arrangement (not shown). The received multimedia signal is fed to the fingerprint detector (302) that derives a fingerprint stream or  
10 segments thereof and determines if there are any matches with fingerprints stored in the database as explained in connection with Figure 1b. If a match is found then a representation of the associated action(s) is also retrieved. The appropriate time point for the associated action(s) is given by the matching fingerprint as described above.

The received multimedia signal is displayed and/or played by the a  
15 display/play circuit (303) and at the appropriate time point(s) the associated action(s) is executed or presented to a user e.g. awaiting user confirmation before executing the action(s).

Preferably, the data layout of the database (203') corresponds to the one shown in Figure 4.

The playback device (300) may also comprise a buffer mechanism (not  
20 shown) for buffering a part of the multimedia signal before displaying/playing it.

Figure 4 illustrates one example of tables/records according to the present invention. Shown is a table comprising fingerprints (102) 'FP1', 'FP2', 'FP3', 'FP4', 'FP5', etc. and respective associated actions (105) 'A1', 'A2', 'A3', 'A4', 'A2, A1', etc. One or more actions (105) are stored for each fingerprint (102). A given fingerprint (102) is only  
25 stored in the table once.

In the claims, any reference signs placed between parentheses shall not be constructed as limiting the claim. The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements.

30 The invention can be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer. In the device claim enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different

PHNL030807EPP

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11.07.2003

dependent claims does not indicate that a combination of these measures cannot be used to advantage.

## CLAIMS:

1. A method of relating one or more trigger actions with a multimedia signal (101), the method comprising the steps of
  - providing at least one trigger time point ( $T_n$ ;  $T_{n+1}$ ) and for each trigger time point ( $T_n$ ;  $T_{n+1}$ ) providing at least one representation of least one associated trigger action (105),  
5 where each trigger time point ( $T_n$ ;  $T_{n+1}$ ) indicates a time point of the multimedia signal (101) for which the at least one associated trigger action is to be available during playback of the multimedia signal (101), and
  - for each given trigger time point ( $T_n$ ;  $T_{n+1}$ ) deriving a fingerprint (102) on the basis of a segment of the multimedia signal (101), where the segment of the multimedia signal  
10 (101) is unambiguously related with the given trigger time point ( $T_n$ ;  $T_{n+1}$ ).
2. A method according to claim 1, characterized in that the method further comprises for each obtained trigger time point ( $T_n$ ;  $T_{n+1}$ ), storing the derived fingerprint (102) and the at least one representation of the at least one associated trigger action (105) in a first  
15 database (203).
3. A method according to claims 1, 2, characterized in that the one or more derived fingerprints (102) and/or the at least one representation of at least one associated trigger action (105) for the multimedia signal (101) is transmitted to a playback-device (300)  
20 via the Internet or in a side-channel of a broadcast channel or via some other channel or means.
4. A method according to claims 1 to 3, characterized in that the segment of the multimedia signal (101) is unambiguously related with the given trigger time point ( $T_n$ ;  $T_{n+1}$ )  
25 according to:
  - the segment of the multimedia signal (101) ending substantially at the given trigger time point ( $T_n$ ;  $T_{n+1}$ ),
  - the segment of the multimedia signal (101) starting substantially at the given trigger time point ( $T_n$ ;  $T_{n+1}$ ),

- the segment of the multimedia signal (101) starting or ending at a predetermined distance before or after the given trigger time point ( $T_n$ ;  $T_{n+1}$ ), or
- the given trigger time point ( $T_n$ ;  $T_{n+1}$ ) being at a predetermined time point between a start and an end of the segment of the multimedia signal (101).

5

5. A method of detecting one or more trigger actions in a multimedia signal (101), the method comprising the steps of:

- generating a fingerprint stream (104) on the basis of the multimedia signal (101),
- comparing a segment of the fingerprint stream (104) with one or more fingerprints (102) stored in a second database (203') in order to determine if a match exists or not between the segment and a fingerprint (102) in the second database (203'), the second database (203') further comprising for each stored fingerprint (102) at least one representation of at least one associated action (105), and
- if a match exists retrieving the at least one representation of the at least one associated action (105) associated with the matching fingerprint (102).

6. A method according to claim 5, characterized in that said method further comprises the step of: executing the at least one associated action (105) associated with the matching fingerprint (102) at an appropriate trigger time point ( $T_n$ ;  $T_{n+1}$ ).

20

7. A method according to claim 6, characterized in that the appropriate trigger time point ( $T_n$ ;  $T_{n+1}$ ) is given by an unambiguously relation with a segment of a multimedia signal (101) used during generation of the matching fingerprint (102).

8. A method according to claims 1 to 4 or claims 5 to 7, characterized in that said multimedia signal (101) is an audio signal, a video signal or a combined audio/video signal.

9. A method according to claims 1 to 4 or claims 5 to 8, characterized in that said at least one associated trigger action (105) is selected from the group of:

- retrieving and displaying additional information on a display,
- retrieving and playing additional information via a speaker,
- playing another multimedia signal instead of said multimedia signal (101) for a predetermined or variable period of time,
- stopping/pausing, e.g. temporarily, display/play,

30

- executing other control commands, and/or
- preparing the system for user inputs.

10. A method according to claims 1 to 4 or claims 5 to 9, characterized in that the  
5 derived fingerprint (102) and/or the fingerprint (102) in the second database (203') is an audio and/or video fingerprint (102).

11. A multimedia device (200) for relating one or more trigger actions with a multimedia signal (101), the device comprising  
10 - means (202; 204) for providing at least one trigger time point ( $T_n$ ;  $T_{n+1}$ ) and for each trigger time point ( $T_n$ ;  $T_{n+1}$ ) providing at least one representation of at least one associated trigger action (105), where each trigger time point ( $T_n$ ;  $T_{n+1}$ ) indicates a time point of the multimedia signal (101) for which the at least one associated trigger action is to be available during playback of the multimedia signal (101), and  
15 - a fingerprint generator (202) adapted to for each given trigger time point ( $T_n$ ;  $T_{n+1}$ ) deriving a fingerprint (102) on the basis of a segment of the multimedia signal (101), where the segment of the multimedia signal (101) is unambiguously related with the given trigger time point ( $T_n$ ;  $T_{n+1}$ ).

20 12. A device according to claim 11, characterized in that the device further comprises a first database (203) having stored the derived fingerprint (102) and the at least one representation of the at least one associated trigger action (105) for each obtained trigger time point ( $T_n$ ;  $T_{n+1}$ ).

25 13. A device according to claims 11, 12, characterized in that the device further comprises a transmitter (204) for transmitting the one or more derived fingerprints (102) and/or the at least one representation of at least one associated trigger action (105) for the multimedia signal (101) to a playback-device (300) via the Internet or in a side-channel of a broadcast channel or via some other channel or means.

30 14. A device according to claims 11 to 13, characterized in that the segment of the multimedia signal (101) is unambiguously related with the given trigger time point ( $T_n$ ;  $T_{n+1}$ ) according to:

- the segment of the multimedia signal (101) ending substantially at the given trigger time point ( $T_n; T_{n+1}$ ),
  - the segment of the multimedia signal (101) starting substantially at the given trigger time point ( $T_n; T_{n+1}$ ),
  - 5 - the segment of the multimedia signal (101) starting or ending at a predetermined distance before or after the given trigger time point ( $T_n; T_{n+1}$ ), or
  - the given trigger time point ( $T_n; T_{n+1}$ ) being at a predetermined time point between a start and an end of the segment of the multimedia signal (101).
- 10 15. A audio and/or video playback device (300) for detecting one or more trigger actions in a multimedia signal (101) comprising:
- means (302) for generating a fingerprint stream (104) on the basis of the multimedia signal (101),
  - means (302) for comparing a segment of the fingerprint stream (104) with one or
  - 15 more fingerprints (102) stored in a second database (203') in order to determine if a match exists or not between the segment and a fingerprint (102) in the second database (203'), the second database (203') further comprising for each stored fingerprint (102) at least one representation of at least one associated action (105), and
  - 20 - means (302) for, if a match exists, retrieving the at least one representation of the at least one associated action (105) associated with the matching fingerprint (102).
16. A device according to claim 15, characterized in that said device further comprises: means (303) for executing the at least one associated action (105) associated with
- 25 the matching fingerprint (102) at an appropriate trigger time point ( $T_n; T_{n+1}$ ).
17. A device according to claim 16, characterized in that the appropriate trigger time point ( $T_n; T_{n+1}$ ) is given by an unambiguously relation with a segment of a multimedia signal (101) used during generation of the matching fingerprint (102).
- 30 18. A device according to claims 11 to 14 or claims 15 to 17, characterized in that said multimedia signal (101) is an audio signal, a video signal or a combined audio/video signal.

19. A device according to claims 11 to 14 or claims 15 to 18, characterized in that said at least one associated trigger action (105) is selected from the group of:

- retrieving and displaying additional information on a display,
- retrieving and playing additional information via a speaker,
- 5 - playing another multimedia signal instead of said multimedia signal (101) for a predetermined or variable period of time,
- stopping/pausing, e.g. temporarily, display/play,
- executing other control commands, and/or
- prepairing the system for user inputs.

10

20. A device according to claims 11 to 14 or claims 15 to 19, characterized in that the derived fingerprint (102) and/or the fingerprint (102) in the second database (203') is an audio and/or video fingerprint (102).

15 21. A computer readable medium having stored thereon instructions for causing one or more processing units to execute the method according to any one of claims 1 to 4 or any one of claims 5 to 10.



1/3

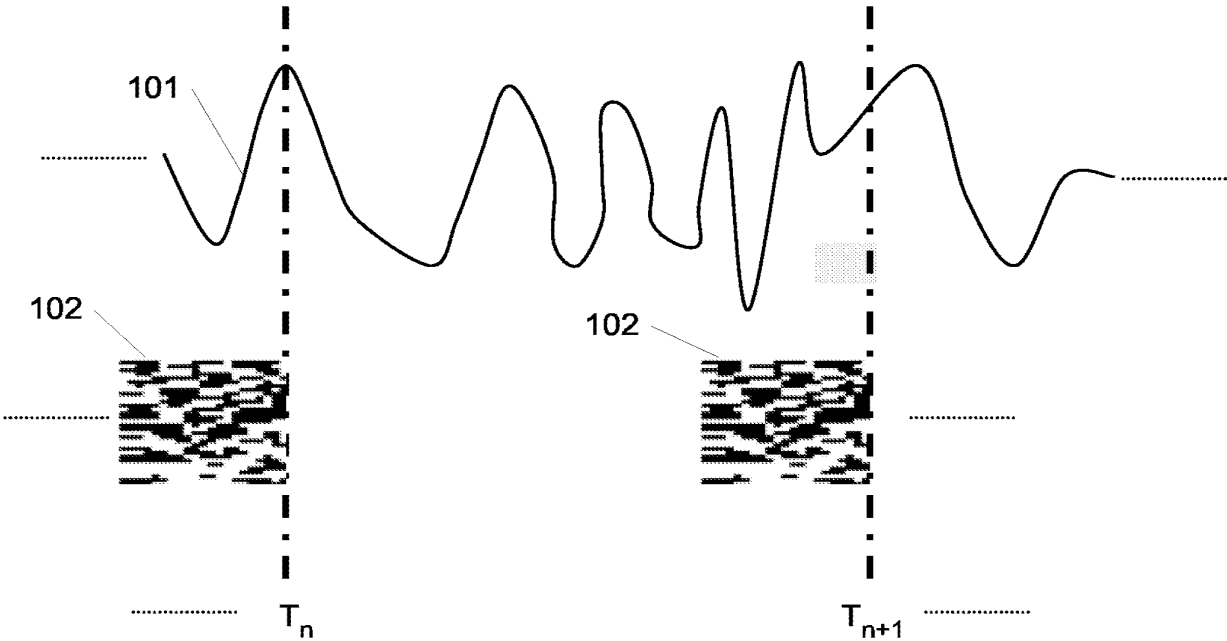


Figure 1a

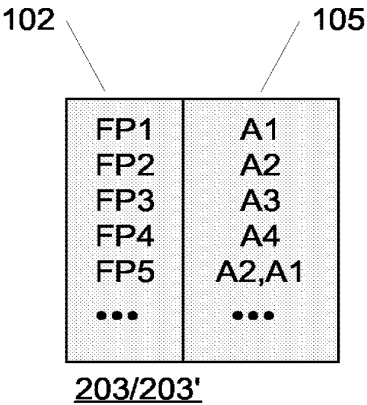


Figure 4

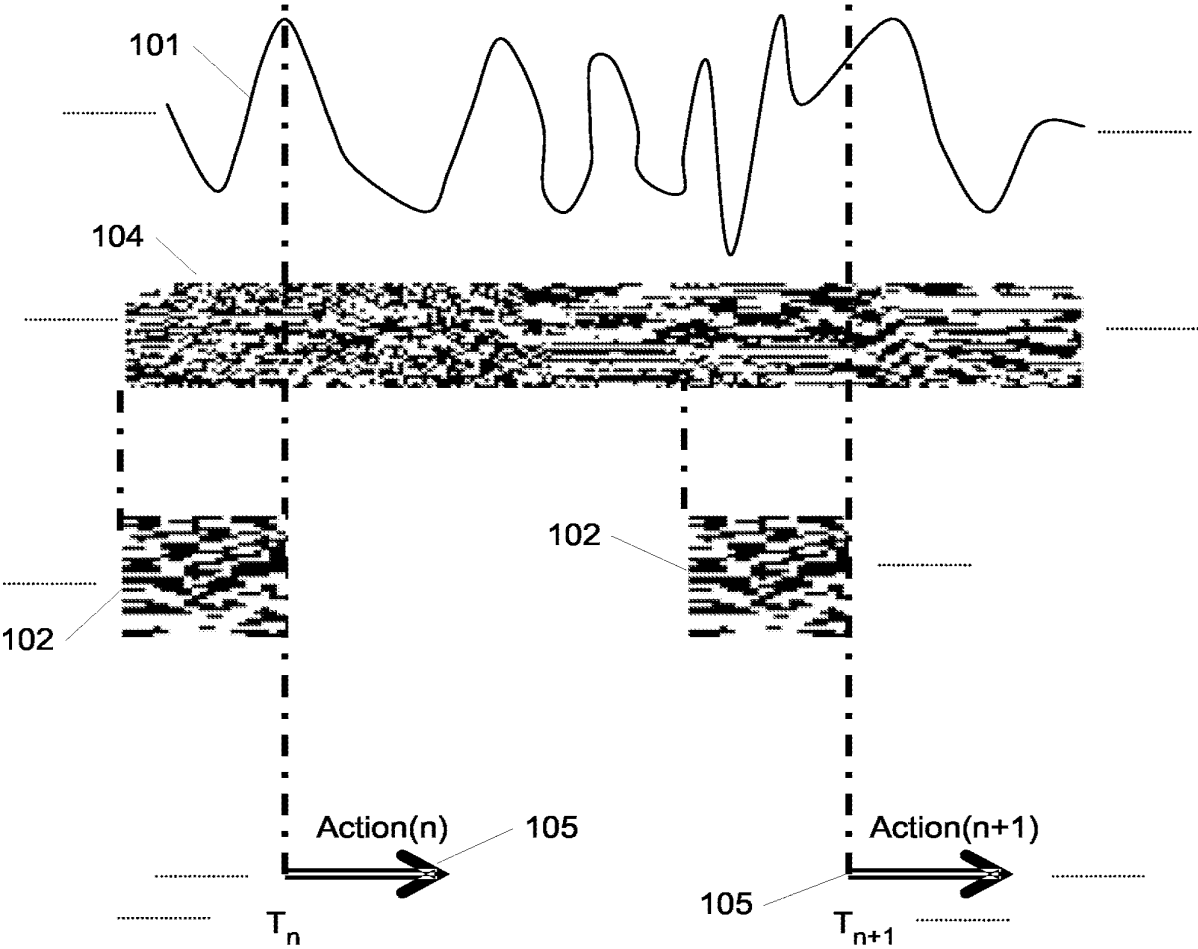
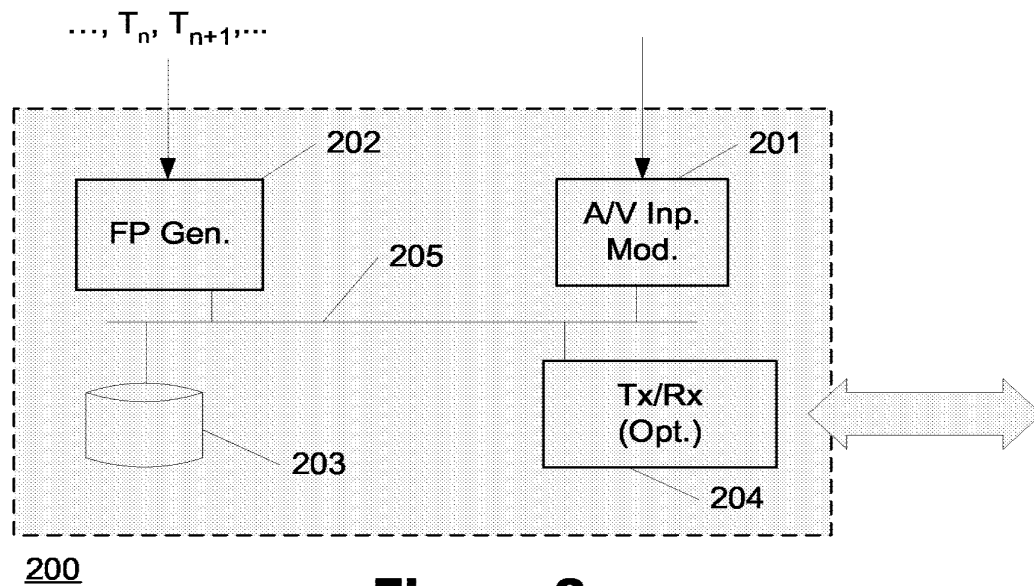
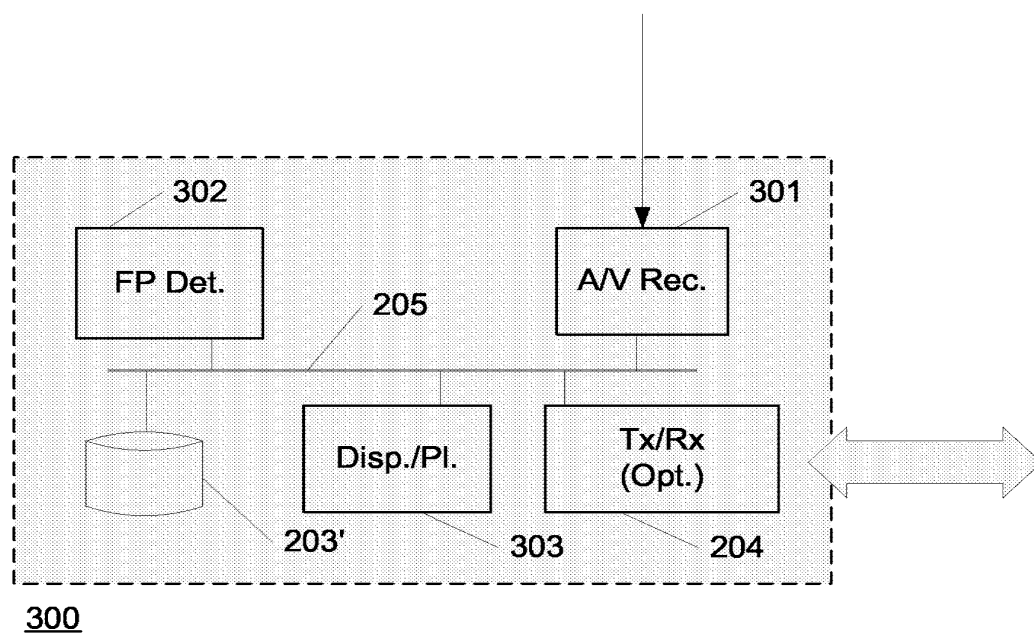


Figure 1b

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**Figure 2****Figure 3**

## ABSTRACT:

This invention relates to a device and a method of relating one or more trigger actions with a multimedia signal and corresponding method and device for detecting one or more trigger actions in a multimedia signal. One fingerprint is generated on the basis of a segment of the multimedia signal at each trigger time point. The generated fingerprint(s) is  
5 stored in a database and communicated to playback devices. During playback fingerprints of the multimedia signal are generated and matched against fingerprints in the database. When a match is found, associated trigger actions is retrieved. The trigger time point is determined as a time point near or at a segment of the multimedia signal that caused a fingerprint to match.

In this way, a simple and reliable way of detecting trigger markers for trigger  
10 actions is enabled without modifying the multimedia signal.

Figure 1b

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	14/151,879
	<b>Filing Date</b>	January 10, 2014
	<b>First Named Inventor</b>	Job Cornelis Oostveen
	<b>Group Art Unit</b>	2178
	<b>Examiner Name</b>	Unknown
Sheet 1 of 3		Attorney Docket No: 2167.052US3

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	"Application Serial No. 10/564,297, Examiner Interview Summary 10-12-10", 4 pgs	
	"Application Serial No. 10/564,297, Examiner Interview Summary mailed 10-12-10", 1 pg	
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	<b>Application Number</b>	14/151,879
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	<b>First Named Inventor</b>	Job Cornelis Oostveen
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Sheet 3 of 3		Attorney Docket No: 2167.052US3

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IPR2020-00216

Gracenote EX2009 Page 59

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
23 August 2001 (23.08.2001)

PCT

(10) International Publication Number  
**WO 01/61987 A2**

(51) International Patent Classification<sup>7</sup>: **H04N**  
(21) International Application Number: PCT/US01/40013  
(22) International Filing Date: 1 February 2001 (01.02.2001)  
(25) Filing Language: English  
(26) Publication Language: English  
(30) Priority Data:  
09/505,080 16 February 2000 (16.02.2000) US  
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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

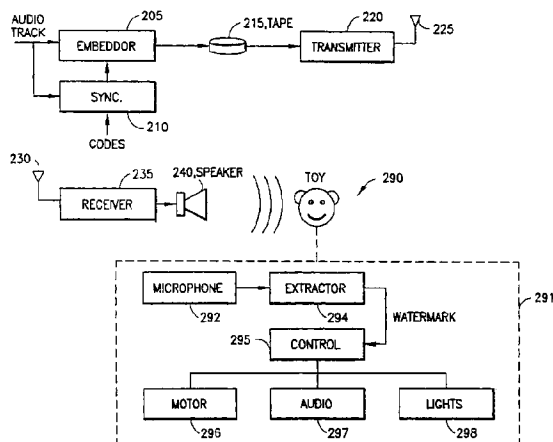
**Published:**

— without international search report and to be republished upon receipt of that report

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(54) Title: REMOTE CONTROL SIGNALING USING AUDIO WATERMARKS



(57) Abstract: A system for using a watermark embedded in an audio signal to remotely control a device (290). Various devices such as toys, computers, and appliances, equipped with an appropriate detector (292), detect the hidden signals, which can trigger an action, or change a state of the device. The watermarks can be used with a "time gate" device, where detection of the watermark opens a time interval within which a user is allowed to perform an action, such as pressing a button, typing in an answer, turning a key in a lock, etc. To prevent fraudulent activation of a time gate, the time gate device can be configured to react only to watermarks coming from live broadcasts, and not from replays from tapes or other storage devices. In another feature, robustness of the watermark is improved, e.g., for acoustic propagation channels, by shifting the detection time of the watermark based on a measured bit error count of the watermark. Furthermore, the watermark may be inserted before the desired action along with corresponding offset information if the audio signal is not suitable at the time of the action.

WO 01/61987 A2



## REMOTE CONTROL SIGNALING USING AUDIO WATERMARKS

## BACKGROUND OF THE INVENTION

The present invention relates to a method and apparatus for remotely controlling a device, such as a toy, lock, smart card, or home appliance, via a control message that is imperceptibly embedded in an audio signal, e.g., as a "watermark". Moreover, the invention optionally enables the device to be synchronized with the audio signal, for example, so that the actions of a doll can be synchronized with a children's television program.

Audio signals are ubiquitous, being broadcast over AM/FM radio, TV, public announcement systems, transmitted over telephone channels, or stored on cassette tapes, CDs, computer memories, etc. Therefore, it is convenient to use audio channels or audio storage to transmit or store some other information.

Audio watermarking, or embedded signaling, has recently emerged as a technology for embedding auxiliary data imperceptibly in a host audio signal. A basic feature of audio watermarking techniques is that the embedded signal is substantially imperceptible to a listener of the host signal. Furthermore, the audio-watermarks occupy the same time/frequency/space domain as the host signal, so that they are not lost in standard audio signal processing, recording or

transmissions, nor filtering and/or masking operations in a deliberate attack can remove them.

5 A primary proposed use of watermarking is in protecting intellectual property rights, e.g., through copy control, automatic broadcast monitoring, ownership dispute resolution, Internet commerce tracking, etc. Alternative applications include auxiliary data embedding, such as the song title and purchasing instructions, assurance of content integrity, proof of performance in TV and radio advertisements, audience exposure monitoring, caller identification (authentication) in telephone conversations, or generic covert communication.

15 Moreover, various schemes have been proposed for sending command and control signals, or their equivalent, concurrently with audio signals. However, these schemes do not qualify as audio watermarking techniques. For example, in one proposed scheme, an "instructional signal" is inserted in a narrow frequency band set aside at the upper frequency edge of the audio spectrum. However, this system does not qualify as a watermarking system since the host and the control signals occupy distinct frequency bands.

20 In another proposed scheme, a unique code describing an offer for products and services is transmitted by a TV program as an audible "beep". There is no attempt to hide this beep, so this technique also is not audio watermarking.

25 In yet another proposed scheme, information related to a TV game show is encoded in touch tones and

30

broadcast in-band with an audio portion of the show. The touch-tones can be masked by the show's usual sound effects, such as buzzers and beeps. This is substantially different from the watermarking approach, because it cannot simultaneously meet the inaudibility requirement and the requirement for the time domain overlap of a watermark and an arbitrary audio signal.

Accordingly, it would be desirable to provide a watermarking system for sending command and control signals concurrently with audio signals that overcomes the disadvantages of the existing proposed schemes.

The system should use watermarking techniques to provide a hidden data channel in an audio signal for providing short messages, such as device activation commands, or remote control signals that can change the state of a device.

The system should be compatible with existing watermarking techniques, such as those disclosed in U.S. Patent 5,940,135 to Petrovic et al., entitled "Apparatus and Method for Encoding and Decoding Information in Analog Signals," issued August 17, 1999, and incorporated herein by reference.

The system should provide a hidden remote control signal as a watermark within an audio signal for controlling various devices that detect the hidden signal.

The system should allow the remote control signal to be related to, or independent of, content of the host audio signal. For related content, the system

should optionally provide synchronization of the remote control signal with the host audio signal content.

5       The system should use a watermark to define a time gate (window) during which a device is enabled to receive a user input or perform a specified action.

      The system should provide a security mechanism to ensure that the time gate is defined only from a real-time broadcast audio signal, and not from a replay of the audio signal.

10       The system should improve the robustness and temporal resolution of a watermark, and provide a simplified watermark detector.

      The system should provide synchronization of a watermark encoder and decoder.

15       The present invention provides a system having the above and other advantages.

## SUMMARY OF THE INVENTION

The present invention relates to a system for using a watermark embedded in an audio signal to remotely control a device.

5 In particular, the system is compatible with existing audio-watermarking technologies that use audio channels and/or audio storage to carry independent data without interfering with the audio channel's original purpose. However, such a channel has much lower  
10 information capacity than a modem channel, typically no more than about twenty bits per second per audio channel. The invention uses this hidden data channel for relatively short messages, such as device activation commands, or remote control signals that can  
15 change state of a device.

A remote control signal is hidden within an audio signal that is broadcast over radio and TV, stored on CDs, DVD, tape or computer memory, played over speakers and/or transmitted over other audio channels. Various  
20 devices such as toys, computers, and appliances, that are equipped with an appropriate detector, detect the hidden signal to trigger an action, or change a state of the device. The device action can be completely unrelated to the ongoing audio content, and it can have  
25 a number of different objectives, such as entertainment, education, sales, security, etc.

In one particular implementation, a "time gate" device is disclosed, where detection of the watermark opens a time interval within which a user is allowed to

perform an action, such as pressing a button, typing in an answer, turning a key in a lock, etc. To prevent fraudulent activation of a time gate, the time gate device can be further upgraded to react only to  
5 watermarks coming from live broadcasts, and not from replays from tapes or other storage devices.

In another implementation, detection of the watermark triggers an action.

10 Additionally, techniques are presented for improving existing watermarking technology in view of requirements for the proposed applications. In particular, the invention provides improvements in robustness of the watermark in the channels with acoustic propagation (e.g., propagation through air) -  
15 using delay hopping (watermarking adjacent bits using distinct autocorrelation delays), robustness improvements using redundant watermarking, improvements in the time resolution of the trigger feature, and simplifications of the detector design.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates an audio watermarking process in accordance with the present invention.

5 FIG. 2 illustrates a system for remote control of a device, such as a toy, in synchronism with audio data, such as from a television program, in accordance with the present invention.

10 FIG. 3(a) illustrates a time gate defined by start and stop watermarks in accordance with the present invention.

FIG. 3(b) illustrates a time gate defined by a start watermark and a fixed interval  $\tau$  in accordance with the present invention.

15 FIG. 3(c) illustrates a time gate defined by a start watermark and a multiple  $N$  of a fixed interval  $\tau'$  in accordance with the present invention.

FIG. 4 illustrates a real-time time gate application in accordance with the present invention.

20 FIG. 5 illustrates the use of countdown watermarks for defining a start time of a desired action in accordance with the present invention.

FIG. 6 illustrates an autocorrelation modulation extractor based on sign correlation in accordance with the present invention.

25 FIG. 7 illustrates an example of a bit error count versus a time shift for detecting a watermark in accordance with the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a system for using a watermark embedded in an audio signal to remotely control a device.

5        FIG. 1 illustrates an audio watermarking process in accordance with the present invention.

At an encoding side 100, a watermark, i.e., an embedded signal, is inserted into an audio signal at an embeddor 105, using a key, which is a set of parameters that define the hiding process. The key may comprise a  
10        steganographic key. The composite signal that is output from the embeddor 105 can be recorded, transmitted over various channels, or processed in different ways, which usually includes corruption by  
15        noise and distortion.

The composite signal is received at a decoding side 150, where the embedded signal (watermark) is retrieved from the composite signal in an extractor 155 with the help of the key used in the embedding process.

20        Various details regarding conventional signal processing techniques, such as compression, coding, error-correction, modulation, and the like, are not explicitly disclosed but their appropriate use will be evident to those skilled in the art.

25        The embeddor 105 may provide the watermark in the audio signal using various known watermarking techniques, including those discussed in the aforementioned U.S. Patent 5,940,135, where the short-term autocorrelation function of the host audio signal



is modulated in such a way to match the embedded signal. The key contains the information about the frequency band of the host signal used for hiding, the delay set used for autocorrelation calculation and its change patterns, baseband symbol waveform, data packet structure, scrambling key, etc. With this system, the extractor 155 calculates the short-term autocorrelation using the same key, and regenerates the inserted message with the help of standard digital signaling techniques.

Typical bit rates of the embedded messages are low, ranging from a few bits per second to a few tens of bits per second. For example, the International Federation of the Phonograph Industry required 20 bps per channel for its review of watermarking technologies. Those skilled in the art can appreciate that the increase in the bit rate brings reduced robustness, increased audibility and/or increased complexity. Therefore, only relatively short messages can be hidden within an audio signal. This is quite suitable for intellectual property protection, where copy control information and/or content identification codes of less than one-hundred bits are embedded.

However, the present invention proposes the use of audio watermarks for remote control of various devices, such as toys, locks, smart cards, appliances, etc., over standard audio channels, such as radio and TV broadcasts, audio tapes, CDs, telephone channels, public address systems, etc. As an example, we will

describe a system for remote control of toys participating in a TV show, as illustrated on FIG. 2.

FIG. 2 illustrates a system for remote control of a device 290, such as a toy, in synchronism with audio data, such as from a children's television program, in accordance with the present invention.

The control messages are inserted using audio watermarking at appropriate places of the show's audio track using an embeddor 205 and a synchronization device 210. The composite audio signal is optionally stored, e.g., on a tape 215, and subsequently broadcast via a transmitter 220 and antenna 225. While antennas 225 and 230 are shown as an illustration, any type of broadcast scheme can be used, including delivery via a terrestrial path, cable, optical fiber, and/or computer network. Moreover, broadcast of the composite signal to a large population of receivers is not required, as the invention is also suitable for any transmission, including point-to-point transmissions, video-on-demand transmissions in a cable television network, and so forth. Moreover, the composite audio signal may be played back locally at a user's home from a storage device such as a tape or disc.

A TV receiver 235 receives the signal via an antenna 230 and the audio signal is played over a TV speaker 240. The toy 290, specially designed in accordance with the present invention, includes components 291, including a built-in microphone 292 for picking up (detecting) the audio signal, a watermark extractor 294 for extracting the watermarks from the

composite audio signal, and a control 295 that is responsive to the watermarks for performing some action.

5       The toy 290 may optionally be hard-wired to the receiver using appropriate jacks and wiring, in which case the microphone 292 is not needed.

10       A motor 296, audio function 297, such as a speech synthesizer, and lights function 298 are responsive to the control 295. For example, if the toy 290 is a doll, the audio function 297 may play a prerecorded message in concert with the ongoing show. The motor 296 may cause the toy's 290 arms, legs, head and/or mouth to move. The lights function 298 may cause the toy's eyes to light up. This creates the appealing  
15       impression that the toy is actually following the show together with the children, and that it participates.

20       Advantageously, no modification is required for the TV channel, including the TV signal storage equipment, satellite distribution channels, broadcast equipment, and TV sets. Additional equipment consists only of an embeddor, specially designed for precise watermark insertion at a desired segment of the audio track, and a mass-produced, inexpensive detector incorporated in a suitably-designed toy and connected  
25       to the toy controller 295. Also, note that the same toy 290 can be activated by audio watermarks coming from any audio source, such as an AM/FM radio broadcast, CD or tape player, or speakers wired to a computer.

An important feature in the previous example is the synchronization of the action of a toy (or toys) with the ongoing show. To achieve this, the watermark should be embedded in the audio track segment immediately preceding the desired moment of the toy action, with a small allowance for processing and propagation delays. This synchronizing feature can be useful in many other practical applications.

#### Time Gate

For example, we will describe here a device suitable for watermark-based activation that we will call a "time gate" (e.g., window). In accordance with the invention, the detection of a watermark causes the time gate to open a time interval, during which a user is allowed to perform an action. For example, during an interactive TV quiz show, the viewers may participate by keying in their answers to a hand-held unit, while the players in the television studio prepare their answers. This can be achieved if the audio track has appropriately inserted watermarks, and if a time gate device synchronized to the watermarks controls access to the hand-held unit.

Such a hand-held unit can have similar componentry as the toy 290 of FIG. 2. The control 295 can be configured to send a message to the user to alert the user that the time gate has started or ended, the duration of the time gate, and the amount of time remaining in the time gate. An output screen on the hand-held unit, such as a liquid-crystal display (LCD), may be appropriate for this purpose. Or, the hand-held

unit may send a signal back to the television receiver  
235 to provide a display on a TV or computer screen  
that informs the user of the information provided by  
the watermark (e.g., via a wired path, infra-red signal  
or the like).

Alternative applications including an automated  
audio/video exam, where the time gate defines a period  
during which the user can enter responses for the exam,  
alertness monitoring, where the user is required to  
provide an input during the time gate, TV coupon  
collection, where electronic coupons can be retrieved  
by a user during the time gate, remote control of a  
lock, where the lock can be opened or closed only  
during the time gate, and so forth, are discussed  
below.

Three different designs of the time gate protocol  
are illustrated in FIGs 3(a)-3(c).

FIG. 3(a) illustrates a time gate defined by start  
and stop watermarks in accordance with the present  
invention.

This design uses two distinct watermarks,  
including a start watermark 305 and a stop watermark  
310, to mark the desired beginning and the end,  
respectively, of the gated interval 315 bounded by  $T_1$   
and  $T_2$ . Note that the boundaries of the interval 315  
are shown as occurring slightly after the end of the  
corresponding watermarks, due to processing and  
propagation delays. This design can mark an arbitrary  
time interval that is larger than the duration of the

stop watermark 310, since the duration of the stop watermark 310 consumes a portion of the time gate 315.

FIG. 3(b) illustrates a time gate defined by a start watermark and a fixed interval  $\tau$  in accordance with the present invention.

This time gate protocol design is simpler than that of FIG. 3(a) since it requires a single start watermark 330 before the beginning of the marked interval 335. The duration of the marked interval (time gate),  $\tau$ , is predefined, e.g., at the time the device, such as the toy 290 in FIG. 2, is manufactured. However, the interval may be re-programmable (e.g., by replacing a memory chip). This design is suitable if the user action is simple, like pressing a button, or turning a key in a lock.

FIG. 3(c) illustrates a time gate defined by a start watermark and a multiple  $N$  of a fixed interval  $\tau'$  in accordance with the present invention.

This time gate design requires a single watermark 350, but still can mark a variable time interval. This is achieved by inserting an integer number  $N$  into the watermark's data field, where the interval 360 is  $N$  times a predefined time slot duration  $\tau'$ .

The value  $N$  can be carried in a separate or same watermark as that of the control data, or even provided beforehand. A preferred solution is for the same watermark 350 to include both  $N$  and the control data (for reasons of efficiency, potential for false action, etc.)

FIG. 4 illustrates a real-time time gate application in accordance with the present invention.

Many time gate applications allow pre-processing of the audio track in a similar manner as depicted in  
5 FIG. 1, e.g., for toy applications. For example, the time gate device can be used in an educational process to monitor alertness of the student. In this case, a pre-recorded lecture (video/audio, or audio only) contains a watermarked content that opens a time gate  
10 interval after questions/instructions that require the student's response, such as pressing yes/no buttons on the time gate device. The device may score correct/incorrect answers for review by a teacher, but we expect major educational benefits by simply  
15 confirming that the student was paying attention to the audio signal.

Similarly, an advertisement company may poll viewers about an advertised product, and engage their attention. Active participation of users is expected  
20 to bring better recognition of products in a shorter time, and lower advertisement costs. In particular, as an encouragement for participation, an advertiser may offer discounts to those who bring the time gate device to a specified retail store, where the user's answers  
25 to the poll questions are downloading from the device. This is equivalent to bringing cut-out coupons from a paper advertisement. Again, the watermarks are pre-stored in the audio track of a TV or radio adds.

However, in other applications, the embedding of  
30 the watermark should occur in real-time, while the

audio signal is being transmitted. Such a case occurs when the time gate is used, for instance, to control a user's access to a secure area or safe box, or to override other restrictions. For example, an innocuous  
5 public address system announcement or background music may be used with an electronic lock to allow a key to operate within the defined time interval. Similarly, a user may remotely control a door lock in the user's residence by calling home over a telephone line, and  
10 speaking to the telephone answering machine (with its speaker on). The user's telephone set includes an encoder that embeds watermarks with control data into the user's voice. When the voice is received at a decoder with a watermark extractor at an electronic  
15 door lock mechanism, the lock can be activated.

In a related example, background music or a public address announcement in a larger facility such as an office may be used as a host audio signal for watermarked control data to remotely lock or unlock  
20 doors, filing cabinets and so forth without requiring re-wiring of the facility.

With these application, it is important that there is no detectable communication channel between the user and the controlled device, so that potential attackers  
25 are oblivious to the control mechanism. Furthermore, if an attacker does learn the operational principle of the lock, he/she should not be able to gain access to the secure area by recording and subsequently replaying the audio signal with the embedded control data.



Even if an attacker knows the operational principle of the lock, he/she cannot forge the message if he/she does not know the secret key used in the embedding process, as shown in FIG. 1.

5       The real-time time gate system shown in FIG. 4 addresses these concerns. An encoding side 400 includes an audio source 405, an embeddor 410, a clock 415 and a control data encoder 420. A receiving side 470 that receives the real-time transmission of the  
10       composite audio signal includes an extractor 475, a logic function 480, and a clock 485.

      The embeddor 410 receives a continuous audio signal from the audio source 405, and also receives a string of messages from the data encoder 420. The  
15       messages include the control data, as well as timing information from the local clock 415, with possibly some additional data (e.g., number of slots for slotted time gate). The message embedding is triggered from outside, e.g., by an operator pressing a button on the  
20       embeddor 410. The message is inserted into the audio data stream using a secret key. In the real-time operation, the message is immediately transmitted, i.e., there is no recording of the audio signal except for a short buffering in the embeddor 410 necessary for  
25       the embedding process (up to a few tens of milliseconds). The output composite signal is transmitted over a standard audio channel (telephone, radio, TV, public announcement system, etc). The receiver 470 detects the signal and passes it to the

extractor 475, which detects the message and passes it to the logic function 480 for verification.

The logic function 480 compares the timing data from the incoming message to locally-generated timing data from the clock 485. If the match is sufficiently close, the logic function 480 concludes that a real-time transmission has occurred, and the control information taken from the received message is passed, e.g., starting the time gate. Simultaneously, the local clock 485 may be adjusted (e.g., synchronized with the clock 415) if the discrepancy with the transmitter clock 415 is within predefined bounds. However, if the time discrepancy is too large (e.g., the local time is significantly after the transmitted time), it implies that recording and play back may be taking place, so the message is ignored.

If the local time is significantly before the transmitted time, this implies a significant mis-calibration, and a default mode can be invoked to ignore the message.

Clearly, potential attacks based on storing and replaying messages would introduce large delays, certainly more than a few seconds. On the other hand, propagation and processing delays are certainly less than a second, so there should be a clear separation of the two cases. Also, typical clock devices can maintain a timing error well below a couple of seconds for a quite long time, so that the time drift of local clocks can be also distinguished from the store-and-replay attack. Occasional re-synchronization of the

receiver clock with the transmitter's clock should keep the timing mismatch between the send and receive clocks within tight bounds indefinitely. This re-synchronization can be achieved using known techniques.

5           Watermark design considerations

          The applications described above impose somewhat different sets of requirements on the audio watermark design than do the intellectual property protection applications. For example, most of the applications  
10       described above imply an acoustic (free-space) propagation channel, while the property rights establishment is usually done on an electronic form of the audio signal. The use of an acoustic propagation channel is especially challenging since it generates  
15       intersymbol interference due to multipath, signals may be corrupted with background noise, and the distortions in speakers and microphones are usually large compared to electronic channel distortions.

          Furthermore, some of the above applications, such  
20       as the toy applications, require very inexpensive designs for the watermark extractors. On the other hand, in some other applications, such as remote control of locks, it is equally important to have an inexpensive embeddor as well, e.g., for the telephone  
25       set example. Finally, the time gate device requires careful consideration of timing tolerances to achieve the best possible resolution in time domain, as opposed to typical copyright protection applications, where the location of the watermark within a signal is relatively  
30       unimportant.

With the above requirements in mind, the present inventors looked at different watermarking technologies, and found that the best-suited technology is the autocorrelation modulation (ACM) technique described in the aforementioned U.S. Patent 5,940,135. However, any other suitable watermarking/data embedding technique may be used.

ACM features a simple design for the embeddor and extractor, high robustness, large throughput, low probability of falses, good layering capability, and full inaudibility. However, the present invention provides improvements and the special selection of design parameters to optimize ACM for the proposed applications. Herein, several techniques are disclosed that can substantially improve the performance of ACM in remote control signaling using audio watermarks.

The acoustic-coupling environment, where a speaker broadcasts an audio signal, and the detector captures it through a microphone, can be improved by a special watermark design that is not addressed by conventional techniques. The main issue is the multipath propagation caused by reflections of acoustic waves, which may introduce intersymbol interference to the watermark detector. Standard techniques to fight intersymbol interference, such as adaptive equalization, are too costly for an inexpensive detector. An increase in the bit interval is helpful, but with obvious drawback in the reduction of the watermark bit rate.

To avoid intersymbol interference, we propose watermarking adjacent bits using distinct autocorrelation delays ("delay hopping"). In effect, distinct autocorrelation delays can be considered as  
5 distinct channels, with little interference between them. This aspect of the invention increases the watermark robustness, which is particularly useful in the acoustic-coupling environment, but may be used in other environments as well. That is, if consecutive  
10 symbols are sent over distinct channels, they cannot cause intersymbol interference, regardless of the pulse broadening caused by a multipath environment.

In a further aspect of the invention, robustness of the watermarking is improved by first evaluating the  
15 masking ability of the host audio signal before embedding the watermark. In a typical scenario, the device activation, time gate opening, or other actions occur upon detection of the corresponding watermark. This means that the encoder should insert the watermark  
20 immediately prior to the desired moment, taking into account propagation and processing delays. However, the desired (candidate) watermark insertion interval may be unsuitable, for example, if it is mainly a silence. Accordingly, the watermark can be inserted  
25 before the desired instant of action, along with information for informing the decoder about the delay between the watermark detection and the desired action, which corresponds to the delay between the time segment in which the watermark is embedded and the original  
30 desired time segment.

There is a tradeoff between the flexibility in choosing the optimum watermark insertion time and the amount of the payload (bits) assigned to the delay information.

5        FIG. 5 illustrates the use of countdown watermarks for defining a start time of a desired action in accordance with the present invention.

10        In a further alternative embodiment, a string of watermarks 510 is embedded before the desired start of action ( $T_1$ ). Each watermark, such as watermarks 512, 514 and 516, has a countdown data field ( $n=2, 1, 0$ ) that indicates the number of remaining watermarks before ( $T_1$ ). Detection of any of the watermarks in the string 510 allows the calculation of the desired timing of the action. For example, if the countdown field of a particular watermark contains the countdown field value  $n$ , and the watermark duration is  $w$  seconds, then the desired action should begin  $n*w$  seconds after the particular watermark is detected, plus some additional propagation and processing delay.

15        This provides improved robustness since the start time of the desired action is designated with redundancy. Thus, even if all but one of the watermarks are not received correctly, the start time will be still be designated.

20        FIG. 6 illustrates an autocorrelation modulation extractor based on sign correlation in accordance with the present invention.

25        The simple decoder design described in the aforementioned U.S. Patent 5,940,135 includes a filter,

followed by a delay line, correlator (multiplier), and an integrator. The output of the integrator represents a base-band watermark signal without normalization. When a binary message has been embedded, the output is  
5 positive at the decision moment if a "one" bit is embedded, or negative for a "zero" bit. In this design, it is important to maintain a very precise delay in the delay line; small errors in the delay can bring significant distortion of the watermark signal.  
10 Those skilled in the art know that precise delays are best achieved by a digital delay line. This means that an A/D converter is necessary prior to the delay line, which add to the cost of the decoder.

In accordance with the present invention, the  
15 decoder of U.S. Patent 5,940,135 can be further simplified as shown in FIG. 6 to meet even lower cost demands, suitable for toy applications, without compromising the delay precision.

This decoder 600 includes a filter 610 that  
20 receives the composite signal with the watermark, e.g., from a channel or a storage device, and a comparator 620 for comparing the filtered signal to ground 630. An AND gate 640 receives the output of the comparator 620, and a local clock signal. An XNOR (exclusive-NOR)  
25 gate 660 receives a direct output of the AND gate 640, as well as a shifted version of the output via shift register 650. The output of the XNOR gate 660 is provided to a counter 670, which communicates with a logic function 680.

Thus, instead of multiplying the received signal with a delayed version of itself, it is possible to detect the signal polarity, and then perform an XNOR operation between the signal and a delayed version of  
5 itself (i.e., if the signs are the same, the output is one, if opposite, the output is zero). Then, instead of integration, it is enough to run the counter 670 at a clock rate that is much higher than the bit rate for the duration of the watermark bit. If the count at the  
10 end of the bit interval is more than half the maximum count, then a "one" bit is detected; otherwise a "zero" bit is detected. A synchronizing algorithm, residing in the logic block 680, determines the beginning and the end of the bit interval, and generates a reset  
15 signal for the counter at the end of each bit.

The above simplification shows that the comparator substitutes for an A/D converter, the XNOR gate 660 replaces a multiplier, and the counter 670 substitutes for an integrator. Moreover, the present  
20 inventors have confirmed through experimentation that the proposed simplification does not significantly reduce robustness.

FIG. 7 illustrates an example of a bit error count versus a time shift for detecting a watermark in  
25 accordance with the present invention.

In the time gate applications in particular, but in other triggering applications as well, it is important to achieve a good timing precision in detecting the end of a watermark. In the case of  
30 watermarks described in U.S. Patent 5,940,135, this is



equivalent to detecting the trailing edge of the last bit of the watermark bit stream. However, noise and channel distortions can corrupt the trailing edge of any bit, or the bit as a whole. Therefore, it is  
5 necessary to take the watermark in its totality to decide the most probable timing of the end of the watermark.

In typical digital watermarks described in U.S. Patent 5,940,135, error correction codes are used to  
10 recover watermarks in the case when some bits are corrupted. In this case, the watermark can be detected at a time interval that is slightly earlier than its optimal position, but with a higher error count than in its optimal position. The present invention modifies  
15 this scheme propose to use this feature to further optimize the watermark timing detection.

In accordance with the present invention, the decoder will attempt to detect the watermark with a starting and ending position that are delayed slightly  
20 with respect to the timing position where initial detection of the watermark occurred. The time shifts are very small with respect to the watermark duration, typically of the order of 5% of the bit interval ( $T_{bit}$ ) (each watermark contains tens or even hundreds of  
25 bits). In each of these shifts, the decoder will continue to detect the same watermark and monitor the bit error count over the duration of the watermark. The same watermark is detectable even with slight time shifts, which is the basis of the precise time  
30 resolution disclosed herein. The optimum timing is

found where the error count is minimized. For multiple minimums, the optimum timing can be taken at the midpoint.

For example, in FIG. 7, the error count changes as the detecting time is shifted. Initially, with no time shift (i.e., at the originally-detected position), the watermark is detected with four bits in error (point 710). However, as the detecting time is shifted in steps of  $t_s$  (e.g.,  $t_s = T_{bit}/20$ ), the error count decreases (points 715 and 720), reaches a minimum for two shifts (points 725 and 730), and then increases (points 735, 740 and 745).

A minimum bit error (points 725 and 730) is reached for two consecutive steps, and we conclude that the best estimate for a reference position of the watermark (which can be, e.g., the ending time of the watermark) is at the mid-point of these two events, i.e., at  $(t_{s3}+t_{s4})/2$ . Alternatively, either  $t_{s3}$  or  $t_{s4}$  could be selected. The resolution of the extractor's clock will govern the minimum possible time shift.

If only one minimum is found, the optimum position is taken at that time shift position.

To reduce computations, it is possible to terminate the bit error calculations once a minimum has been detected and the bit error count begins to rise (e.g., at point 735). Also, optionally, the bit error calculations can be terminated when a bit error count of zero is first reached.

As an numeric example, assume the watermark message is two seconds long, and  $T_{bit}=0.08$  sec. Let us

say that watermark is first detected in the audio signal starting at time 12.340 sec. and ending at time 14.340 sec. This corresponds to a zero time shift. Then, with  $ts1=0.08/20=0.004$  sec., the watermark is  
5 next detected starting at time 12.344 sec., and ending at time 14.344 sec., and so forth. Note that the detection interval is 2 sec., and the position shift, and the resolution, is 0.004 sec.

Moreover, for a strong watermark, the error count  
10 may reach zero or some other minimum value for several time shifts. In this case, the optimum timing is again set in the middle of the time intervals with the minimum errors.

Experiments show that this technique detects the  
15 watermark with the precision of  $\pm 20\%$  of the bit interval. For example, for watermarks running at a 50 bit/sec. rate, this corresponds to a time resolution of  $\pm 4$  ms. This resolution corresponds to  $\pm 1.4$  meters of acoustic propagation delay, so it is adequate  
20 for the systems based on acoustic coupling.

Accordingly, it can be seen that the present invention provides a method and apparatus with various advantages, including:

- allows remote control of a device, such as a  
25 toy, lock, smart card, or home appliance, via a control message that is imperceptibly embedded in an audio signal as a watermark;
- is compatible with, and builds upon, existing watermarking techniques;

- allows the remote control signal to be synchronized with the audio content, such as to allow a toy to move in conjunction with the audio track of a children's television program;
- 5 • uses a watermark to define a time gate (window) during which a device is enabled to receive a user input;
- provides a security mechanism to ensure that the time gate is defined only from a real-time broadcast audio signal, and not from a replay of the audio signal;
- 10 • provides a simplified watermark detector;
- improves the robustness and temporal resolution of a watermark, e.g., in acoustic propagation channels, by shifting the detecting point based on an error count of the watermark; and
- 15 • improves robustness by evaluating the masking ability of the host audio signal when embedding the watermark, and inserting the watermark in a suitable interval before the desired action, along with information indicating the time shift, if necessary.
- 20

Although the invention has been described in connection with various specific embodiments, those skilled in the art will appreciate that numerous adaptations and modifications may be made thereto without departing from the spirit and scope of the invention as set forth in the claims.

25

What is claimed is:

1. A method for remotely controlling a device, comprising the steps of:
  - embedding at least a first control message for triggering a desired action of the device as a corresponding first watermark in an audio source signal to provide a composite audio signal;
  - wherein the first watermark is carried substantially inaudibly in the composite audio signal; and
  - communicating the composite audio signal to the device; wherein:
    - the device is adapted to receive the composite audio signal communicated thereto and recover the first control message embedded therein for triggering the desired action in accordance therewith; and
    - the first watermark and the audio source signal coexist in the composite audio signal in a common time, frequency and space domain.
2. The method of claim 1, wherein said embedding step comprises the step of:
  - modifying the audio source signal so that data symbols of the first control message are determined according to corresponding values of an autocorrelation function of the composite audio signal;
  - wherein each autocorrelation value is calculated over a time interval of a corresponding data symbol.

3. The method of claim 1, wherein:  
the first control message designates a time for  
triggering the desired action.

4. The method of claim 1, wherein:  
the first control message designates the desired  
action.

5. The method of claim 1, wherein:  
the composite audio signal is communicated to the  
device, at least in part, by propagating via a speaker.

6. The method of claim 1, wherein:  
in said embedding step, the first control message  
is embedded in the audio source signal so that the  
desired action is triggered in synchronism with a  
desired content of the audio source signal.

7. The method of claim 1, wherein:  
in said embedding step, the first control message  
is embedded in the audio source signal so that the  
desired action is triggered in synchronism with a  
desired content of a video signal that is associated  
with the audio source signal.

8. The method of claim 1, wherein:  
in said communicating step, the composite audio  
signal is communicated, at least in part, via a  
broadcast channel.

9. The method of claim 1, wherein:  
the composite audio signal is stored at a storage device and subsequently retrieved from the storage device for said communicating step at a designated time for triggering the desired action.

10. The method of claim 1, wherein:  
a time gate for triggering the desired action is defined in accordance with the first control message.

11. The method of claim 10, wherein:  
a start of the time gate is defined according to the first control message.

12. The method of claim 10, wherein a start of the time gate is defined according to the first control message, comprising the further step of:  
embedding a second control message as a corresponding second watermark following the first watermark in the audio source signal;  
wherein an end of the time gate is defined according to the second control message.

13. The method of claim 10, wherein:  
a start of the time gate is defined according to the first control message, and an end of the time gate is defined according to a fixed gate interval that follows the start.

14. The method of claim 10, wherein:

the first watermark comprises a countdown data field for defining a start of the time gate according to a multiple of a duration of the first watermark.

15. The method of claim 10, wherein:

a start of the time gate is defined according to the first control message, and an end of the time gate is defined according to a multiple of a fixed gate interval that follows the start.

16. The method of claim 10, comprising the further step of:

embedding at least a second watermark in the audio source signal following said first watermark;

wherein each watermark comprises a countdown data field for defining a start of the time gate according to a multiple of a duration of each watermark.

17. The method of claim 16, wherein:

the countdown data field of only one of the watermarks is required to define the start.

18. The method of claim 1, wherein:

the first control message is embedded in the audio source signal according to a steganographic key to control access to the first control message.

19. The method of claim 18, wherein:

the device is adapted to use the steganographic key in recovering the embedded first control message.



20. The method of claim 1, wherein:  
the desired action is to change a state of the device.

21. The method of claim 20, wherein:  
the state of the device is changed to control access to the device.

22. A method for enabling a device to perform a desired action via remote control, comprising the steps of:

receiving a composite audio signal communicated to the device; and

recovering at least a first control message embedded in the composite audio signal to perform the desired action; wherein:

the first control message is embedded as a corresponding first watermark in an audio source signal to provide the composite audio signal;

the first watermark is carried substantially inaudibly in the composite audio signal; and

the first watermark and the audio source signal coexist in the composite audio signal in a common time, frequency and space domain.

23. A method for defining, by remote control, a time gate for a device, during which an access state of the device is changed, comprising the steps of:

embedding at least a first control message for changing the access state of the device as a corresponding first watermark in an audio source signal to provide a composite audio signal, said first watermark being carried substantially inaudibly in the composite audio signal; and

communicating the composite audio signal to the device;

wherein the device is adapted to receive the composite audio signal communicated thereto and recover the first control message embedded therein for changing the access state in accordance therewith.

24. The method of claim 23, wherein:

the access state is changed from: (a) not allowing a user input to control the device outside the time gate, to (b) allowing a user input to control the device during the time gate.

25. The method of claim 23, wherein:

the access state is changed from allowing a user input to control the device outside the time gate to not allowing a user input to control the device within the time gate.

26. The method of claim 23, wherein:

the access state is changed to allow a user to actuate a key to control the device during the time gate.

27. The method of claim 23, wherein:  
the access state is changed to allow a user to  
actuate an electronic interface to control the device  
during the time gate.

28. The method of claim 23, wherein:  
the composite audio signal is communicated to the  
device, at least in part, via propagation from a  
speaker.

29. The method of claim 23, wherein a start of  
the time gate is defined according to the first control  
message, comprising the further step of:  
embedding a second control message as a  
corresponding second watermark following the first  
watermark in the audio source signal;  
wherein an end of the time gate is defined  
according to the second control message.

30. A method for defining, by remote control, a  
time gate at a device during which an access state of  
the device is changed, comprising the steps of:  
receiving a composite audio signal communicated to  
the device; and  
recovering at least a first control message  
embedded in the composite audio signal for use in  
changing the access state of the device; wherein:  
the first control message is embedded as a  
corresponding first watermark in an audio source signal  
to provide the composite audio signal; and

the first watermark is carried substantially inaudibly in the composite audio signal.

31. A method for remotely controlling a device, comprising the steps of:

embedding, at an encoder, at least a first control message for triggering a desired action of the device as a corresponding first watermark in an audio source signal to provide a composite audio signal;

embedding clock data into the audio source signal according to an associated clock of the encoder;

wherein the first watermark and clock data are carried substantially inaudibly in the composite audio signal; and

communicating the composite audio signal to the device;

wherein the device is adapted to receive the composite audio signal communicated thereto, recover the embedded clock data and compare it to associated clock data of the device, and, if a difference between the recovered clock data and the device's associated clock data is within a predefined bounds, recover the first embedded control message for triggering the desired action in accordance therewith.

32. The method of claim 31, comprising the further step of:

synchronizing the device's associated clock data with the encoder's associated clock data if the difference is within the predefined bounds.

33. The method of claim 31, comprising the further step of:

precluding the triggering of the desired action if the difference is not within the predefined bounds.

34. The method of claim 31, wherein:

the predefined bounds accounts for an expected time for communicating the composite audio signal from the encoder to the device.

35. The method of claim 31, wherein:

the clock data associated with the encoder is embedded in the audio source signal according to a steganographic key to control access thereto.

36. The method of claim 35, wherein:

the device is adapted to use the steganographic key in recovering the embedded clock data.

37. The method of claim 31, comprising the further step of:

periodically re-synchronizing the device with the audio source signal.

38. The method of claim 31, wherein:

the composite audio signal is communicated in said communicating step substantially without delay after being provided.

39. A method for enabling a device to perform a desired action via remote control, comprising the steps of:

(a) receiving a composite audio signal communicated to the device; wherein:

at an encoder, at least a first control message for triggering a desired action of the device is embedded as a corresponding first watermark in an audio source signal to provide the composite audio signal,

clock data is embedded into the audio source signal according to an associated clock of the encoder, and

the first watermark and clock data are carried substantially inaudibly in the composite audio signal; and

(b) recovering the embedded clock data and comparing it to associated clock data of the device, and, if a difference between the recovered clock data and the device's associated clock data is within a predefined bounds, recovering the first embedded control message for triggering the desired action in accordance therewith.

40. A method for robustly embedding data in an audio signal, comprising the step of:

embedding at least a first message as a corresponding first watermark in an audio source signal to provide a composite audio signal by modifying the audio source signal so that data symbols of the first message are determined according to corresponding

values of an autocorrelation function of the composite audio signal; wherein:

the values of the autocorrelation function are determined using delays that differ for adjacent data symbols; and

the first watermark is carried substantially inaudibly in the composite audio signal.

41. The method of claim 40, wherein:

each autocorrelation value is calculated over a time interval of a corresponding data symbol.

42. A method for recovering data that is robustly embedded in an audio signal, comprising the steps of:

(a) receiving a composite audio signal; wherein:

at an encoder, at least a first message is embedded as a corresponding first watermark in an audio source signal to provide the composite audio signal by modifying the audio source signal so that data symbols of the first message are determined according to corresponding values of an autocorrelation function of the composite audio signal;

the values of the autocorrelation function are determined using delays that differ for adjacent data symbols; and

the first watermark is carried substantially inaudibly in the composite audio signal; and

(b) recovering the first message from the composite audio signal.

43. The method of claim 42, wherein:  
each autocorrelation value is calculated over a  
time interval of a corresponding data symbol.

44. A method for robustly embedding data in an  
audio signal, comprising the steps of:  
determining a first, candidate time segment of an  
audio source signal for embedding at least a first  
message as a corresponding first watermark to provide a  
composite audio signal;  
evaluating the audio source signal to determine if  
the first time segment is suitable for masking the  
first message; and  
if the first time segment is found to be  
unsuitable:  
(a) selecting another, second time segment of the  
audio source signal that is suitable for masking the  
first message; and  
(b) embedding the first message in the second time  
segment along with information indicative of a time  
shift between the first and second time segments.

45. The method of claim 44, wherein:  
the second time segment precedes the first time  
segment.

46. A method for recovering embedded data from a  
composite audio signal, comprising the steps of:  
(a) receiving the composite audio signal; wherein:



at least a first message is embedded as a corresponding first watermark in a first time segment of the composite audio signal, along with time shift information indicative of a time shift between the first time segment and another, second time segment; and

an audio source signal of the composite audio signal is suitable for masking the first message during the first time segment, but is unsuitable for masking the first message during the second time segment;

(b) recovering the first message and the time shift information from the first time segment of the composite audio signal;

(c) determining when the time shift has elapsed in accordance with the time shift information; and

(d) providing a control signal for controlling a device after the time shift has elapsed in accordance with said determining step.

47. The method of claim 46, wherein:

the second time segment precedes the first time segment.

48. A method for decoding embedded data in an audio signal, comprising the step of:

(a) receiving a composite audio signal;

wherein data symbols of at least a first message are embedded as a corresponding first watermark in an audio source signal to provide the composite audio

signal, and the first watermark is carried substantially inaudibly in the composite audio signal;

the audio source signal is modified so that data symbols of the first message are determined according to corresponding values of an autocorrelation function of the composite audio signal; and

each autocorrelation value is calculated over a time interval of a corresponding data symbol; and

(b) recovering the embedded data symbols from the received composite audio signal according to polarities of the composite audio signal.

49. A decoding method for improving the time resolution of the position of a message that is embedded in an audio signal, and encoded according to an error-correcting code, comprising the steps of:

(a) receiving the audio signal;

(b) determining an initial position in the audio signal at which the message is initially detected;

(c) determining a bit error count for the message at each of a plurality of positions, including the initial position and at least one other position that is shifted relative to the initial position;

(d) determining an optimum position at which it is most probable that the message is embedded in the audio signal in accordance with the bit error counts; and

(e) recovering the message at the optimum position.

50. The method of claim 49, wherein:

the optimum position is determined according to the position that yields a bit error count that is a minimum among the plurality of positions.

51. The method of claim 49, wherein:

the optimum position is determined according to a mid-point of the positions that yield bit error counts that are minimums among the plurality of positions.

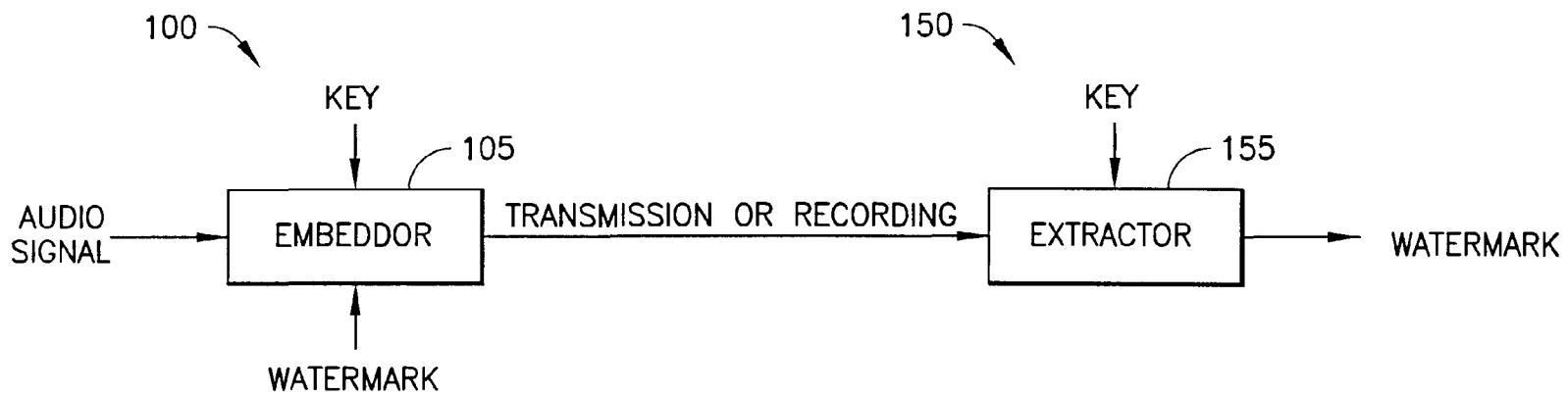
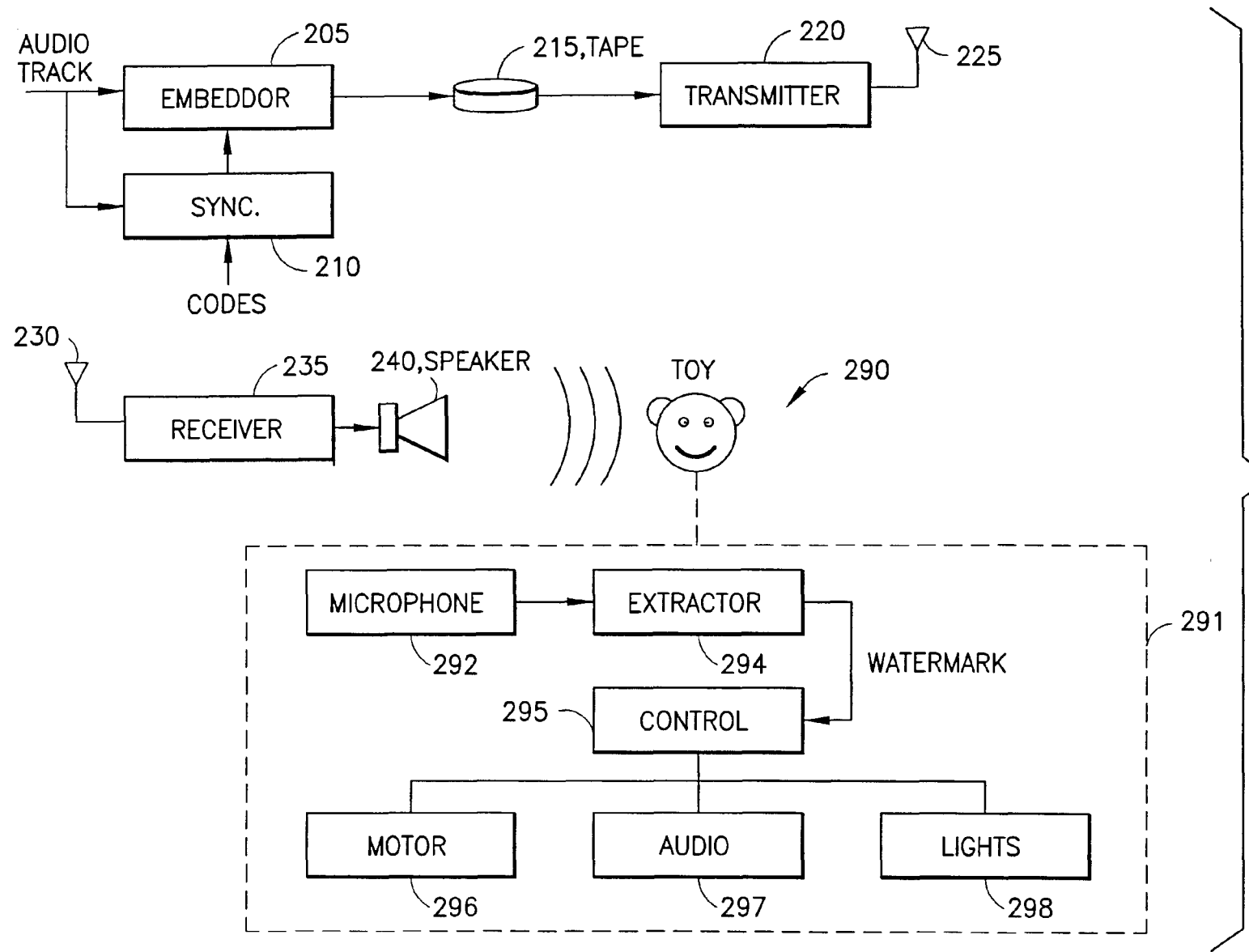


FIG.1

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FIG.2

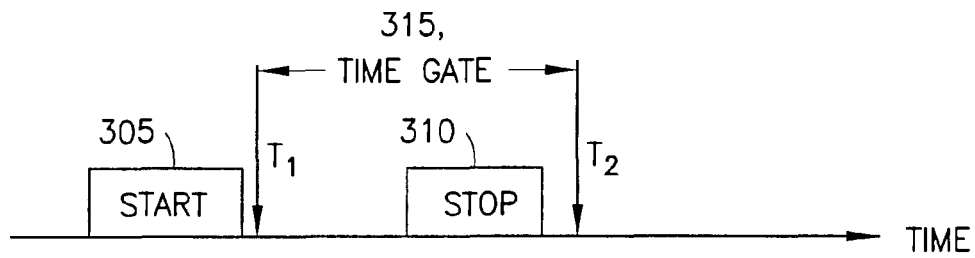


FIG.3a

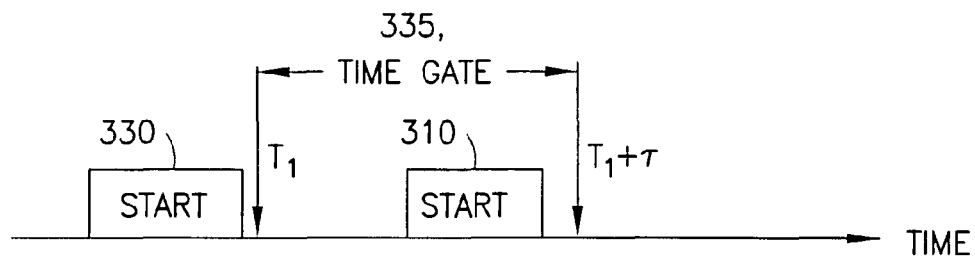


FIG.3b

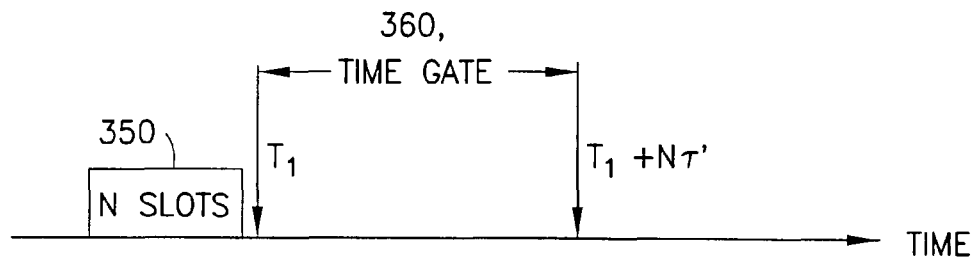


FIG.3c

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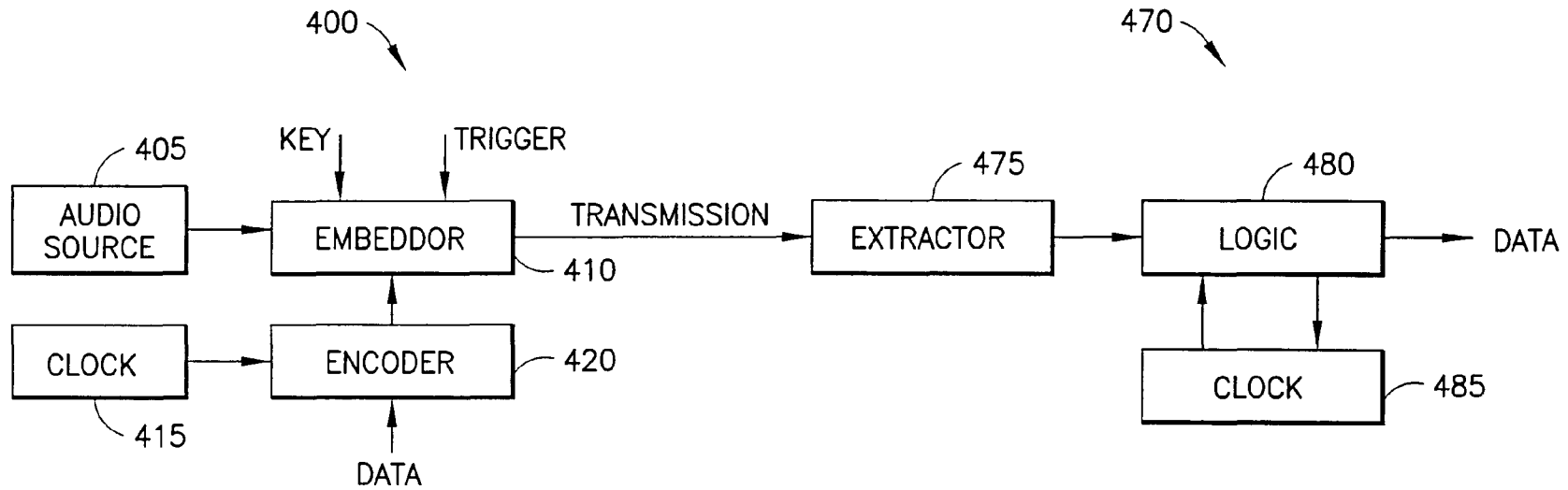


FIG.4

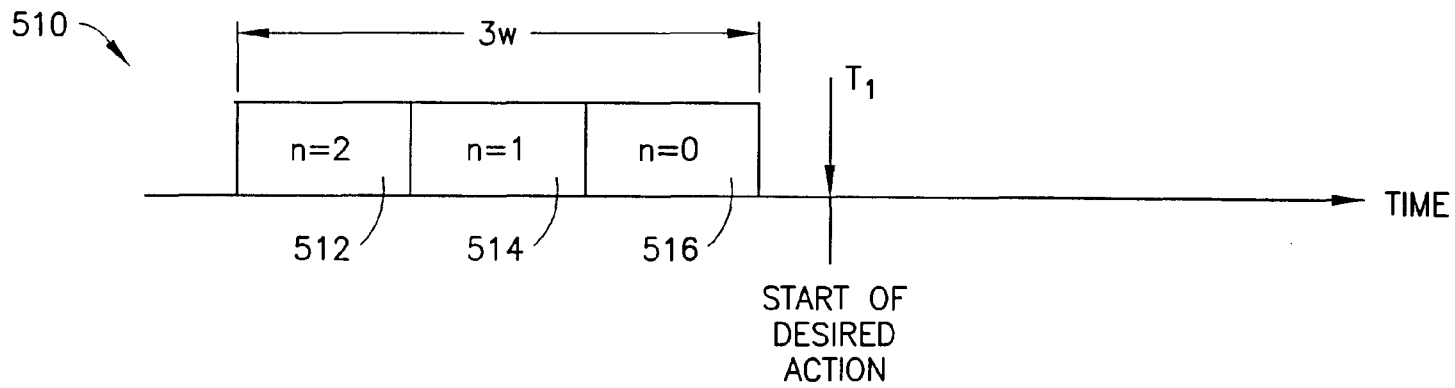
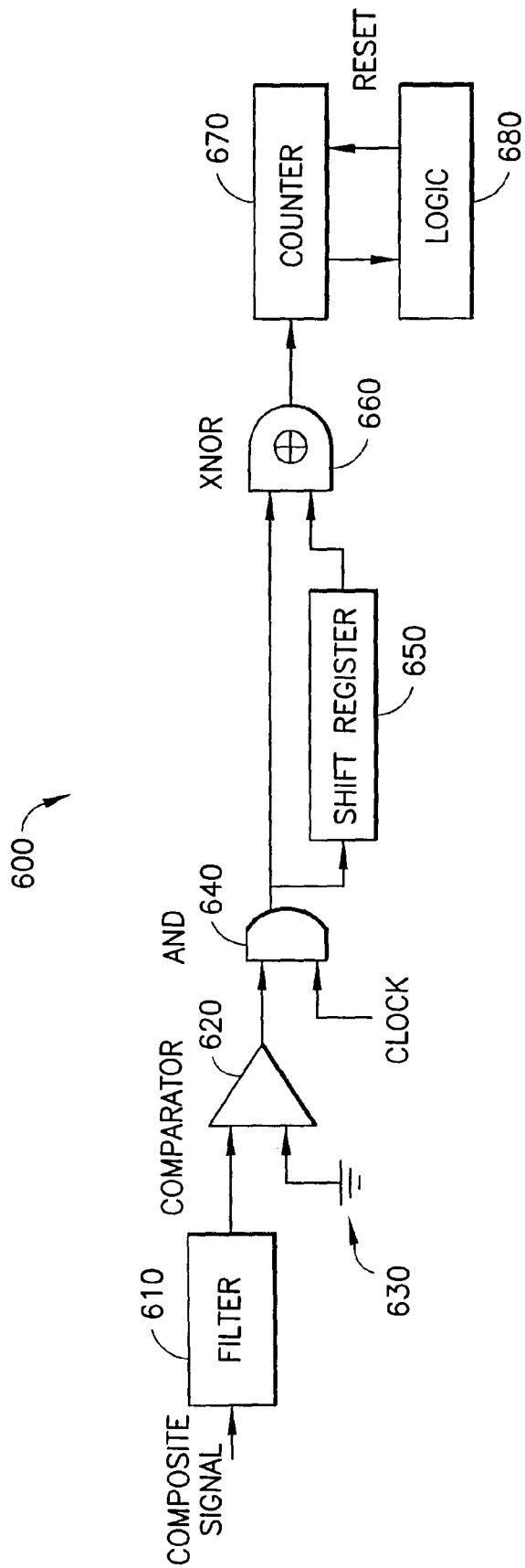


FIG.5

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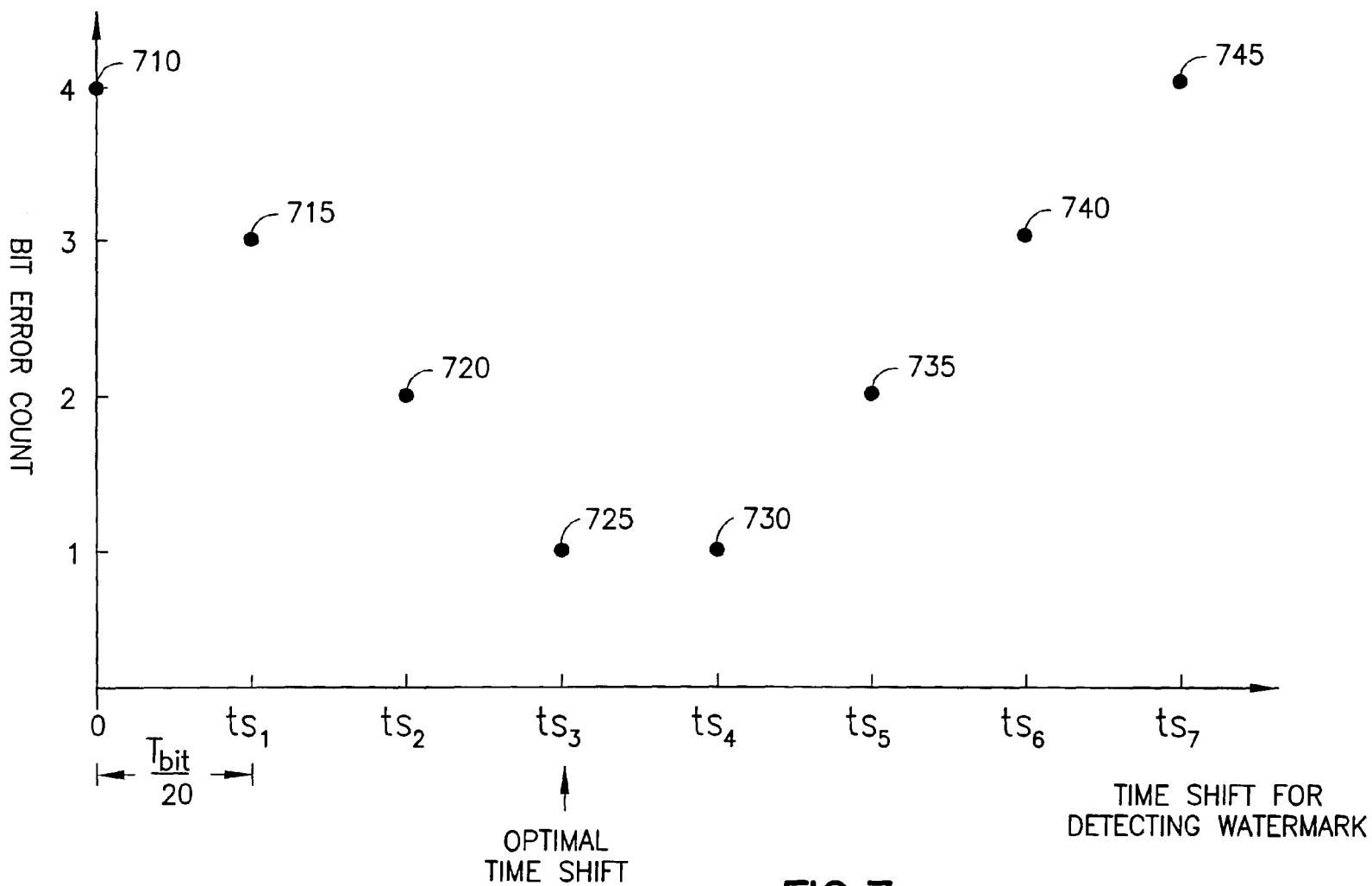


FIG.7

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
31 January 2002 (31.01.2002)

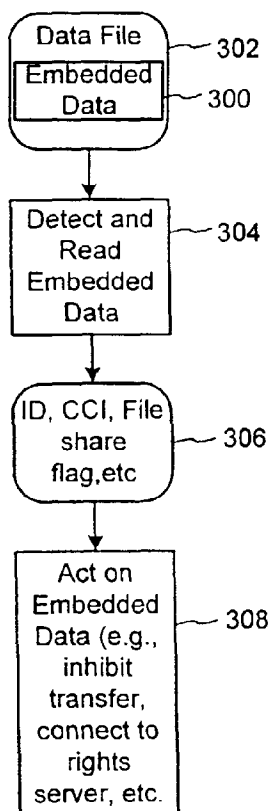
PCT

(10) International Publication Number  
**WO 02/08945 A1**

- (51) International Patent Classification<sup>7</sup>: **G06F 17/00** (72) Inventor; and  
(75) Inventor/Applicant (for US only): **LEVY, Kenneth, L.**  
(21) International Application Number: **PCT/US01/22953** [US/US]; 110 NE Cedar Street, Stevenson, WA 98648 (US).  
(22) International Filing Date: **20 July 2001 (20.07.2001)** (74) Agent: **MEYER, Joel, R.**; Digimarc Corporation, 19801 SW 72nd Avenue, Suite 100, Tualatin, OR 97062 (US).  
(25) Filing Language: **English** (81) Designated States (national): **AE, AG, AI., AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.**  
(26) Publication Language: **English**  
(30) Priority Data:  
09/620,019 20 July 2000 (20.07.2000) US  
60/257,822 21 December 2000 (21.12.2000) US  
(71) Applicant (for all designated States except US): **DIGIMARC CORPORATION** [US/US]; 19801 SW 72nd Avenue, Suite 100, Tualatin, OR 97062 (US). (84) Designated States (regional): **ARIPO** patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), **Eurasian** patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), **European**

[Continued on next page]

(54) Title: USING EMBEDDED DATA WITH FILE SHARING



(57) Abstract: A system and method for maintaining the scalability and promoting reliability of file sharing including embedding data (300) within the data file (302), reading the embedded data (304), decoding (306) and acting on the embedded data (308). The embedded data (300) may include a watermark and be linked to other copy management systems such as those proposed in DVD and SDMI.



WO 02/08945 A1



patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*

## USING EMBEDDED DATA WITH FILE SHARING

This application relates to Utility Patent Application Ser. No. 09/404,291 filed  
5 9/23/99 by Kenneth L. Levy, and Ser. No. 09/404,292 filed 9/23/99 by Kenneth L.  
Levy, which are incorporated herein by reference.

### Technical Field

The invention relates to file sharing systems for computer networks such as the  
10 Internet, and specifically relates to using embedded data in files to enhance such  
systems.

### Background and Summary

With the explosive growth of the Internet, file-sharing programs have evolved.  
15 One popular file sharing program is known as Napster, with a user base that has grown  
to between 10 and 20 million users in 1 year. This is one of the fastest growing  
products today. Currently, scores of music files can be found from Napster's database  
of current online users, and downloaded from another user's computer, in a data transfer  
scheme known as peer-to-peer file sharing. File-sharing is easily extended to all  
20 content, such as done with Scour.com.

In the Napster system, web site servers store a database of directories of the  
digital music libraries on the hard drives of thousands of registered users. The digital  
files of the songs themselves remain on the users' hard drives. If a user wants a  
particular song title, he logs onto the Napster web site and types in a search query for  
25 the title. Client software on the user's computer connects to the Napster server and  
receives a list of active users  
who have the requested file on their computer. In response to selecting a handle name,  
the client software opens a link between the user's computer and the computer of the  
selected user, and the client software executing on the two computers transfer the  
30 requested file.

Many new file-sharing systems are evolving in which the database is dynamic  
and not stored on a central server. One example of software with a dynamic database is  
known as Gnutella. Initially, when a user logs on to the Gnutella network, the user  
downloads client software from a Gnutella website. Next, the user types in the Internet  
35 address of an established Gnutella user (e.g., from a listing available at the web site).

The client software then transmits a signal on the network that informs other computers in the Gnutella file sharing network of its network address and connection status. Once a link with the other computer is secure, the other computer informs other computers of the Gnutella network that it has encountered in previous sessions of the user's presence  
5 (e.g., address and connection status).

After this initial session, the client software stores the addresses of other computers that it has encountered in the Gnutella network. When the client software is loaded, it recalls these addresses and attempts to reconnect with the other computers located at these addresses in the Gnutella network. The Gnutella software enables users  
10 to exchange many types of files. It enables users to issue a search request for files containing a desired text string. In response, the Gnutella clients connected with the user's computer search their respective hard drives for files satisfying the query. The client on the user's computer receives the results (e.g., files and corresponding addresses) and displays a list of them. By clicking on a file item in the user interface,  
15 the user instructs the client software to transfer the selected file.

In another file sharing system known as Freenet, the identity of the person downloading and uploading the files can be kept secret. Alternatively, the files could be stored on a central server, but uploaded by users such that the central server does not know the origin or true content of the files.

20 Unfortunately, the file-sharing methodology also allows massive piracy of any content, such as text, music, video, software, and so on. However, due to the scalability and freedom of distribution with file-sharing, it provides a powerful tool to share information. As such, there is a need for technology that facilitates and enhances authorized file sharing while respecting copyrights.

25 A few examples of the benefits of file-sharing follow. A file sharing system allows unknown artists to obtain inexpensive and worldwide distribution of their creative works, such as songs, images, writings, etc. As files become more popular, they appear on more of the users' computers; thus, inherently providing scalability. In other words, there are more places from which to download the file and most likely  
30 several files exist in close proximity to the downloading computer, thus improving efficiency. In addition, anonymous file-sharing, like FreeNet, foster political debate in places around the world where such debate might trigger reprisals from the government.

Current attempts to curb unauthorized file sharing include enforcement of copyright laws and use of files with content bombs. The current legal enforcement  
35 efforts allege that uses of file sharing systems violate copyright laws. Content bombs involve placing files that appear to be the correct content, but contain alternative

content or viruses. For example, a MP3 file can have the middle replaced with someone saying "do not copy songs" instead of the desired music. Neither of these solutions will help the Internet grow and improve the quality of life, worldwide.

Current copy management systems allow copying, but block rendering on  
5 equipment if the person does not have rights, where rendering only refers to reading a text file, seeing an image, watching a movie, listening to an audio file, smelling a smell file, or executing a software program. Although this can limit piracy within a file-sharing system, it does not improve the system for the user. In fact, this rendering based method of copy protection detracts from the system. This detraction stems from  
10 the fact that current copy control systems are implemented on the user's computer at the time of importing into the secure system, rendering, or moving to a portable rendering device or media, as described in the Secure Digital Music Initiative's specifications version 1 (available at <http://www.sdmi.org>, and incorporated by reference). In other words, current copy control systems do not check rights at the time of copying or  
15 transfer between computers. For example, the user downloads the protected file, and then finds out that he/she cannot render the file (i.e. play the song). In addition, the user does not know if the file is the correct file or complete until after downloading and attempting to render the file. More specifically, the file is encrypted by a key related to an unique identifier within the user's computer; thus, after copying to a new computer,  
20 the file cannot be decrypted. In addition, watermarks can only be used after the file has been decrypted, or designed to screen open (i.e. decrypted) content for importation into the user's secure management system after the file has been copied to their computer.

Another approach would be to use a database lookup to determine whether the content is allowed to be shared. For example, music in the MP3 file format can be  
25 determined whether it can be shared by the ID3 song title tag. However, this solution does not scale. Specifically, every downloaded file needs to access and search this central database, and this database's access does not improve as the file becomes more popular. In addition, the approach can be bypassed by changing the file's title tag or filename, although this makes searching more difficult.

30 A desirable solution includes embedding data throughout the content in which the embedded data has any of the following roles. The embedded data can have an identifier that has many uses, such as identifying the file as the content that the user desires, allowing the file to be tracked for forensic or accounting purposes, and connecting the user back to the owner and/or creator of the file. The embedded data  
35 can be analyzed in terms of continuity throughout the file to quickly demonstrate that the file is complete and not modified by undesirable content or viruses. An additional

role is to identify the content as something that is allowed to be shared, or used to determine the level or type of sharing allowed, such as for subscription users only.

The embedded data may exist in the header or footer of the file, throughout the file as an out-of-band signal, such as within a frame header, or embedded in the content while being minimally perceived, most importantly without disturbing its function, also known as a watermark.

In the utilization of this embedded data, the computer from which the content to be downloaded (i.e. the uploading computer) can check to make sure the content is appropriate to be uploaded when the files (e.g., music files) on this computer are added to the central database and/or when the content is requested. Similarly, the downloading computer can also check that the requested content is appropriate before, after or during the downloading process. An appropriate file can be defined as any of the following: the content is allowed to be shared, i.e. it is not copyright material, the file is the correct content, and that the content is complete and does not contain any viruses.

#### Brief Description of the Drawings

FIG. 1 is an overview of peer-to-peer file sharing system demonstrating locations at which embedded data can be used to control file-sharing.

FIG. 2 is a flowchart of an embedding process.

FIG. 3 is a flowchart of a detecting process.

FIG. 4 is a diagram of a file sharing system using embedded data.

FIG. 5 is a diagram of an embedded data format and corresponding database format.

FIG. 6 is a diagram illustrating an arrangement for generating a unique ID based on content.

#### Detailed Description

The following sections describe systems and methods for using auxiliary data embedded in files to enhance file sharing systems. Fig. 1 depicts an example of a file sharing system for a computer network like the Internet. The solution described below uses data embedded in a file to identify a file as having content desired for downloading, to verify that the content of the file is complete and free of viruses, and to allow the file to be shared among users' computers at the user's share level. In many

applications, an embedding process encodes auxiliary data in the file during creation, but it may also be embedded at a later time. For example, the file may be embedded (or re-embedded) as part of a file transfer process or electronic transaction where a user is granted usage rights for the file.

5        Fig. 2 depicts an embedding process for adding auxiliary data to files in a file sharing system. A data embedding process 200 (e.g., steganographic encoder, file header encoder, data frame header encoder, etc.) embeds auxiliary data 202 in a file 204 to create a data file 206 including the embedded data 202. The file may then be distributed in a file sharing system comprising a number of computers or other devices  
10 in communication with each other via a network. The auxiliary data embedded in the file is used to manage file sharing operations, and to enhance the user's experience.

#### *Types of Embedded Data*

15        The embedded data can be placed in the header or footer of the file, throughout the file such as within frame headers, or hidden in the content itself using steganographic encoding technology such as digital watermarking. The file may contain any combination of text, audio, video, images and software, in compressed or uncompressed format.

20        Auxiliary data used to manage sharing of a file may be embedded in headers and footers of the file for each type. When the data is to be embedded throughout the file, the file can be broken into frames of known size, with a header for each frame including space for embedded data. For MPEG compressed audio and video, these frames already exist. The embedded data can be hidden in copyright, private or auxiliary bits. The data embedded in frame headers can be modified by the audio in any frame and/or  
25 encrypted (defined as dynamic locking in patent application Ser. No. 09/404,291, already incorporated by reference) to improve its robustness to duplication in another content file, a content bomb, or virus.

30        With respect to watermarking, there are many known techniques for embedding data within software, image, audio, video, and text in the state of the art, and new techniques will evolve, especially for software. Examples of steganographic encoding and decoding technologies are described in US Patent 5,862,260, and in co-pending



patent application 09/503,881, filed February 14, 2000. The watermark may exist only in one place in the content, several places in the content, or continuously throughout the content. For example, in an audio file, the watermark may be repeated in temporal segments of the audio track. In a still image, the watermark may be repeated in spatial  
5 segments of the image. In video, the watermark may be repeated in temporal or spatial segments of the video signal.

#### *Roles of Embedded Data*

The embedded data may include an identifier (ID) that serves as an index to an  
10 entry in a searchable database that describes or otherwise identifies the content of the file. For example, the database can include elements, where each element comprises an ID, song title, album (or CD) title, release year, and artist name. This database can be indexed by any of these elements, thus improving automated searching capabilities. Specifically, rather than needing to search for "Help and Beatles", "The Beatles –  
15 Help!", and so on, a unique ID can be used in a search query to identify The Beatles' song Help, and different IDs may be used for different releases.

The user, via an automated search program, only needs to submit a search query including that ID. When searching, the user may be presented with a drop down menu of titles of files from the database that satisfy the search query. The search program  
20 automatically knows the ID from the database so that the correct file can be found and downloaded from a computer at an address associated with that file in the database. In addition, these IDs could help music be searched by year, which is desirable to many people who want to hear music from their high school or college days.

In addition to facilitating automated searches for content in files, the ID may also  
25 be used to track these files. For example, the file transfer system can add the ID of a file to an event log when the file is transferred (e.g., downloaded, uploaded, etc.). The specific components of the file transfer system involved in the event logging process may vary with the implementation. Also, the time at which the event is triggered and logged may also vary.

30 The client system responsible for sending a file may issue and log an event, and either store the log locally, and/or send it to a central or distributed database for

communication to other systems. The client system that receives the file may perform similar event logging actions. Additionally, if a server system is involved in a file transfer, it may also perform similar event logging actions. For example, the server may transfer the file, or facilitate the transfer between two clients, and as part of this operation, log an event of the operation including the file ID, the type of event, etc. In distributed systems where no central server is involved, the event logs can be stored on computers in the file sharing network (or a subset of the computers), and composite event logs can be compiled by having the computers broadcast their event logs to each other. Each computer, in this approach, could maintain a copy of the event log, which is synchronized upon each broadcast operation. The log could be used to account for all file transfers, and be used to properly pay the rights holders.

Another use for the embedded data when it contains a unique ID, such as unique to the retailer, song, artist and/or rights holder, is to link the consumer to more information, such as information about the retailer, song, artist and/or rights holder. The ID could be used to link to the retailer's web site, where the consumer can find additional songs in the same genre, year and by the same artist. Or, the ID could be used to link to the artist's web site where the consumer finds additional information about the artist and song, and can locate other songs by the artist. Or, the ID could be used to link back to the rights owner, such as the record label where the consumer can find additional information and music.

This connected content link could be displayed by the file sharing application during the downloading process. This provides the user with benefits of not wasting time during the downloading process, and gaining access to more music and information. The file sharing company can use this process to increase the revenues generated from the file sharing system through deals with the companies who gain access to the user via the connected content links.

The unique ID could be generated from the content, such as done with CDDDB, which generates an ID from a CD's table of contents (TOC), and then steganographically embedded into the content. Alternatively, the unique ID may not be embedded but inherently linked to the content via a hash or fingerprint function that turns some or all of the content into a few bits of data. The number of bits allowed

determines the likelihood that different files transform into the same number of bits. However, even with as few as 32 bits, this is unlikely. In addition, this is less likely if the hash function prioritizes parts of the data that are most perceptually relevant. This process is sometimes referred to as fingerprinting.

5       The embedded data, when continuously embedded throughout the content, can improve the reliability of the content by, for example, demonstrating that the content is complete and has no viruses. One way to make the embedded data continuous is to insert it in periodically spaced frame headers, or steganographically encode it at locations spread throughout the file.

10       A person trying to sabotage the file-sharing system can try to replicate the embedded data through a content bomb (such as audio repetitively saying "do not copy") or virus to fool the system. Thus, the harder it is to duplicate the embedded data, the more reliable the system is. When trying to resist duplication, it is advantageous to encrypt the embedded data payload, thus making it harder to duplicate.

15       In addition, the embedded data payload can be modified by the content to improve resistance to duplication. Finally, the embedded data can be modified by the content and then encrypted for more secure applications. The above three robustness methods are labeled dynamic locking and disclosed in patent application #09/404,291, already incorporated by reference. When the embedded data is a watermark, meaning that it is

20       steganographically embedded within the content and not just as auxiliary data in each frame, it is usually inherently robust to duplication because many watermarks use secret keys that are required to detect the watermark and read the information carried in it. One form of key is a pseudo-random noise (PN) sequence used as a carrier to embed, detect, and read the watermark. In particular, a spreading function is used to modulate

25       the PN sequence with the watermark message. The resulting signal is then embedded into the host data (e.g., perceptual or transform domain data) using an embedding function. The embedding function modifies the host signal such that it makes subtle changes corresponding to the message signal. Preferably, these changes are statistically imperceptible to humans yet discernable in an automated steganographic decoding

30       process. Encryption and changing the watermark message or PN sequence adaptively based on the content can improve the robustness of the watermark to duplication.

Alternatively, if the embedded data is generated from the content, the embedded data is inherently linked to the content and is difficult to duplicate in a virus or content bomb. For example, pseudo-randomly chosen frames can be hashed into a few data bits that can be embedded in other pseudo-randomly chosen frames. Thus, without  
5 knowledge of the pseudo-random sequence (i.e. key) used to choose the frames and the hash function, the hacker cannot duplicate the embedded data.

Importantly, header and footer structures should be of known size or protected so a hacker cannot slip a virus into the header or footer.

The embedded data can also demonstrate that the file is allowed to be shared,  
10 which means its owner has authorized copying (i.e. sharing) rights. The watermark message may include standard copy control information such as two message bits to encode copy permission states of “no more copy,” “copy once” and “copy freely.” In addition, only one bit can be used, thus indicating whether or not sharing, is allowed.

The copyright can be linked to other copy management systems. For example,  
15 according to the DVD-Audio specification (available at <http://www.dvdforum.org>) and the Portable Device Specification of the Secure Digital Music Initiative (available at <http://www.sdmi.org>), audio may be watermarked with copy control information. This information may automatically be passed along if encoded within a watermark robust enough to survive the compression used in most file-sharing systems. Alternatively, the  
20 watermark can be read and re-embedded as embedded data, possibly another type of watermark (as discussed in patent applications Ser. No. 09/404,292, already incorporated by reference).

In addition, the copyright data can provide more information than just copy or not. For example, the bits may inform file sharing software, system or device that this  
25 file can be shared by subscription users, but not free users. Or, it can inform the level or type of subscription which allows sharing of the file. Specifically, subscription users who pay per month can share files that a free user cannot share. With music sharing, a popular band may allow only subscription users (or possibly users with an expanded subscription) to share their file so that they can earn revenue directly from the file.  
30 However, a new band may allow their song to be shared by all users.

*Embedded Data Payload*

The simplest form of the embedded data is a payload of one bit determining whether or not the file can be copied. A better payload is one with two bits for copy control and more bits, such as 32 bits, for a unique identifier that can be used to verify that the file contains the correct content. Note that demonstrating the file is complete does not depend upon the payload, but upon completeness of embedded data throughout the content. A decoding process can verify whether the file is complete by determining whether or not the embedded data is present at predetermined intervals or segments of the content. Finally, the payload can have a payload type, such as 8 bits, and then more bits, like 32 bits, of information that depends upon the document type and probably includes copy control and an identification section.

One way to verify that a file is complete without spreading embedded data throughout the file is to embed a hash of the file data at one or more selected locations within the file. The completeness of the file is checked by a program or device that recomputes the hash from the file and compares it with the previously computed hash which is embedded in the file.

When the payload is to be continuously embedded with dynamic locking and it contains only a few bits, such as 1 bit, a system designer can easily convert the payload into a multi-bit payload for more secure dynamic locking. For example, the 1 bit payload can be represented by a 16-bit PN sequence, where a "1" is the 16-bit PN sequence and a "0" is the 16-bit complement, embedded over and over again.

A further concept is the integration of watermark data into peer-to-peer (e.g., Napster-like) systems.

Referring to Fig. 4, the top 3 boxes correspond to an embedding part of the system. The embedded bits may fall into various classes, e.g:

Copyright/Subscription level bits or protocol (e.g., 1-3 bits)

- In a free subscription system, these bits can provide copyright notification and control. They may also provide preview and/or stream capabilities, permitting the viewer to buy a copy of the content.

- In a pay subscription system, these bits can be used to track royalty payments (e.g., when including Unique ID bits)

Date stamp bits (e.g., 16 bits)

- Allows content to enter different parts (tiers or levels) of the file-sharing system over time, so as to maximize profitability (e.g., as done with video releases)

Unique ID bits (payload) per song (e.g., 24-32 bits)

- Connected content and e-commerce opportunities
  - Buy paraphernalia and other similar music
  - More information about artist
- Improved searching because the unique ID uniquely identifies the content

Retail Channel bits (e.g., 12-16 bits)

- Optionally connect to same retail channel from which the song was originally purchased

These bits are desirably embedded repetitively and continuously throughout a song. The bit payload at the beginning of a song may be different from that at the end (either in the specified bits, or others), permitting the watermark to serve as a receipt of complete downloading. Such continuous embedding is not required for all applications.

This watermark payload, and the format of an associated database record, is shown in Fig. 5.

The Unique ID may be automatically generated based on the content (e.g., fingerprint-like), or it can be specified by the owner of the content. The CDDB database (now termed Gracenote) can provide CD and song titles from the Table of Contents data read from a CD, and this information can be used in generating an ID. Fig. 6 shows such an arrangement. In this arrangement, the ripper reads song tracks from a CD as well as table of contents data. From the information on the CD, it forms an index into the CDDB database. Using information from the database, the ripper forms an ID to be embedded in a song track. The watermark payload may include, for

example, a CDDB TOC ID, used to index information in the CDDB database, and a track ID to identify the track as well as index information in the watermark ID database and/or in the CDDB database.

Today, MP3 content owners, such as Emusic.com, and MP3.com can embed  
5 their songs with copyright bits that control file sharing without audibility issues, and can additionally embed unique IDs that can be used to connect content back to the retailers and the artist's web site for increased e-commerce options.

While watermarked data is preferred because it is format independent, header data and the like can also be employed. The latter, for example, could be used by  
10 content owners to embed data in each frame header of MP3 files.

#### *General Utilization of Embedded Data for File-Sharing*

Before using the embedded data in the file-sharing system, the embedded data has to be added to the content, as shown in figure 2. Usually, the embedded data will be  
15 added at the time of creation or purchase. Minimally, the embedded data includes a copy control bit, possibly repeated throughout the file. When repeated, the embedded data also demonstrates file continuity and completeness. Additionally, the embedded data may include an ID to identify the content.

Alternatively, the content can be watermarked when created or manufactured for  
20 public release. For perceptual content such as images, audio or video, the watermark is designed to survive the compression, such as used in a JPEG or MPEG format. Or if not made to survive certain types of compression or other processing, the watermark can be read and re-embedded in the compressed content. An advantage of the watermark is that it survives typical file conversion processes such as ripping content  
25 from a CD to another electronic file format, usually a compressed format. A related benefit is that the watermark obviates the need for the file conversion program or device to be responsible for ensuring that the embedded data remains with the content. In other words, the ripper does not need to have a decoder for the embedded data and does not need to act on embedded data.

30 The system, as shown in figure 1, may be implemented in three principal network architectures:

1. A client server model with a central database 100, like the Napster file sharing system. In this case, the database 100 is centralized on a server 102 or group of servers managed by one entity. To the clients (e.g., 104, 106) of the system, the server 102 presents a common interface for accessing and searching the database 100 and getting address information of desired files to facilitate file transfer between clients.
2. A distributed client model with a distributed database, like the Gnutella file sharing system. In this case, the database 100 is distributed among several different computers (e.g., 104, 106) on a network 108 and several copies of similar but slightly different databases may co-exist. Each database may be replicated on each client or on other computers on the network that the clients may access via conventional network communication protocols like TCP/IP and HTTP. When any registered user makes a change to one copy of the database, other copies of the distributed database may be updated using database synchronization.
3. A central server model where users upload the files to a central server 102 for downloading from there, without the server knowing what content is in the file. In other words, the central server is not moderated. The central server contains a database 100 of the files that have been uploaded and are available for downloading.

In all three architectures, in general, a client system downloads the file from another place (e.g., client 106 downloads a file 110 from client 104). In architectures (1) and (2), the other place is another user's computer, whereas in case (3) the other place is a central server. In each case, the database is searchable via an automated search program.

Fig. 3 depicts a process for decoding embedded data from files in the file sharing system. For optimal scalability, the embedded data 300 is detected and read from a data file 302, by an embedded data decoding process 304 in the user's computer and not the network server. The decoding process, which is preferably integrated into client software of the file sharing system, returns the embedded data 306. The file sharing software in the client (and potentially on a server) then acts on the embedded data as



depicted in block 308. The user's computer can be the uploading or downloading computer, or both, in architectures (1) and (2), whereas the user's computer is the downloading computer in architecture (3).

Alternatively, when registering files and a network address with the file-sharing database, the user's file sharing software can scan files for the embedded data to enable proper registration. Note that each user is provided with client software or firmware, which is provided electronically or on a portable storage device like an optical disk.

The database, for any of the above architectures, is searchable via an automated search program and maintains records of the files (MP3 files, software, documents, images, video, etc.) available for sharing from each registered user. In addition, each user may maintain a local database 112, 114 of files available for sharing, including file identifiers, other file related metadata, and address information indicating where the file resides on the user's computer system (104, 106). When the user connects to the file sharing system (e.g., connects to the network), this information is added to the database of files available for sharing (e.g., connected to file registry 100).

Both systems have a mechanism for communicating connectivity status of clients. In particular, the connectivity status indicates which clients are currently connected to the network, and are available to transfer registered files. The connectivity status information may be maintained in the same or a different database as the one that maintains records of files available for transfer along with the addresses of the clients where those files are available. The example shown in Fig. 1 shows that a database, called the connected file registry, stores identifiers and possibly other information about files available for sharing and connectivity information such as the addresses of the computers where the files reside.

All three architectures include a client system (104, 106) that acts as the interface to end users, and maintains the end user's copy of files available for sharing in the network architecture. The client system is capable of directly or indirectly communicating with the database 100 and is capable of obtaining connectivity status.

In one preferred embodiment, the content files such as audio, image and video files, have been marked with embedded data that conveys any or all of the following: file identification, file status, such as complete and virus free, and copy control

information within the network architecture. The clients have an embedded data decoder that screens files for the presence of embedded data, and if found, determines whether the embedded data enables the desired action. Before sending or receiving a file as part of a file sharing process in the network architecture, the client checks the file transfer status and determines whether or not the file can and is the correct and complete file to be transferred.

One enhancement is to add a user interface to the client that informs the user of file transfer rights, and gives the user the opportunity to get rights that he or she desires. One way to get the rights is to connect to another computer and purchase a copy of the file with the desired file transfer rights. One way to enable this connection is to include an identifier (e.g., address, URL, name, etc.) or index to an identifier in the embedded data that instructs or otherwise enables the client to establish network communication with an e-commerce or rights transaction server. The purchased file may be transferred to the client electronically or physically shipped on packaged media, such as an optical disk, memory card, etc.

The user interface may also enable the user to get additional information about a file (e.g., a generic or customized copyright notice or other metadata) and to access another server that provides electronic purchase opportunities. For example, the user interface may facilitate a link to a server on the network that enables the user to buy a file of interest or related files. For music applications, the user can buy a music track or set of tracks, concert tickets, etc. via an electronic transaction between the client and an e-commerce server on the Internet. This link can be shown during the downloading process, with the advantage of allowing the user to browse during the downloading process.

Another way is to connect to another computer and purchase the rights, which in turn, are updated in the file by changing the embedded data in some fashion. The updated rights may be affected by encoding more embedded data, such as another watermark, or altering the existing embedded data, such as by removing it. Content providers or distributors pay the provider of the embedded data technology to encode files. In one embodiment, the files are watermarked at their time of creation. In addition, the content providers or distributors pay the provider of the embedded data

technology per transaction when users purchase enhanced rights. There are a number of ways to track these transactions. The client software that performs encoding or decoding of the embedded data can keep a log of transactions and add the log to a central or distributed database of transactions. Alternatively, the transaction server that communicates the enhanced rights to the client can log the transaction event in a similar fashion.

Finally, if no embedded data exists, it is up to the client file sharing application to decide what to do.

On the user side, when the user registers a song on the hard drive, the user's file-sharing application tells the central database:

- Song is reliable if embedded data exists and is continuous
- Copyright and subscription level of song
- Song title, album, artist, etc., optionally obtained from clearinghouse web server
- In the future, look for watermark and trans-watermark or embed data in frame header

When the user searches for songs, the database can quickly

- Display "reliable" icon for watermarked songs (increasing the user's confidence in safety)
- Display Label (helps determine if good song, especially for smaller or classical labels)
- Determine which songs the user is allowed to access, and which are available for purchase (display options set by user; user not confused by seeing files they cannot access)

When the user downloads a song, the user's file-sharing application can

- Double check that the embedded data is continuous, if supposed to be present (drastically reducing sabotage by substituting songs on uploading computers)
- Double check that the embedded data allows sharing

- Check that complete file is downloaded (and optionally providing download receipt)
- Use the identification and clearinghouse web server to track songs for rights organizations, and provide additional e-commerce opportunities from the original retailer and artist's web site

The foregoing arrangement employs a remote database, or other data repository, to store the ancillary information.

The following section details particular watermark-related actions that can be utilized when distributing digital content.

1. Label content with watermark
2. Use watermarked label to trigger automated purchase and file transfer operation from source to user's machine, digital locker, etc. (e.g., press button while listening to song to trigger transaction), may include some notions of digital money transaction (see, e.g., , application 09/337,590)
3. Embed label in an automated fashion on users' machines: search for content on drive, look up ID from local or network database (with either fingerprint or TOC type indicators), embed ID into content
4. Embed label at time of rip, where the file transfer "client" (which acts as both client and server) includes read/write functionality. The write function can be used for supplementing previous embedding by content owner or ripper software (see, e.g., applications 09/563,664 and 09/578,551). During download, adding the unique ID from a fingerprint and secondary second database .
5. Check file for proper naming, labeling before adding to file sharing registry of content items (songs)
6. Update a listing of name - ID mapping, increment registry in real time
7. Mark file with user's ID during a download, then if user attempts to add to a file sharing system, the system knows the user and informs them how the user can and cannot use the file; e.g., refuse registration
8. Distinguish level of service in subscription service by watermark label (see,

e.g., application 09/620,019)

9. check integrity of file: free of content bombs and viruses (see, e.g., application 09/620,019)

10. Use time stamp to control changing of rights over time (see, e.g.,  
5 application 60/232,163).

11. During transfer of a content object (e.g., by streaming or file transfer), a fingerprint or meta-tag obtained from the object can be parsed from the in-transfer object and used as an ID to access a database record. The database record can contain pre-existing information that can be read by the client device (e.g., to ascertain  
10 permitted usage rights). Or the database record can be written, e.g., with the date, time, username, etc., relating to the transfer.

12. Audio excerpts (e.g., individual MP3 frames) can be hashed (e.g., yielding 16 bits). This hash code can be used to modulate bits – making it more difficult to change the audio.

15

#### *Specific Example Utilization*

In this specific example utilization, it is assumed that the embedded data has been added and dynamically locked (including being modified by the audio content and encrypted, as defined in patent application Ser. No. 09/404,291, already incorporated by  
20 reference) to the audio throughout the frames in all legitimate MP3 files at the time of creation. (Note that the embedded data could include an ID to identify the content and/or artist, such as could be created from CDDDB's database, available at <http://www.cddb.com>, and incorporated by reference, but not included in this example.) For personal use, this may happen at the ripping stage, i.e. when content on an optical  
25 disk like a CD is converted into a MP3 file. For retail use, this may happen when the file is made available for sale, probably through a commercial ripper. This can also happen during the file transfer in the file sharing system. The identity of the file can be determined from its ID3 song title tag or digital fingerprint, defined as a hash of some or all of the digital audio file. The song title or fingerprint can be used to connect to a  
30 secondary database to locate the ID for that song. In this design, the ID embedded in a song is the same for each user.

When a user enables a file sharing system (e.g., an enhanced version of the Napster file sharing system) to share a directory on his computer, client software on the user's computer searches for all MP3 audio files in locations (i.e. folders or directories) allowed by the user. For each audio file, the client software looks for embedded data placed throughout the frame headers of the MP3 file. The embedded data provides data that the file is allowed to be shared and is continuous from start to end. Since the embedded data is dynamically locked to the audio, thus extremely difficult to duplicate, it is presumed that no viruses or audio bombs have been substituted. Now, the client software establishes a connection with a central database, and transfers to the central database the artist and song title of each song due to its ID3 tags, that the file can be shared, and that it is a "safe" file. (Note that the artist and song title can be identified by the embedded data ID and a secondary database, as discussed above, but not implemented in this example.) In addition, if no embedded data exists, it is up to the application to decide whether to allow file sharing. The application would not want to display a "safe" icon.

Next, when the user is connected to the file sharing system, the central database activates his songs (e.g., adds them to the connected file registry 100). If someone else's search locates this user's songs, they can download the songs from his computer and know they have rights and that the song is "safe" by some identifying feature displayed in the UI of the client software, such as a "safe" icon.

However, if a user wants to foil the system, he may have tried to replace the file with a file of the same size and name. In this case, the client software can do any or all of the following to improve its reliability. The uploading side client software may want to verify that the embedded data still exists and is complete before allowing uploading. Or, the requesting/downloading client software may ask the uploading client software for the embedded data. This uploading-side security and client-to-client exchange is more difficult to trick since it involves changing object code of the client software, but not impossible since the exchange includes using software available on the computer of the person desiring to sabotage the system. In addition, the requesting/downloading client application may want to check the embedded data while the file is downloaded. Bypassing this last downloading-side security feature is the most difficult since it

happens on a computer not available to the person desiring to sabotage the system and the embedded data is secure.

In an alternative example, the embedded data could be a watermark placed in the original CD or DVD audio, and which survives compression and is used in other copy management systems, such as designed by DVD-A and the Secure Digital Music Initiative (SDMI). In this case, the enabling and usage of the file-sharing system would be similar. It is mainly the embedding process that is different.

*Using the Embedded Data to Link to Additional Information or Actions*

In addition to the roles of the embedded data described above, the embedded data may also be used to link additional information or actions to a file. For example, the embedded data may carry an address or an index to an address of additional information or a program related to the file. The embedded data may trigger the decoding application to fetch the additional information or execute the linked action automatically. Alternatively, the decoding application may present a user interface to the user, giving the user the option to instruct the computer to fetch additional information or launch a program associated with the file via the embedded data.

The additional information may be rendered to the screen (e.g., a web page, graphical image, video) or rendered to an audio output device (e.g., a sound clip). The additional information may represent a graphical brand identifier, copyright notice, web page or link to a web page, etc. Visual information or program instructions linked to a file may be used to create a user interface that controls how the user interacts with the file. The user interface may include graphical icons that act as hot links to web pages or programs, user interface controls that enable the user to control rendering or transfer of the file from which the embedded data was extracted. For example for a music file, the user interface controls could enable the user to control playback of the file. These user interface controls may create a unique user interface for each file or customize a media player, such as Windows Media Player, Real Player from Real Networks, WinAmp from America OnLine, for that file.

In one usage scenario, the client system extracts this embedded data and presents a user interface to the user asking him if he wants additional information about the file. In the case of a music file, the client system could display a link to additional

information or a related action as the music file is being transferred or rendered. Specifically, the embedded data could be used as an index to a URL of a web site that provides more information or opportunities to buy the music or related products or services via an electronic transaction.

5           A database mapping embedded data to additional information or actions could be stored in the client system, a remote computer or device connected via a network, or a combination of both. The client system may be programmed to automatically look up corresponding information or actions in response to decoding the embedded data. The information or actions in this case may include displaying a user interface with links to  
10 additional information, programs, etc. (e.g., links to web sites, or programs that execute when the user selects the link). Alternatively, it may include fetching related information or programs that is rendered or executed automatically while the file is being transferred or rendered. For example, the embedded data in a music file might link to video or image data that is rendered as the music is being rendered. Also, the  
15 embedded data might also link to a web site where the user can buy the content, license usage rights in the content, or buy or purchase related content, products or services. For more information about these types of applications see co-pending patent applications: 09/563,664 entitled Connected Audio and Other Media Objects filed May 2, 2000, and 09/571,422 entitled Methods and Systems for Controlling Computers or Linking to  
20 Internet Resources from Physical and Electronic Objects filed May 15, 2000, 09/574,726, entitled Methods and Systems Employing Digital Watermarking filed May 18, 2000, which are hereby incorporated by reference.

#### *Using Fingerprints to Enhance Searching and Tracking of Files*

25           Just as embedded data enhances file sharing systems, fingerprints can also provide additional functionality. Fingerprints refer to unique identifiers that are derived from the content of the file. For example, a fingerprint can be computed from an audio, image or video signal stored in a file by hashing the data representing that signal into a unique identifier.. The data that is used may be part or all of the file, desirably using an  
30 initial segment, and can the perceptually relevant data of the file, such as frequency components of an audio file that have large magnitudes. The unique identifiers for files



are stored in a database that associates information, and in some cases, automated actions, with the unique identifiers. Such fingerprint technology is currently used to identify audio and video signals for broadcast monitoring applications, and can be used for applications described in this document.

- 5           Fingerprints may be computed for media files, like image, audio, and video files, and stored in a database along with information or actions associated with the files. This database enables files to be associated with related information or actions as described in the previous section.

- For example, file sharing software executing on the client computes the  
10   fingerprint for a file recently received or sent in the file sharing system. As part of the file sharing process, the file sharing software computes the fingerprint and sends it to a database system, which is located at a central server or distributed in the file sharing network. In response, the database system returns related information, or performs an action related to the fingerprint, such as logging an event, linking to another computer  
15   (e.g., a web site that returns information to the sending or receiving computer, a licensing server that sends a web page to the sending or receiving computer with licensing information or usage control rules), streaming a media signal (e.g., streaming audio or video) to the sending or receiving computer, etc.

- The fingerprint augments file searching and tracking in the system because files  
20   can be searched or tracked based on their fingerprint. For example, the user could instruct the file sharing system to return a list of related files to a file in question. In response, the file sharing software computes a fingerprint of the file in question, sends it to a search engine, which in turn, returns a list of files and related information linked to that fingerprint in a database. Also, to track usage or transfer of a file, the file  
25   sharing system can log the fingerprint of a file when it is transferred or used as described previously.

- The fingerprint is computationally expensive to calculate each time in some cases. The fingerprint ID can be stored in the file sharing database so it only needs to be calculated once. This fingerprint ID is then associated with the media file from  
30   which it was calculated, such as by associating it with an identifier for the file.

However, this method of storage is not tightly locked to the file, and, thus, allows people to create content bombs within files, or swap them under false names.

As such, a method of embedding the fingerprint data in the header can be used to  
5 improve the efficiency of the fingerprinting method. Similarly, the method of embedding the watermark ID in the header can be used to improve the efficiency of the watermark method. This method allows header data to be efficiently checked for the ID before calculating the fingerprint or detecting the watermark.

In addition, this ID can be embedded in the header when the watermark is  
10 embedded or when it is read, or when the fingerprint is calculated, preferably the first time calculating the fingerprint. The embedding can provide reliability and digital receipts if it is embedded throughout the frames, possibly using the MPEG standard copyright bit, and locked to the content and encrypted, as discussed previously.

#### 15 *Concluding Remarks*

Having described and illustrated the principles of the technology with reference to specific implementations, it will be recognized that the technology can be implemented in many other, different, forms. To provide a comprehensive disclosure without unduly lengthening the specification, applicant incorporates by reference the  
20 patents and patent applications referenced above.

The methods, processes, and systems described above may be implemented in hardware, software or a combination of hardware and software. For example, the auxiliary data encoding processes may be implemented in a programmable computer or a special purpose digital circuit. Similarly, auxiliary data decoding may be  
25 implemented in software, firmware, hardware, or combinations of software, firmware and hardware. The methods and processes described above may be implemented in programs executed from a system's memory (a computer readable medium, such as an electronic, optical or magnetic storage device). Additionally, content encoded with auxiliary data used in file sharing may be distributed on packaged media, such as  
30 optical disks, flash memory cards, magnetic storage devices, or distributed in an electronic file format.

The particular combinations of elements and features in the above-detailed embodiments are exemplary only; the interchanging and substitution of these teachings with other teachings in this and the incorporated-by-reference patents/applications are also contemplated.

## Claims

1. A method of controlling file-sharing in a file sharing system using embedded data, the method comprising:  
checking for the embedded data in a file designated for file sharing at a  
5 user's computer, and  
in response to finding the embedded data, instructing the user's computer to act according to the embedded data;  
wherein the user's computer interacts with the embedded data to control file-sharing in the file sharing system.  
10
2. The method of claim 1 in which the embedded data includes an identifier of content in the file that facilitates automated searching for the file.
3. The method of claim 1 in which the embedded data includes data  
15 continuously throughout the file that facilitates verification that the file is complete or free of a virus.
4. The method of claim 3 in which the embedded data is modified by the content and encrypted to improve its robustness to impersonation.  
20
5. The method of claim 3 in which the embedded data includes embedding an identifier of the content to facilitate automated searching.
6. The method of claim 1 in which the embedded data includes data to  
25 determine whether the content can be shared.
7. The method of claim 5 in which the embedded data includes data to determine whether content in the file can be shared.
8. The method of claim 1 in which the embedded data comprises a  
30 watermark embedded in content in the file, the watermark persisting within the content and being difficult to remove without degrading the content.
9. The method of claim 8 in which the embedded data includes an identifier  
35 of content in the file to facilitate automated searching.

10. The method of claim 8 in which the embedded data includes data continuously throughout the file to facilitate verification that the file is complete or free of a virus.
- 5        11. The method of claim 10 in which the embedded data includes an identifier of content in the file to facilitate automated searching.
12. The method of claim 8 in which the embedded data includes data to determine whether content in the file can be shared.
- 10        13. The method of claim 11 in which the embedded data includes data to determine whether content in the file can be shared.
14. The method of claim 1 in which the embedded data is a watermark and the file is an audio file, the watermark persisting within the content and being difficult to remove without degrading the content.
- 15        15. The method of claim 12 in which the embedded data includes a watermark embedded in content in the file that carries an identifier of the content facilitating automated searching of the content.
- 20        16. The method of claim 12 in which the embedded data is embedded continuously throughout the file to facilitate verification that the file is complete or free of a virus.
- 25        17. The method of claim 16 in which the embedded data includes an identifier of content in the file to facilitate automated searching for the content.
18. The method of claim 1 in which the user's computer checks content in the file for the embedded data before adding the file to a file-sharing database.
- 30        19. The method of claim 1 in which the user's computer checks content in the file for the embedded data before allowing the file to be uploaded.
- 35        20. The method of claim 1 in which the user's computer checks content in the file for the embedded data before allowing the file to be downloaded.

21. The method of claim 8 in which the user's computer checks content in the file for the embedded data before adding the file to a file-sharing database.
- 5 22. The method of claim 8 in which the user's computer checks content in the file for the embedded data before allowing the file to be uploaded.
23. The method of claim 8 in which the user's computer checks content in the file for the embedded data before allowing the file to be downloaded.
- 10 24. The method of claim 14 in which the user's computer checks content in the file for the embedded data before adding the file to a file-sharing database.
25. The method of claim 14 in which the user's computer checks content in the file for the embedded data before allowing the file to be uploaded.
- 15 26. The method of claim 14 in which the user's computer checks content in the file for the embedded data before allowing the file to be downloaded.
- 20 27. A method of controlling file-sharing using embedded data, the method comprising:  
embedding data in a file before releasing the file for file-sharing,  
checking for the embedded data in the file at a user's computer, and  
having the user's computer act according to the embedded data.
- 25 28. A file sharing system comprising: a file sharing client operable to locate a file available for sharing on one or more remote devices, and an embedded data decoder operable to check the file for embedded data, and to instruct the file sharing client to act according to the embedded data.
- 30 29. A computer readable medium on which is stored software for performing the method of claim 1.
- 35 30. A computer readable medium on which is stored software for performing the method of claim 27.

31. The file sharing system of claim 28 wherein the embedded data includes control information operable to inhibit the file sharing client from transferring the file.

5 32. A method of controlling use of a media file in a file sharing system, the method comprising:

in a client of the file sharing system, computing a fingerprint of media data;

10 using the fingerprint to look up a related information in a database; and performing an action associated with the related information.

33. The method of claim 32 wherein the action comprises generating a list of related media files.

15 34. The method of claim 32 wherein the action comprises logging an event to track usage or transfer of the media data.

20 35. The method of claim 32 wherein the action comprises establishing a connection to a server that provides licensing information or usage control rules for the media data.

36. The method of claim 32 wherein the action comprises linking to a web page related to the media data.

25 37. The method of claim 32 wherein the fingerprint is computed from the media data by hashing the media data into a substantially unique identifier.

38. The method of claim 37 wherein the hashing of the media data operates on parts of the media data representing perceptually relevant parts of the media data.

30 39. A method of processing media data comprising:  
computing a fingerprint of the media data by hashing perceptually relevant parts of the media data; and embedding the fingerprint in the media data.

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Fig. 1

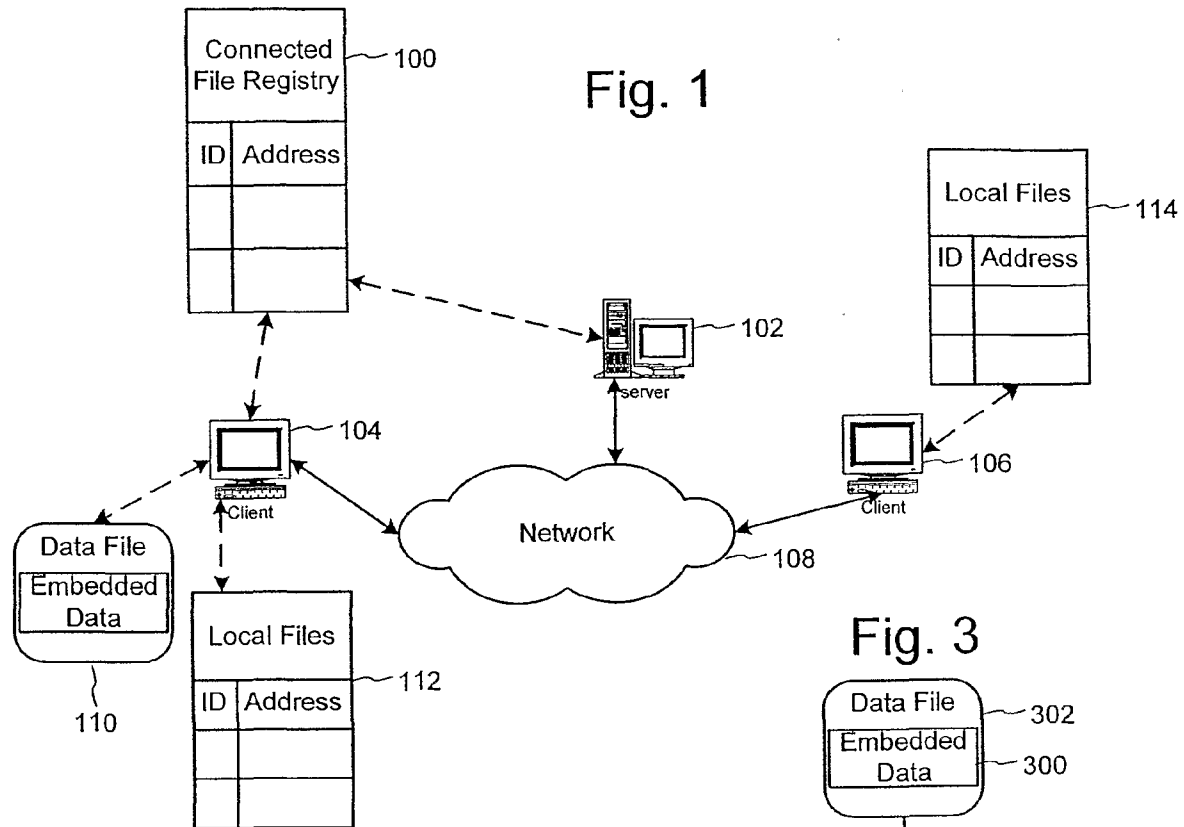


Fig. 2

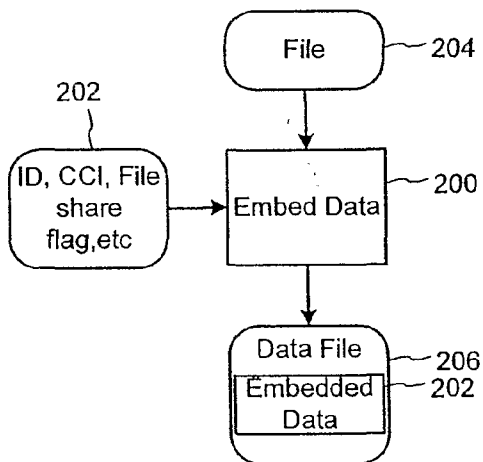
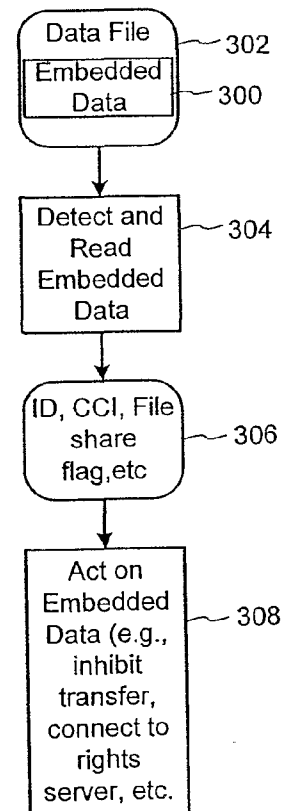


Fig. 3





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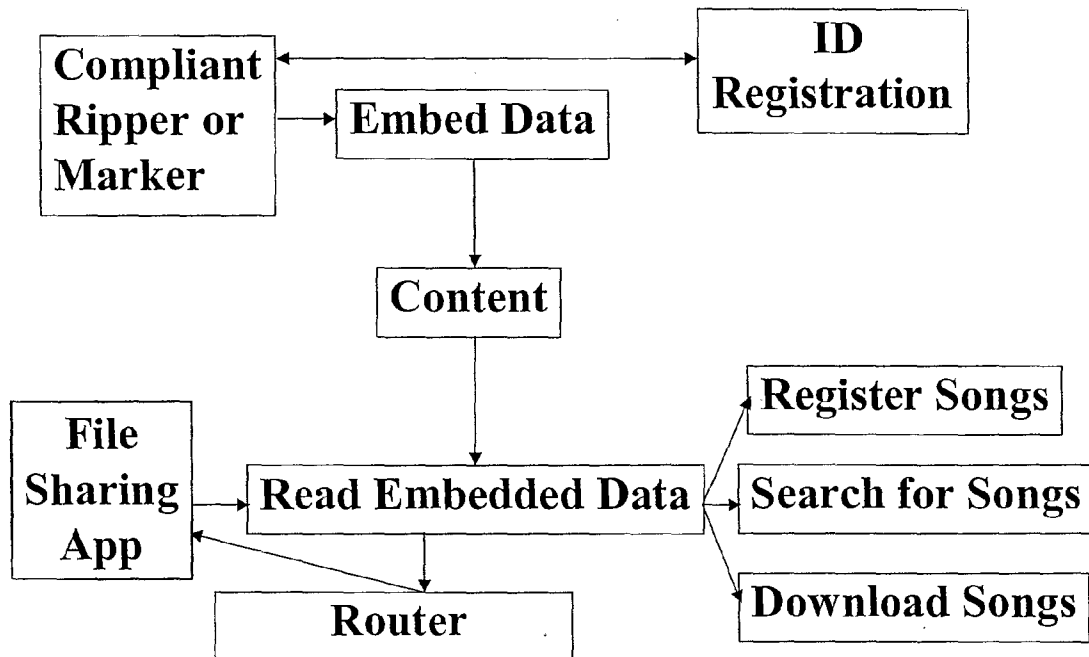


Fig. 4

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**ID Format**

<b>Copyright</b> <b>(1-3 bits)</b>	<b>Date</b> <b>(16 bits)</b>	<b>Unique Song ID</b> <b>(24-32 bits)</b>	<b>Retail Channel</b> <b>(12-16 bits)</b>
---------------------------------------	---------------------------------	--	--

**Database Format**

<b>Song Info</b>					<b>Connected URLs</b>				
ID	Song Title	Artist	Label	Date ©	Song- writer	Artist	Label	Retail channel	Default

**Fig. 5**

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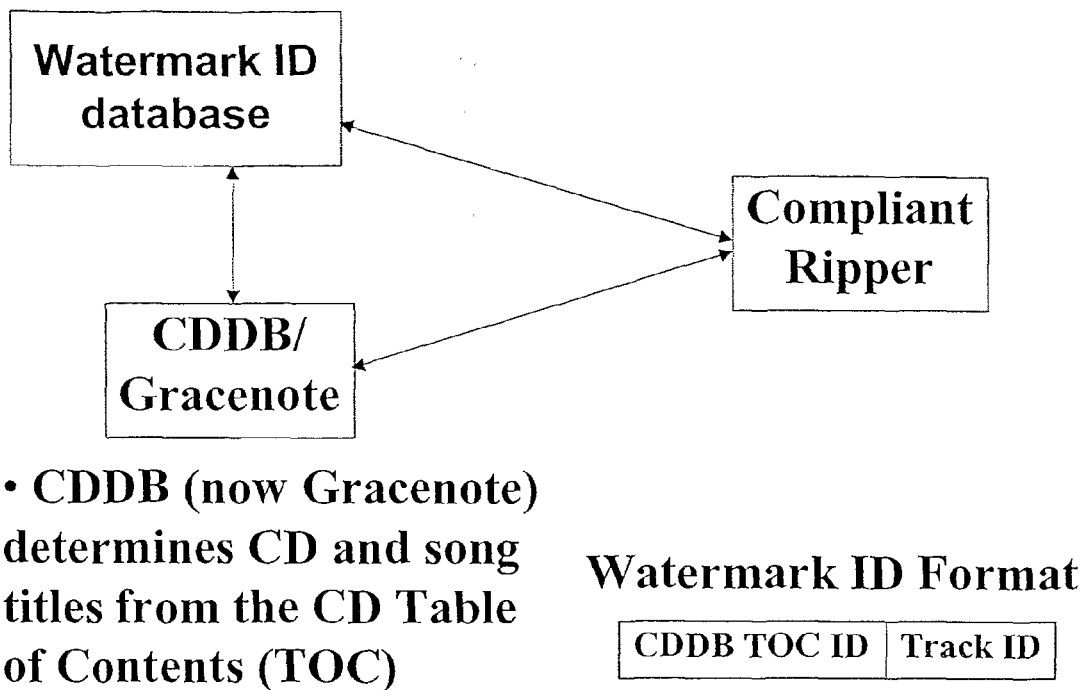


Fig. 6

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/22953

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/00

US CL : 707/104.1

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 707/104.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EAST

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, P	US 6,115,741 A (DOMENIKOS et al) 05 September 2000 (05.09.2000), ALL.	1-39
Y	US 5,809,317 A (KOGAN et al) 15 September 1998 (15.09.1998), ALL.	1-39

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

15 October 2001 (15.10.2001)

Date of mailing of the international search report

15 NOV 2001

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks

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Washington, D.C. 20231

Facsimile No. (703)305-3230

Authorized officer

Uyen T Le

Telephone No. 703-305-3900

Form PCT/ISA/210 (second sheet) (July 1998)

IPR2020-00216

Gracenote EX2009 Page 144

(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
20 November 2003 (20.11.2003)

PCT

(10) International Publication Number  
**WO 03/096337 A2**(51) International Patent Classification<sup>7</sup>: **G11B 20/00**(21) International Application Number: **PCT/IB03/01524**(22) International Filing Date: **15 April 2003 (15.04.2003)**(25) Filing Language: **English**(26) Publication Language: **English**(30) Priority Data:  
02076848.7 **10 May 2002 (10.05.2002) EP**(71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL];  
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c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).(74) Agent: **SCHMITZ, Herman, J., R.**; Internationaal Octrooibureau B.V., Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

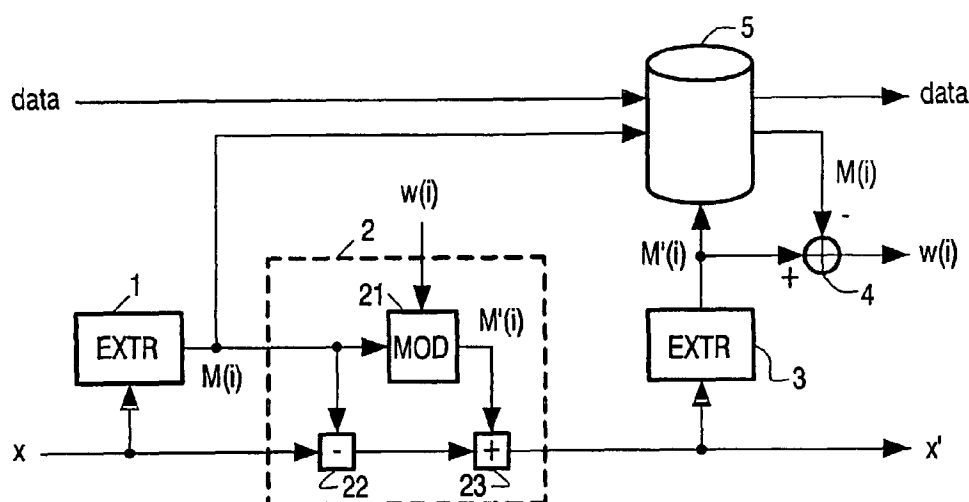
(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CII, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

[Continued on next page]

(54) Title: **WATERMARK EMBEDDING AND RETRIEVAL**

(57) **Abstract:** Fingerprinting is a technique to identify multimedia signals by extracting robust perceptual features of the signal contents and searching the extracted features in a database where titles, artists, etc. are stored. Watermarking is a technique of embedding payload data in a signal in an unobtrusive manner. The invention combines both techniques. A fingerprint ( $M(i)$ ) is extracted (1) from a host signal ( $x$ ) and stored in a database (5). A watermark ( $w(i)$ ) is embedded (2) in the host signal by modifying (21) the signal, such that the fingerprint ( $M'(i)$ ) of the modified signal ( $x'$ ) differs slightly from the original fingerprint. The difference is so small that the database considers them to be similar. At the receiver end, the fingerprint is extracted (3) from the watermarked signal and applied to the database, which responds by returning the original fingerprint of the signal. The embedded watermark is retrieved by subtracting (4) the original fingerprint supplied by the database from the fingerprint extracted from the host signal.

WO 03/096337 A2



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## Watermark embedding and retrieval

## FIELD OF THE INVENTION

The invention relates to a method and arrangement for embedding a watermark in an information host signal. The invention also relates to a method and arrangement for retrieving the embedded watermark.

5

## BACKGROUND OF THE INVENTION

A prior-art method of embedding and retrieving a watermark is disclosed in Khalid A. Kaabneh and Abdou Youssef: "Muteness-Based Audio Watermarking Technique", presented at the 2001 IEEE Conference on distributed computing systems workshop, pp.

10 379-383. In this prior-art document, a sequence of periods of silence (mute periods) that occur in an audio signal are extracted from the host audio signal. The watermark is embedded by slightly modifying said mute periods, such that the watermarked signal is not perceptually different for the human auditory system. The watermark is retrieved by extracting the mute periods from a watermarked copy, and subtracting the original mute periods therefrom. The  
15 difference between both is the watermark to be retrieved.

The prior-art document discloses that it is sufficient for the watermark detector to have the original lengths of the mute periods available. The original signal itself is not required. The document does not disclose how the original lengths of mute periods of a watermarked signal are obtained. This is a problem in practical situations where the host  
20 signal is often unknown.

## OBJECT AND SUMMARY OF THE INVENTION

It is an object of the invention to provide a solution for the above-mentioned problem of the prior-art watermark embedding and retrieving method.

25 To this end, the invention provides a method and arrangement for embedding a watermark in a host signal, the method comprising the steps of extracting from the host signal an original fingerprint representing a perceptual feature of the host signal, storing the original fingerprint of the host signal in a database along with original fingerprints of further host

signals, and modifying the host signal, such that the fingerprint is modified in accordance with the watermark to be embedded.

A fingerprint, often also referred to as signature or hash, is the result of a function that maps perceptual features of a signal to a binary sequence. Unlike cryptographic hashes that are extremely fragile (flipping a single bit of the source data will generally result in a completely different hash), fingerprints are herein understood to be robust. That is, if source signals are perceptually similar, then the corresponding fingerprints are also very similar. Fingerprints are therefore used to identify audiovisual contents. An example of such fingerprints and use thereof is disclosed in Jaap Haitsma, Ton Kalker and Job Oostveen: “Robust Audio Hashing for Content Identification”, published at the Content-Based Multimedia Indexing (CBMI) 2001 Conference in Brescia, Italy.

The invention is based on the recognition that the perceptual features being modified to represent the watermark as taught by the prior-art constitutes a fingerprint. The invention exploits the insight that the fingerprint of the watermarked signal and the original fingerprint will only slightly differ, whereas fingerprints of perceptually different host signals will differ substantially. It is thus achieved with the invention that the watermarked signal can be identified by virtue of its original fingerprint stored in the database.

The corresponding method of retrieving a watermark embedded in a watermarked host signal comprises the steps of extracting from the watermarked host signal a fingerprint representing a perceptual feature of the watermarked host signal, searching, in a database in which original fingerprints of a plurality of host signals are stored, an original fingerprint which substantially matches the extracted fingerprint, and determining the difference between the original fingerprint found in the database and said extracted fingerprint, where said difference represents the watermark to be retrieved.

An embodiment of the watermark embedding method further comprises the steps of extracting from said host signal an identification of the host signal, and storing said identification in the database to identify the location of the corresponding original fingerprint in the database. Such an additional identification makes the process of searching the original fingerprint in the database easier, faster and more univocal.

In an advantageous embodiment, the identification is a further fingerprint representing a further perceptual feature of the host signal. With such an embodiment, one fingerprint conveys the watermark whereas the other fingerprint is used to identify the



location of the original fingerprint in the database. Different fingerprint schemes can now be chosen that are optimal for their respective purposes.

These and other aspects of the invention are apparent from and will be elucidated with reference to the embodiment described hereinafter.

5

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram of a system comprising a watermark embedding arrangement and a watermark retrieving arrangement according to the invention.

Fig. 2 is a schematic diagram of a further embodiment of the system according to the invention.

10

## DESCRIPTION OF EMBODIMENTS

Fig. 1 is a schematic diagram of a system comprising a watermark embedding arrangement and a watermark retrieving arrangement according to the invention. The watermark embedding arrangement comprises a fingerprint extracting circuit 1 and a watermark embedding module 2. The watermark retrieving arrangement comprises a fingerprint extracting circuit 3 and a watermark retrieving module 4. Both arrangements have access to a database 5.

The watermark embedding arrangement receives a multimedia host signal  $x$ . It will be assumed here that the multimedia signal  $x$  is an audio signal, but it will be appreciated that the multimedia signal may also be a video, image, or other type of signal. The signal  $x$  is applied to the fingerprint extraction circuit 1, which analyses the audio signal for occurrences of periods of silence in accordance with the teaching of Kaabneh et al. referenced herein before. The output of the extraction circuit constitutes a fingerprint in the form of a sequence of mute periods  $M(i)$ . The fingerprint  $M(i)$  extracted from the original host signal  $x$  will further be referred to as original fingerprint. The original fingerprint  $M(i)$  is stored in the database 5, possibly along with other data such as title of the song, artist, dates of creation, etc. A plurality of fingerprints extracted from a plurality of different songs are stored in the database in this manner.

The audio signal  $x$  is also applied to the watermark embedding module 2. In this module, a watermark is embedded which is applied to the module in the form of a sequence of watermark signal samples  $w(i)$ . The watermark embedding module 2 modifies

30

the signal  $x$  in such a manner that the mute periods  $M(i)$  are slightly lengthened or shortened in accordance with the watermark. This operation can be typically expressed as:

$$M'(i) = M(i) + w(i) \quad (1)$$

In the Figure, the watermark embedding operation is schematically illustrated as being carried out by a modification circuit **21**, a separation circuit **22** and an insertion circuit **23**. The modification circuit **21** modifies the original mute periods  $M(i)$  into modified mute periods  $M'(i)$  in accordance with respective samples  $w(i)$  of the watermark. The watermark is embedded by first separating the original mute periods from the signal and subsequently inserting the new mute periods  $M'(i)$  into the signal.

The watermark retrieving arrangement receives the watermarked signal  $x'$ . The watermarked signal is applied to a fingerprint extracting circuit **3**, which is similar to the fingerprint extraction circuit **1** of the embedding arrangement. Accordingly, the mute periods  $M'(i)$  are extracted from the watermarked signal  $x'$ . The sequence of mute periods  $M'(i)$  is applied to the database **5** for matching with the plurality of original fingerprints stored in the database. Since the difference between the mute periods  $M'(i)$  of the watermarked signal  $x'$  and the original fingerprint  $M(i)$  of the original signal  $x$  is small, the most resembling sequence of mute periods found in the database may be assumed to be the one that corresponds to the original signal  $x$ . The stored fingerprints of other signals will generally be substantially different.

The database **5** outputs the original sequence of mute periods  $M'(i)$  to the watermark retrieving module **4**. Herein, the original mute periods  $M(i)$  as found in the database are compared with the extracted mute periods  $M'(i)$  to retrieve the watermark. In conformity with equation (1), this operation can be typically expressed as:

$$w(i) = M'(i) - M(i) \quad (2)$$

Additional data associated with the song, such as title of the song, artist, dates of creation, etc. can also be retrieved from the database.

In the example described above, the fingerprint is represented by the mute periods of an audio signal. Another example of a robust perceptual property that can constitute the fingerprint is a binary representation of the energy differences of several frequency bands of the audio signal as disclosed in Haitsma et al. referenced hereinbefore. The Haitsma et al. reference also provides a detailed description of a practical matching strategy to find the most resembling fingerprint in the database. For video and image

applications, a sequence of mean luminance differences between image blocks may constitute the fingerprint.

Fig. 2 is a schematic diagram of a further embodiment of the system. The same reference numerals are used in this Figure to denote the same elements as in Fig. 1. The embedding arrangement now comprises an identification circuit 6 which generates an identification signal ID to identify the original host signal x. The identification signal ID is stored in the database 5 along with the fingerprint M(i) with which it is associated. The retrieving arrangement comprises an identical or similar identification circuit 7, which generates an identification signal ID' to identify the watermarked signal x'. In this embodiment, the identification signal ID' is used to search in the database the stored fingerprint M(i) of original signal x.

If the original signal x is a digital computer file (e.g. an mp3 song) which includes metadata such as an ID tag identifying the file, then the identification signal ID may take the form of (a part of) said ID tag. Assuming that the ID tag is not affected by the watermark embedding process, the identification signal ID' derived from the watermarked signal is exactly the same. The fairly complicated process of fingerprint matching is now reduced to a simple look-up operation. The original fingerprint M(i) of the original signal can thus easily be found in the database.

If the original signal x does not have such a tag, the identification signal ID can be another fingerprint of the signal, now being extracted on the basis of a different robust perceptual feature of the contents. In this case, the identification circuits 6 and 7 are further fingerprint extraction circuits. This embodiment allows the fingerprint extraction circuits 1 and 3 for conveying the watermark, on the one hand, and identification circuits 6 and 7 for signal identification, on the other hand, to be optimized for their respective purposes.

It should be noted that the location of the database 5 is not relevant to the invention. The database may be located at the embedding arrangement end, the retrieving arrangement end, or remote from both. Where necessary, networks such as the Internet, may be used to apply fingerprints to or retrieve fingerprints from the database.

The invention can be summarized as follows. Fingerprinting is a technique to identify multimedia signals by extracting robust perceptual features of the signal contents and searching the extracted features in a database where titles, artists, etc. are stored.

Watermarking is a technique of embedding payload data in a signal in an unobtrusive manner. The invention combines both techniques. A fingerprint (M(i)) is extracted (1) from a

host signal ( $x$ ) and stored in a database (5). A watermark ( $w(i)$ ) is embedded (2) in the host signal by modifying (21) the signal, such that the fingerprint ( $M'(i)$ ) of the modified signal ( $x'$ ) differs slightly from the original fingerprint. The difference is so small that the database considers them to be similar. At the receiver end, the fingerprint is extracted (3) from the watermarked signal and applied to the database, which responds by returning the original fingerprint of the signal. The embedded watermark is retrieved by subtracting (4) the original fingerprint supplied by the database from the fingerprint extracted from the host signal.

## CLAIMS:

1. A method of embedding a watermark in a host signal, comprising the steps of:
  - extracting from the host signal an original fingerprint representing a perceptual feature of the host signal,
  - storing the original fingerprint of the host signal in a database along with original
  - 5 fingerprints of further host signals, and
  - modifying the host signal, such that the fingerprint is modified in accordance with the watermark to be embedded.
2. A method as claimed in claim 1, further comprising the steps of extracting
- 10 from said host signal an identification of the host signal, and storing said identification in the database to identify the location of the corresponding original fingerprint in the database.
3. A method as claimed in claim 2, wherein said identification is a further
- 15 fingerprint representing a further perceptual feature of the host signal.
4. A method of retrieving a watermark embedded in a watermarked host signal, comprising the steps of:
  - extracting from the watermarked host signal a fingerprint representing a perceptual
  - feature of the watermarked host signal,
  - 20 – searching, in a database in which original fingerprints of a plurality of host signals are stored, an original fingerprint which substantially matches the extracted fingerprint, and
  - determining the difference between the original fingerprint found in the database and said extracted fingerprint, where said difference represents the watermark to be retrieved.
- 25 5. A method as claimed in claim 4, wherein for each plurality of host signals an identification is stored in the database to identify the location of the corresponding original fingerprint, the method further comprising the steps of extracting from the watermarked host

signal an identification of the watermarked host signal, and using said identification to identify in the database the location of the corresponding original fingerprint.

6. A method as claimed in claim 5, wherein said identification is a further  
5 fingerprint representing a further perceptual feature of the watermarked host signal.

7. An arrangement for embedding a watermark in a host signal (x), comprising:  
– means (1) for extracting from the host signal an original fingerprint (M(i)) representing a  
perceptual feature of the host signal, and storing the original fingerprint of the host signal  
10 in a database (5) along with original fingerprints of further host signals, and  
– means (2) for modifying the host signal, such that the fingerprint is modified in  
accordance with the watermark (w(i)) to be embedded.

8. An arrangement for retrieving a watermark embedded in a watermarked host  
15 signal (x'), comprising:  
– means (3) for extracting from the watermarked host signal a fingerprint (M'(i))  
representing a perceptual feature of the watermarked host signal,  
– means (5) for searching in a database in which original fingerprints of a plurality of host  
signals are stored, an original fingerprint (M(i)) which substantially matches the extracted  
20 fingerprint, and  
– means (4) for determining the difference between the original fingerprint found in the  
database and said extracted fingerprint, where said difference represents the watermark  
(w(i)) to be retrieved.

1/1

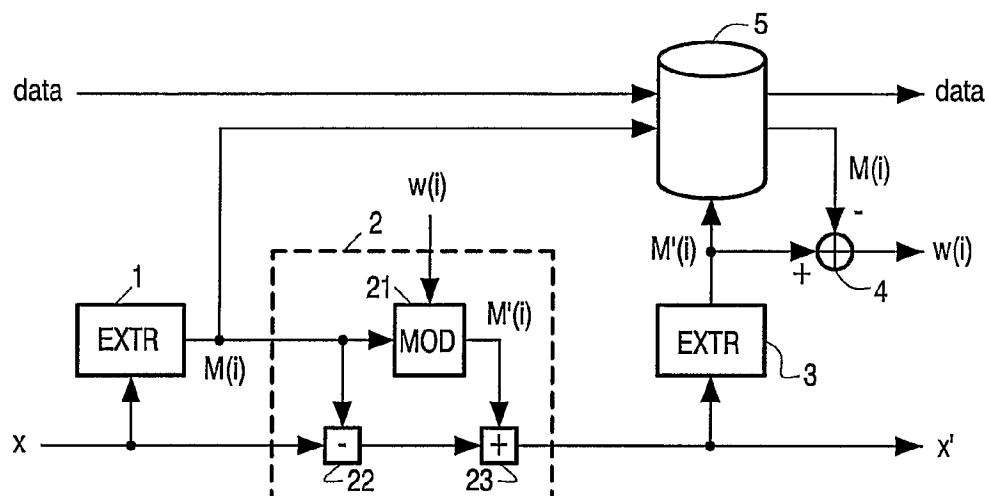


FIG. 1

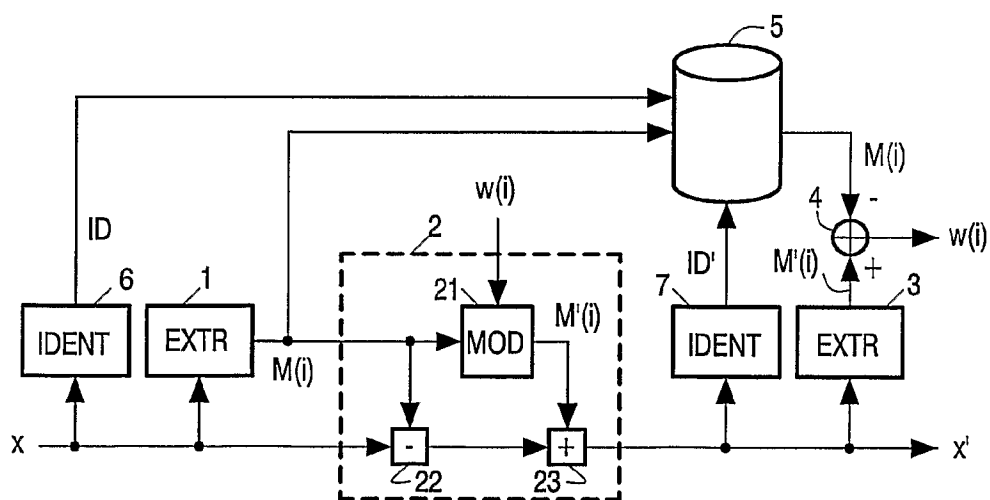


FIG. 2

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference PHNL030807WO	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/IB2004/051128	International filing date ( <i>day/month/year</i> ) 05 July 2004 (05.07.2004)	Priority date ( <i>day/month/year</i> ) 11 July 2003 (11.07.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant KONINKLIJKE PHILIPS ELECTRONICS N.V.		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 <i>bis</i> .1(a).																								
2.	<p>This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																								
3.	<p>This report contains indications relating to the following items:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input checked="" type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input checked="" type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
<input checked="" type="checkbox"/>	Box No. I	Basis of the report																							
<input checked="" type="checkbox"/>	Box No. II	Priority																							
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability																							
<input type="checkbox"/>	Box No. IV	Lack of unity of invention																							
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement																							
<input checked="" type="checkbox"/>	Box No. VI	Certain documents cited																							
<input type="checkbox"/>	Box No. VII	Certain defects in the international application																							
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application																							
4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).																								

<p style="text-align: center;">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 740 14 35</p>	<p>Date of issuance of this report 16 January 2006 (16.01.2006)</p> <p>Authorized officer  Idhir Britel</p> <p>Telephone No. +41 22 338 70 60</p>
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Form PCT/IB/373 (January 2004)



# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

REC'D 08 NOV 2004

PCT

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/B2004/051128

International filing date (day/month/year)  
05.07.2004

Priority date (day/month/year)  
11.07.2003

International Patent Classification (IPC) or both national classification and IPC  
H04N7/24, G06T1/00, H04N7/26

Applicant  
KONINKLIJKE PHILIPS ELECTRONICS N.V

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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Fax: +49 89 2399 - 4465

Authorized Officer

Schoeyer, M

Telephone No. +49 89 2399-2136



**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IB2004/051128

---

**Box No. I Basis of the opinion**

---

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IB2004/051128

---

**Box No. II Priority**

---

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-21
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-21
Industrial applicability (IA)	Yes: Claims	1-21
	No: Claims	

2. Citations and explanations

**see separate sheet**

---

**Box No. VI Certain documents cited**

---

1. Certain published documents (Rules 43*bis*.1 and 70.10)

and / or

2. Non-written disclosures (Rules 43*bis*.1 and 70.9)

**see form 210**

**Re Item V.**

1 The following documents are referred to in this communication:

D1 : EP 1 054 335 A (DIGIMARC CORP) 22 November 2000 (2000-11-22)

D2 : US 2002/178410 A1 (OOSTVEEN JOB CORNELIS ET AL) 28 November 2002  
(2002-11-28)

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not inventive in the sense of Article 33(3) PCT.

Document D1 discloses (see page 44, paragraph 457 ff.):

A method of relating one or more trigger actions with a multimedia signal, the method comprising the steps of:

- providing at least one trigger point and for each trigger time point providing at least one representation of least one associated trigger action, where each trigger time point indicates a time point of the multimedia signal for which the at least one associated trigger action is to be available during playback of the multimedia signal. Differently than claimed in claim 1 it is not explicitly shown in D1 that a fingerprint based on a segment of the multimedia signal is used. However, the use of fingerprints based on segment is well known in the art and is also disclosed by document D2 (see e.g. paragraph 56). The skilled person will consider the use of fingerprints based on segments when inserting the trigger information according to the method of claim 1.

Consequently, the subject-matter of claim 1 lacks inventive step.

3 INDEPENDENT CLAIM 5

3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 5 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 5 relates to the detection of the fingerprint, and carrying

out the associated action. Since this is the whole purpose of inserting the trigger in the first place, the subject-matter of this claim lacks inventive step for the same reason as claim 1.

**4 INDEPENDENT CLAIM 11**

- 4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 11 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 11 relates to a device functioning according to the method of claim 1 and lacks inventive step for the same reasons as set out above for claim 1.

**5 INDEPENDENT CLAIM 15**

- 5.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 15 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 15 relates to a device in functioning in accordance with the method of claim 5. Consequently the subject-matter of this claim lacks inventive step for the same reasons as claim 5.

**6 INDEPENDENT CLAIM 21**

- 6.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 21 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 21 relates to a computer readable medium having stored thereon instructions for causing one or more processing units to execute the method according to claims 1 and 5. Consequently the subject-matter of this claim lacks inventive step for substantially the same reasons as set out above for claims 1 and 5.

**7 DEPENDENT CLAIMS 2-4, 6-10, 12-14, 16-20**

Dependent claims 2-4, 6-10, 12-14, 16-20 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(3) PCT).

In particular:

- the use of the storage of the fingerprint (watermark) is known (as for example in claim 1) is known from D1 (see page 44, line 44);
- derived finger prints and representation of trigger action is transmitted to playback device (as in claim 3), - common general knowledge;
- segments start and end at trigger points (as in claim 4), -see D2 (page 5, paragraph 56);

Also the features of the other dependent claims contain similarly well known features or a shown in either D1 or D2.

## **8 INDUSTRIAL APPLICABILITY**

The subject-matter of claim 1-21 is industrially applicable in the field of multimedia signals.

# INTERNATIONAL SEARCH REPORT

Int      nal Application No  
PCT/IB2004/051128

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7    H04N7/24    G06T1/00    H04N7/26

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7    H04N    G06T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 054 335 A (DIGIMARC CORP) 22 November 2000 (2000-11-22) abstract page 44, paragraph 457 - page 45, paragraph 467 page 47, paragraph 473; figure 3 -----	1-21
X	US 2002/178410 A1 (OOSTVEEN JOB CORNELIS ET AL) 28 November 2002 (2002-11-28) page 5, right-hand column, paragraph 56 - paragraph 59 ----- -/--	1-21

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

27 October 2004

Date of mailing of the international search report

10/11/2004

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Schoeyer, M

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB2004/051128

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KATE TEN W ET AL: "TRIGG & LINK A NEW DIMENSION IN TELEVISION PROGRAM MAKING" PROCEEDINGS OF THE EUROPEAN CONFERENCE ON MULTIMEDIA APPLICATIONS, SERVICES AND TECHNIQUES, XX, XX, May 1997 (1997-05), pages 51-65, XP000668931 cited in the application page 53, paragraph 3 - page 55, paragraph 4 -----	1-21
A	WO 01/61987 A (WINOGRAD JOSEPH M ; PETROVIC RADE (US); VERANCE CORP (US)) 23 August 2001 (2001-08-23) abstract page 3, line 8 - page 4, line 5 -----	1-21
P,A	WO 03/096337 A (BRUEKERS ALPHONS A M L ; KONINKL PHILIPS ELECTRONICS NV (NL); VANDER) 20 November 2003 (2003-11-20) abstract page 3, line 13 - page 5, line 28 -----	1-21



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/051128

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1054335	A	22-11-2000	US 2003050961 A1	13-03-2003
			US 6650761 B1	18-11-2003
			US 6311214 B1	30-10-2001
			US 2003040957 A1	27-02-2003
			AU 4851300 A	05-12-2000
			CA 2373511 A1	23-11-2000
			EP 1054335 A2	22-11-2000
			EP 1185967 A1	13-03-2002
			JP 2002544637 T	24-12-2002
			WO 0070585 A1	23-11-2000
			US 2002062382 A1	23-05-2002
			US 2002112165 A1	15-08-2002
			US 2003105730 A1	05-06-2003
			US 2003130954 A1	10-07-2003
			US 6522770 B1	18-02-2003
			US 2004153649 A1	05-08-2004
			US 2004128514 A1	01-07-2004
			US 2004190750 A1	30-09-2004
			US 2001032251 A1	18-10-2001
			US 2002018579 A1	14-02-2002
			US 2002016816 A1	07-02-2002
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			US 2002164053 A1	07-11-2002
			US 2002181736 A1	05-12-2002
			US 2002181737 A1	05-12-2002
			US 2003012403 A1	16-01-2003
			US 2002032864 A1	14-03-2002
			US 2002028000 A1	07-03-2002
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			US 2003056104 A1	20-03-2003
			US 2001023193 A1	20-09-2001
			US 2002033844 A1	21-03-2002
US 2002178410	A1	28-11-2002	CN 1461565 T	10-12-2003
			EP 1362485 A1	19-11-2003
			WO 02065782 A1	22-08-2002
			JP 2004519015 T	24-06-2004
WO 0161987	A	23-08-2001	US 6737957 B1	18-05-2004
			AU 4371601 A	27-08-2001
			WO 0161987 A2	23-08-2001
			US 2004169581 A1	02-09-2004
WO 03096337	A	20-11-2003	WO 03096337 A2	20-11-2003

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

REC'D 08 NOV 2004

PCT

PCT

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/B2004/051128

International filing date (day/month/year)  
05.07.2004

Priority date (day/month/year)  
11.07.2003

International Patent Classification (IPC) or both national classification and IPC  
H04N7/24, G06T1/00, H04N7/26

Applicant  
KONINKLIJKE PHILIPS ELECTRONICS N.V

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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D-80298 Munich  
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Authorized Officer

Schoeyer, M

Telephone No. +49 89 2399-2136



**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IB2004/051128

---

**Box No. I Basis of the opinion**

---

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IB2004/051128

---

**Box No. II Priority**

---

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

---

**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

---

1. Statement

Novelty (N)	Yes: Claims	1-21
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-21
Industrial applicability (IA)	Yes: Claims	1-21
	No: Claims	

2. Citations and explanations

**see separate sheet**

---

**Box No. VI Certain documents cited**

---

1. Certain published documents (Rules 43*bis*.1 and 70.10)

and / or

2. Non-written disclosures (Rules 43*bis*.1 and 70.9)

**see form 210**

**Re Item V.**

- 1 The following documents are referred to in this communication:

D1 : EP 1 054 335 A (DIGIMARC CORP) 22 November 2000 (2000-11-22)

D2 : US 2002/178410 A1 (OOSTVEEN JOB CORNELIS ET AL) 28 November 2002  
(2002-11-28)

2 INDEPENDENT CLAIM 1

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not inventive in the sense of Article 33(3) PCT.

Document D1 discloses (see page 44, paragraph 457 ff.):

A method of relating one or more trigger actions with a multimedia signal, the method comprising the steps of:

- providing at least one trigger point and for each trigger time point providing at least one representation of least one associated trigger action, where each trigger time point indicates a time point of the multimedia signal for which the at least one associated trigger action is to be available during playback of the multimedia signal. Differently than claimed in claim 1 it is not explicitly shown in D1 that a fingerprint based on a segment of the multimedia signal is used. However, the use of fingerprints based on segment is well known in the art and is also disclosed by document D2 (see e.g. paragraph 56). The skilled person will consider the use of fingerprints based on segments when inserting the trigger information according to the method of claim 1.

Consequently, the subject-matter of claim 1 lacks inventive step.

3 INDEPENDENT CLAIM 5

- 3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 5 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 5 relates to the detection of the fingerprint, and carrying

out the associated action. Since this is the whole purpose of inserting the trigger in the first place, the subject-matter of this claim lacks inventive step for the same reason as claim 1.

**4 INDEPENDENT CLAIM 11**

- 4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 11 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 11 relates to a device functioning according to the method of claim 1 and lacks inventive step for the same reasons as set out above for claim 1.

**5 INDEPENDENT CLAIM 15**

- 5.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 15 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 15 relates to a device in functioning in accordance with the method of claim 5. Consequently the subject-matter of this claim lacks inventive step for the same reasons as claim 5.

**6 INDEPENDENT CLAIM 21**

- 6.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 21 is not inventive in the sense of Article 33(3) PCT.

The subject-matter of claim 21 relates to a computer readable medium having stored thereon instructions for causing one or more processing units to execute the method according to claims 1 and 5. Consequently the subject-matter of this claim lacks inventive step for substantially the same reasons as set out above for claims 1 and 5.

**7 DEPENDENT CLAIMS 2-4, 6-10, 12-14, 16-20**

Dependent claims 2-4, 6-10, 12-14, 16-20 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(3) PCT).

In particular:

- the use of the storage of the fingerprint (watermark) is known (as for example in claim 1) is known from D1 (see page 44, line 44);
- derived finger prints and representation of trigger action is transmitted to playback device (as in claim 3), - common general knowledge;
- segments start and end at trigger points (as in claim 4), -see D2 (page 5, paragraph 56);

Also the features of the other dependent claims contain similarly well known features or a shown in either D1 or D2.

## **8 INDUSTRIAL APPLICABILITY**

The subject-matter of claim 1-21 is industrially applicable in the field of multimedia signals.

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	18655685
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Eric B. Andersland/Valerie Murphy
<b>Filer Authorized By:</b>	Eric B. Andersland
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	02-APR-2014
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	17:09:52
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		14151879_IDS_4-2-14.pdf	339609 fd82346ed0287a6eeddb7c23c7700f2df7fb6f04	yes	8



	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Miscellaneous Incoming Letter		1	1	
	Miscellaneous Incoming Letter		2	3	
	Transmittal Letter		4	5	
	Information Disclosure Statement (IDS) Form (SB08)		6	8	
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Information:					
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5	Non Patent Literature	0004_2167052ep1_decision_refuse_51710.pdf	116448	no	2
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12	Non Patent Literature	0011_2167052wo1_iprp_11606.pdf	837372	no	7
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13	Non Patent Literature	0012_2167052wo1_isr_111004.pdf	410732	no	3
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Warnings:					
Information:					
IPR2020-00216					

IPR2020-00216

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Job Cornelis Oostveen et al.

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Docket No.: 2167.052US3  
Filed: January 10, 2014  
Examiner: Unknown  
Customer No.: 21186

Serial No.: 14/151,879  
Due Date: N/A  
Group Art Unit: 2178  
Confirmation No.: 4055

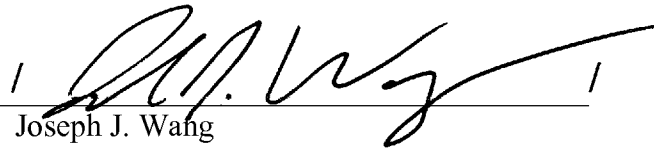
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

- ☒ Communication Concerning Prior and Copending Applications (2 pgs.)
  - ☒ Information Disclosure Statement (2 pgs.), Form 1449 (3 pgs.) Copies of Cited References (15).
- Other Documents NOT enclosed, cited in Parent Application.**

**If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By:   
Joseph J. Wang  
Reg. No. 61,123

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s):	Job Cornelis Oostveen et al.	Examiner:	Unknown
Serial No.:	14/151,879	Group Art Unit:	2178
Filed:	January 10, 2014	Docket:	2167.052US3
Customer No.:	21186	Confirmation No.:	4055
Title:	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		

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**COMMUNICATION CONCERNING PRIOR OR COPENDING APPLICATION(S)**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Pursuant to the guidance of MPEP §§ 2001.06(b) and 2004(9), Applicant would like to bring the following additional application(s) to the Examiner's attention. The identification of these applications is not intended to suggest that the subject matter claimed in any listed application is, or has been, substantially similar to any claim or claims in the present application.

<u>Serial No./ Patent No.</u>	<u>Filing Date</u>	<u>Attorney Docket</u>	<u>Title</u>
10/564,297 8,020,000	January 10, 2006	2167.052US1	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
13/220,267 8,660,267	August 29, 2011	2167.052US2	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

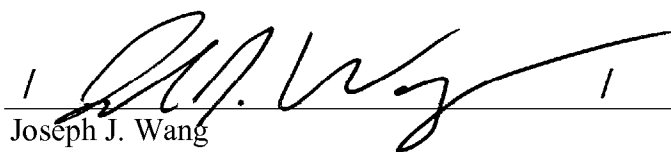
P.O. Box 2938

Minneapolis, MN 55402

(408) 278-4048

Date April 2, 2014

By

A handwritten signature in black ink, appearing to read 'J. Wang', is written over a horizontal line.

Joseph J. Wang

Reg. No. 61,123

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s):	Job Cornelis Oostveen et al.	Examiner:	Unknown
Serial No.:	14/151,879	Group Art Unit:	2178
Filed:	January 10, 2014	Docket:	2167.052US3
Customer No.:	21186	Confirmation No.:	4055
Title:	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		

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**INFORMATION DISCLOSURE STATEMENT**

MS Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicant respectfully requests that this Information Disclosure Statement be entered and the documents listed on the attached PTO 1449 Form be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicant requests that a copy of the PTO 1449 Form, initialed as being considered by the Examiner, be returned to the Applicant with the next official communication.

Pursuant to 37 C.F.R. § 1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement. However, if an Office Action on the merits has been mailed after filing of the application or after the filing of the most recent RCE, the Commissioner is hereby authorized to charge the required fees to Deposit Account No. 19-0743 in order to have this Information Disclosure Statement considered.

Pursuant to 37 C.F.R. § 1.98(d), copies of the listed documents are not provided as these references were previously cited by or submitted to the U.S. Patent Office in connection with Applicant's prior U.S. application, Serial No. 13/220,267, filed on August 29, 2011, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

INFORMATION DISCLOSURE STATEMENT

Serial Number:14/151,879

Filing Date: January 10, 2014

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

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Page 2

Dkt: 2167.052US3

**Copies of fifteen (15) documents, not previously cited in connection with the Applicants' prior U.S. Application, Serial No. 13/220,267, are attached. These documents are highlighted in boldface on the attached Form 1449's.**

Pursuant to 37 C.F.R. § 1.98(a)(2), copies of cited U.S. Patents and Published Applications, and Non-Published Applications identifiable by USPTO Serial Number, are no longer required to be provided to the Office. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. § 1.98(a)(2).

The Examiner is invited to contact the undersigned at the telephone number indicated if there are any questions regarding this communication.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(408) 278-4048

Date April 2, 2014

By

  
Joseph J. Wang

Reg. No. 61,123

JJW:vam





# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3

**CONFIRMATION NO. 4055**

## PUBLICATION NOTICE



\*OC000000068320143\*

21186  
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

**Title:**METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

**Publication No.**US-2014-0130077-A1

**Publication Date:**05/08/2014

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at [www.uspto.gov](http://www.uspto.gov). The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at [www.uspto.gov](http://www.uspto.gov) using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

**S/N 14/151,879**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s):	Job Cornelis Oostveen et al.	Examiner:	Unknown
Serial No.:	14/151,879	Group Art Unit:	2178
Filed:	January 10, 2014	Docket No.:	2167.052US3
Customer No.:	21186	Confirmation No.:	4055
Title:	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		

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**PRELIMINARY AMENDMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Prior to taking up this application for examination, please enter the following amendments:

### IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A method of ~~relating one or more trigger actions with a multimedia signal, the method comprising:~~

~~providing at least one trigger time point ( $T_n$ ;  $T_{n+1}$ ) and for each trigger time point ( $T_n$ ;  $T_{n+1}$ ) providing at least one representation of least one associated trigger action, where each trigger time point ( $T_n$ ;  $T_{n+1}$ ) indicates a time point of the multimedia signal for which the at least one associated trigger action is to be available during playback of the multimedia signal;~~

~~for each given trigger time point ( $T_n$ ;  $T_{n+1}$ ) deriving a fingerprint on the basis of a segment of the multimedia signal, where the segment of the multimedia signal is associated with the given trigger time point ( $T_n$ ;  $T_{n+1}$ ), and~~

~~associating the derived fingerprint with the at least one associated trigger action.~~

determining a plurality of trigger fingerprints from content being played back on a playback device, each trigger fingerprint identifying a corresponding trigger time point of a sequence of trigger time points in the content and at which trigger time point at least one corresponding action is to be triggered, the determining being performed by a processor;

accessing a database that includes a plurality of reference fingerprints, previously derived from the content, and a plurality of reference actions, each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint;

identifying the corresponding reference action by obtaining a match in the database between a trigger fingerprint among the plurality of trigger fingerprints and a reference fingerprint among the plurality of reference fingerprints; and

performing a reference action that corresponds to the reference fingerprint on the playback device.

2. (New) The method of claim 1, wherein:

different corresponding actions are to be performed at different trigger time points in the sequence of trigger time points in the content.

3. (New) The method of claim 1, wherein:

the trigger fingerprint is determined from a segment of the content, the segment ending at the trigger time point at which the reference action is to be performed.

4. (New) The method of claim 1, wherein:

the trigger fingerprint is determined from a segment of the content, the segment beginning at the trigger time point at which the reference action is to be performed.

5. (New) The method of claim 1, wherein:

the trigger fingerprint is determined from a segment of the content, the segment beginning or ending at a predetermined distance before or after the trigger time point at which the reference action is to be performed.

6. (New) The method of claim 1, wherein:

the reference action that corresponds to multiple reference fingerprints that include the reference fingerprint.

7. (New) The method of claim 1, wherein:

multiple reference actions correspond to the reference fingerprint and are to be performed at the trigger time point; and

the performing of the reference action is part of performing the multiple reference actions that correspond to the reference fingerprint.

8. (New) A system comprising:

a fingerprint detector configured to determine a plurality of trigger fingerprints from content being played back on a playback device, each trigger fingerprint identifying a corresponding trigger time point of a sequence of trigger time points in the content and at which trigger time point at least one corresponding action is to be triggered; and

a processor configured to:

access a database that includes a plurality of reference fingerprints, previously derived from the content, and a plurality of reference actions, each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint;

identify the corresponding reference action by obtaining a match in the database between a trigger fingerprint among the plurality of trigger fingerprints and a reference fingerprint among the plurality of reference fingerprints; and

perform a reference action that corresponds to the reference fingerprint on the playback device.

9. (New) The system of claim 8, wherein:

the reference action that corresponds to multiple reference fingerprints that include the reference fingerprint.

10. (New) A non-transitory machine-readable storage medium comprising instructions that, when executed by one or more processors of a machine, cause the machine to perform operations comprising:

- determining a plurality of trigger fingerprints from content being played back on a playback device, each trigger fingerprint identifying a corresponding trigger time point of a sequence of trigger time points in the content and at which trigger time point at least one corresponding action is to be triggered;
- accessing a database that includes a plurality of reference fingerprints, previously derived from the content, and a plurality of reference actions, each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint;
- identifying the corresponding reference action by obtaining a match in the database between a trigger fingerprint among the plurality of trigger fingerprints and a reference fingerprint among the plurality of reference fingerprints; and
- performing a reference action that corresponds to the reference fingerprint on the playback device.

11. (New) A method comprising:

accessing segments of content, a segment among the segments being associated with a corresponding action to be triggered during playback of the segment;

generating a reference fingerprint of the segment associated with the corresponding action, the generating being performed by a processor;

assigning the reference fingerprint of the segment to the corresponding action that is to be triggered during playback of the segment of the content;

providing access to the reference fingerprint of the segment to a playback device configured to match the reference fingerprint to a playback fingerprint derived from the segment by the playback device; and

providing the identifier of the corresponding action to the playback device based on the reference fingerprint matching the playback fingerprint, the provided identifier causing the playback device to trigger the corresponding action during the playback of the segment.

12. (New) The method of claim 11, wherein:

the assigning of the reference fingerprint to the identifier of the corresponding action includes storing the reference fingerprint with the identifier of the corresponding action in a database; and

the playback device is configured to search the database to match the reference fingerprint to the playback fingerprint.

13. (New) The method of claim 11, wherein:

the playback device is configured to trigger the corresponding action at a time point that is a predetermined distance from a start of the segment of the multimedia content.

14. (New) The method of claim 11, wherein:

the playback device is configured to trigger the corresponding action at a time point that is a predetermined distance from an end of the segment of the multimedia content.

15. (New) The method of claim 11, wherein:

the playback device is further configured to present the corresponding action and await confirmation of the corresponding action in response to the playback device triggering the corresponding action during the playback of the segment of the content.

16. (New) The method of claim 11, wherein:

the corresponding action for the reference fingerprint and for the segment of the content includes retrieving and displaying on a display additional information selected from a group consisting of:

- biography data for an actor that appears in the segment of the content,
- a link to a website,
- a local weather forecast, and
- a local commercial.

17. (New) The method of claim 11, wherein:

the corresponding action for the reference fingerprint and for the segment of the content includes retrieving and playing via a speaker additional information selected from a group consisting of:

- biography data of an actor that appears in the segment of the content,
- a local weather forecast, and
- a local commercial.



18. (New) The method of claim 11, wherein:

the corresponding action for the reference fingerprint and for the segment of the content is selected from a group consisting of:

- replacing the content with different content for a period of time,
- pausing playback of the content,
- stopping playback of the content,
- executing a control command, and
- preparing the playback device to receive user input.

19. (New) The method of claim 11, wherein:

the content includes at least one of audio content or video content.

20. (New) A non-transitory machine-readable storage medium comprising instructions that, when executed by one or more processors of a machine, cause the machine to perform operations comprising:

- accessing segments of content, a segment among the segments being associated with a corresponding action to be triggered during playback of the segment;
- generating a reference fingerprint of the segment associated with the corresponding action;
- assigning the reference fingerprint of the segment to the corresponding action that is to be triggered during playback of the segment of the content;
- providing access to the reference fingerprint of the segment to a playback device configured to match the reference fingerprint to a playback fingerprint derived from the segment by the playback device; and
- providing the identifier of the corresponding action to the playback device based on the reference fingerprint matching the playback fingerprint, the provided identifier causing the playback device to trigger the corresponding action during the playback of the segment.

21. (New) A system comprising:

an input module configured to access segments of content, a segment among the

segments being associated with a corresponding action to be triggered during playback of the segment; and

a fingerprint module implemented in a processor and configured to:

generate a reference fingerprint of the segment associated with the corresponding action;

assign the reference fingerprint of the segment to the corresponding action that is to be triggered during playback of the segment of the content;

provide access to the reference fingerprint of the segment to a playback device configured to match the reference fingerprint to a playback fingerprint derived from the segment by the playback device; and

provide the identifier of the corresponding action to the playback device based on the reference fingerprint matching the playback fingerprint, the provided identifier causing the playback device to trigger the corresponding action during the playback of the segment.

22. (New) The system of claim 21, wherein:

the system further comprises a database;

the fingerprint module is configured to store the reference fingerprint with the identifier of the corresponding action in the database; and

the playback device is configured to search the database to match the reference fingerprint to the playback fingerprint.

23. (New) The system of claim 21, wherein:

the corresponding action is to be triggered by the playback device at a time point that is a predetermined distance from a start of the segment of the multimedia content.

24. (New) The system of claim 21, wherein:

the corresponding action is to be triggered by the playback device at a time point that is a predetermined distance from an end of the segment of the multimedia content.

25. (New) The system of claim 21, wherein:

the corresponding action is to be presented by the playback device in response to the playback device triggering the corresponding action during the playback of the segment of the content, the playback device being further configured to await confirmation of the corresponding action prior to executing the corresponding action.

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Gracenote EX2009 Page 192

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Gracenote EX2009 Page 193

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	14151879			
<b>Filing Date:</b>	10-Jan-2014			
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL			
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen			
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall			
<b>Attorney Docket Number:</b>	2167.052US3			
Filed as Large Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
Claims in Excess of 20	1202	5	80	400
Independent claims in excess of 3	1201	3	420	1260
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				

IPR2020-00216

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1660

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	20038694
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall
<b>Filer Authorized By:</b>	Gregory M. Stark
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	03-SEP-2014
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	18:19:49
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1660
RAM confirmation Number	4749
Deposit Account	190743
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

IPR2020-00216



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## File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2167052US3_PAMD_090314.pdf	2722116 19442b68f9ed300c4c905fedf296cd1d5fa2acb7	yes	12

### Multipart Description/PDF files in .zip description

Document Description	Start	End
Miscellaneous Incoming Letter	1	1
Preliminary Amendment	2	2
Claims	3	11
Applicant Arguments/Remarks Made in an Amendment	12	12

## Warnings:

## Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32336 33f74a98ac37920622a38ec89c321e9a49bf4a89	no	2
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## Warnings:

## Information:

**Total Files Size (in bytes):** 2754452

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

### New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

### National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

### New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Job Cornelis Oostveen et al.

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Docket No.: 2167.052US3  
Filed: January 10, 2014  
Examiner: Unknown  
Customer No.: 21186

Serial No.: 14/151,879  
Due Date: N/A  
Group Art Unit: 2178  
Confirmation No.: 4055

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

- ☒ Preliminary Amendment (11 pgs.)  
☒ Authorization to charge Deposit Account 19-0743 in the amount of \$1660.00 to cover the fee for additional claims.

The fee for additional claims has been calculated as follows:

CLAIMS AS AMENDED						
	Claims Remaining After Amendment		Highest Number Previously Paid For	Present Extra	Rate	Fee
<b>TOTAL CLAIMS</b>	<b>25</b>	<b>-</b>	<b>20</b>	<b><u>5</u></b>	<b>x 80.00 =</b>	<b>400.00</b>
<b>INDEPENDENT CLAIMS</b>	<b>6</b>	<b>-</b>	<b>3</b>	<b><u>3</u></b>	<b>x 420.00 =</b>	<b>1260.00</b>
<b>[ ] MULTIPLE DEPENDENT CLAIMS PRESENTED</b>						<b>0.00</b>
<b>TOTAL</b>						<b>1660.00</b>

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

/ Joseph J. Wang /  
\_\_\_\_\_  
Joseph J. Wang  
Reg. No. 61,123

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>14/151,879</b>	Filing Date <b>01/10/2014</b>	<input type="checkbox"/> To be Mailed
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 ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

### APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

### APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

	09/03/2014	CLAIMS REMAINING AFTER AMENDMENT	Minus	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
AMENDMENT	Total (37 CFR 1.16(i))	* 25	Minus	** 20	= 5	X \$80 =	400	
	Independent (37 CFR 1.16(h))	* 6	Minus	***3	= 3	X \$420 =	1260	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
						TOTAL ADD'L FEE	1660	

(Column 1)

(Column 2)

(Column 3)

	CLAIMS REMAINING AFTER AMENDMENT	Minus	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

 LIE  
 /CAROLYN THOMAS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/151,879

01/10/2014

Job Cornelis Oostveen

2167.052US3

4055

21186

7590

10/10/2014

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

P.O. BOX 2938

MINNEAPOLIS, MN 55402

EXAMINER

LEWIS, LISA C

ART UNIT

PAPER NUMBER

2495

NOTIFICATION DATE

DELIVERY MODE

10/10/2014

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@slwip.com

SLW@blackhillsip.com

<b>Office Action Summary</b>	<b>Application No.</b> 14/151,879	<b>Applicant(s)</b> OOSTVEEN ET AL.	
	<b>Examiner</b> Lisa Lewis	<b>Art Unit</b> 2495	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09/03/2014.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims\*

- 5) ☒ Claim(s) 1-10 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-10 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

#### Certified copies:

- a) ☒ All    b) ☐ Some\*\*    c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)  
Paper No(s)/Mail Date \_\_\_\_.
- 3) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Other: \_\_\_\_.

**DETAILED ACTION*****Double Patenting***

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

2. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

3. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1-25 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 8,020,000. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim methods involving

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using fingerprints to associate trigger time points for actions which are based on the start or end time of content.

5. Claims 1-25 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. 8,660,267. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim methods involving using fingerprints to associate trigger time points for actions which are based on the start or end time of content.

### *Claim Objections*

6. Claims 6 and 9 are objected to because of the following informalities: They should recite: “the reference action ~~that~~ corresponds...” Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

7. The following is a quotation of 35 U.S.C. 112(b):

(B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **Claims 8, 9, and 21-25 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.**

9. Claim limitations “detector configured to” and “module configured to” have been interpreted under 35 U.S.C. 112, sixth paragraph, because they use a non-structural terms “detector” and “module”

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coupled with functional language “configured to” without reciting sufficient structure to achieve the function. Furthermore, the non-structural term is not preceded by a structural modifier.

10. Since these claim limitations invoke 35 U.S.C. 112, sixth paragraph, claims 25, 26, 32, and 33 are interpreted to cover the corresponding structure described in the specification that achieves the claimed function, and equivalents thereof.

11. Claim element “detector configured to” and “module configured to” are limitations that invoke 35 U.S.C. 112, sixth paragraph. However, the written description fails to clearly link or associate the disclosed structure, material, or acts to the claimed function such that one of ordinary skill in the art would recognize what structure, material, or acts perform the claimed function.

12. Applicant may:

- a. Amend the claim so that the claim limitation will no longer be interpreted as a limitation under 35 U.S.C. 112, sixth paragraph; or
- b. Amend the written description of the specification such that it clearly links or associates the corresponding structure, material, or acts to the claimed function without introducing any new matter (35 U.S.C. 132(a)); or
- c. State on the record where the corresponding structure, material, or acts are set forth in the written description of the specification and linked or associated to the claimed function. For more information, see 37 CFR 1.75(d) and MPEP §§ 608.01(o) and 2181.

13. If applicant wishes to provide further explanation or dispute the examiner’s interpretation of the corresponding structure, applicant must identify the corresponding structure with reference to the specification by page and line number, and to the drawing, if any, by reference characters in response to this Office action.

14. If applicant does **not** wish to have the claim limitation treated under 35 U.S.C. 112, sixth paragraph, applicant may amend the claim so that it will clearly not invoke 35 U.S.C. 112, sixth



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paragraph, or present a sufficient showing that the claim recites sufficient structure, material, or acts for performing the claimed function to preclude application of 35 U.S.C. 112, sixth paragraph.

15. For more information, see *Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. § 112 and for Treatment of Related Issues in Patent Applications*, 76 FR 7162, 7167 (Feb. 9, 2011).

***Claim Rejections - 35 USC § 102/103***

16. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

17. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. **Claims 1, 8, and 10 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a), as obvious over Haitsma et al. (US 2002/0178410) –**

**Applicant's IDS.**

19. Regarding claims 1, 8, and 10, Haitsma teaches a method (and system and medium) comprising:

a. Determining a plurality of trigger fingerprints (by a fingerprint detector) from content being played back on a playback device, each trigger fingerprint identifying a corresponding trigger time point of a sequence of trigger time points in the content and at which trigger time point at least one corresponding action is to be triggered, the determining being performed by a processor (Information signal (content) is divided into successive frames (sequence of trigger

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time points) and a hash word (fingerprint) for each frame is computed. The hash can be selected (trigger) to lead user to a URL, lookup a song, etc. (action)) - see [0007] and [0055] - [0059], for example.

b. Accessing (by a processor) a database that includes a plurality of reference fingerprints, previously derived from the content, and a plurality of reference actions, each reference fingerprint identifying at least one corresponding reference action to be performed at a reference point in time identified by the reference fingerprint (Extracted hashes are matched to hashes in a database (reference fingerprint). The reference fingerprint may be used to lookup a song, lead user to URL, etc. (reference action)) – see [0026], [0040], and [0055]-[0059], for example.

c. Identifying the corresponding reference action by obtaining a match in the database between a trigger fingerprint among the plurality of trigger fingerprints and a reference fingerprint among the plurality of reference fingerprints fingerprint (Extracted hashes are matched to hashes in a database (reference fingerprint). The reference fingerprint may be used to lookup a song, lead user to URL, etc. (reference action)) – see [0026], [0040], and [0055]-[0059], for example.

d. Performing a reference action that corresponds to the reference fingerprint on the playback device (A hash block is extracted from a song to look up the hash in the database and give the name of the song) - see [0057], for example.

20. Regarding claim 2, Haitsma teaches wherein:

a. Different corresponding actions are to be performed at different trigger time points in the sequence of trigger time points in the content (The hashes may be used to look up a song, direct to a URL, etc.) – see [055] – [0059], for example.

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21. Regarding claims 6 and 9, Haitsmu teaches that the reference action corresponds to multiple reference fingerprints that include the reference fingerprint (hashes of different frames in the audio correspond to the same song lookup) – see [0025], for example.

22. Therefore, it appears that the teachings of Haitsmu anticipate the limitations of claims 1, 2, 6, and 8-10. In the alternative, even if the claimed invention is not identical to that disclosed by the cited reference, the differences between that which is disclosed and that which is claimed are considered to be so slight that that it would have been obvious to the skilled artisan to modify the teachings of Haitsmu in order to create the claimed invention.

23. Accordingly, the claimed invention as a whole was at least prima facie obvious, if not anticipated by the reference, especially in the absence of sufficient, clear, and convincing evidence to the contrary.

***Claim Rejections - 35 USC § 103***

**Claims 3-5 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Haitsma et al. (US 2002/0178410) in view of Petrovic et al. (WO 2001/61987) – Applicant's IDS.**

24. The teachings of Haitsma are relied upon for the reasons set forth above.

25. Regarding claims 3-5, Haitsma does not teach that the trigger fingerprint is determined from a segment of the content, the segment beginning or ending at the trigger time point at which the reference action is to be performed, or the segment beginning or ending at a predetermined distance before or after the trigger time point at which the reference action is to be performed.

26. Petrovic teaches a method wherein hidden signals trigger an action through a watermark. The watermark has a time which opens and closes a time interval for performing an action - see abstract and pages 12-13, for example.

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27. It would have been obvious to modify the teachings of Haitmu by determining the trigger fingerprint from a segment of content that begins or ends at the trigger point or begins or ends at a distance before or after the trigger point in order to provide a time interval for performing the action, based upon the beneficial teachings provided by Petrovic.

**Claim 7 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Haitma et al. (US 2002/0178410) in view of Levy (WO 2002/08945) – Applicant’s IDS.**

28. The teachings of Haitma are relied upon for the reasons set forth above.

29. Regarding claim 7, Haitma does not teach that multiple reference actions correspond to the reference fingerprint and are to be performed at the trigger point and the performing of the reference action is part of the performing the multiple reference actions that correspond to the reference fingerprint.

30. Levy teaches a method wherein embedded data can have an identifier which has many uses, such as identifying files, connecting the user back to the owner/creator of the file, etc. – see page 3 lines 30-35, for example.

31. It would have been obvious to modify the teachings of Haitmu by having multiple reference actions correspond to the reference fingerprint, in order to allow several actions to be performed instead of just one, based upon the beneficial teachings provided by Levy. These modifications would result in enhanced performance and user experience for the system.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa Lewis whose telephone number is (571)270-7724. The examiner can normally be reached on Monday - Friday, 6:30 a.m. - 3:30 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Farid Homayounmehr can be reached on (571) 272-3739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lisa Lewis/  
Primary Examiner, Art Unit 2495



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## BIB DATA SHEET

CONFIRMATION NO. 4055

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
14/151,879	01/10/2014	380	2495	2167.052US3
<b>RULE</b>				
<b>APPLICANTS</b> Koninklijke Philips Electronics N.V., Eindhoven, NETHERLANDS, Assignee (with 37 CFR 1.172 Interest);				
<b>INVENTORS</b> Job Cornelis Oostveen, Haren, NETHERLANDS; Warner Rudolph Theophile Ten Kate, Eindhoven, NETHERLANDS; Adrianus Johannes Maria Denissen, Eindhoven, NETHERLANDS; David K. Roberts, Cheddar, UNITED KINGDOM;				
<b>** CONTINUING DATA *****</b> This application is a CON of 13/220,267 08/29/2011 PAT 8660267 which is a CON of 10/564,297 01/10/2006 PAT 8020000 which is a 371 of PCT/IB2004/051128 07/05/2004				
<b>** FOREIGN APPLICATIONS *****</b> EUROPEAN PATENT OFFICE (EPO) 03102116.5 07/11/2003				
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b> 01/23/2014				
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input type="checkbox"/> No Verified and Acknowledged <u>/LISA C LEWIS/</u> Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> NETHERLANDS	<b>SHEETS DRAWINGS</b> 3	<b>TOTAL CLAIMS</b> 1
<b>INDEPENDENT CLAIMS</b> 1				
<b>ADDRESS</b> SCHWEGMAN LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402 UNITED STATES				
<b>TITLE</b> METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL				
<b>FILING FEE RECEIVED</b> 3400	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit	

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	14/151,879
	<b>Filing Date</b>	January 10, 2014
	<b>First Named Inventor</b>	Job Cornelis Oostveen
	<b>Group Art Unit</b>	2178
	<b>Examiner Name</b>	Unknown
Sheet 1 of 3	Attorney Docket No: 2167.052US3	

**US PATENT DOCUMENTS**

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-20020032864A1	3/14/2002	Rhoads, Geoffrey B, et al.
	US-20020033844A1	3/21/2002	Levy, K. L, et al.
	US-20020178410A1	11/28/2002	Haitsma, Jaap Andre, et al.
	US-20030021441A1	1/30/2003	Levy, K. L, et al.
	US-20040194130A1	9/30/2004	Konig, Richard, et al.
	US-20050015802A1	1/20/2005	Masson, J. M
	US-20060277409A1	12/7/2006	Galwas, Paul
	US-20120016876A1	1/19/2012	Oostveen, Job Cornelis, et al.
	US-6,959,865	11/1/2005	Walczyk, Joseph, et al.
	US-7,185,201	2/27/2004	Rhoads, Geoffrey, et al.
	US-8,020,000	9/13/2011	Oostveen, Job, et al.
	US-8,660,267	2/25/2014	Oostveen, Job Cornelis, et al.

**FOREIGN PATENT DOCUMENTS**

Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
	EP-1054335A2	11/22/2000	Grossi, Brian J., et al.	
	WO-0161987A2	8/23/2001	Petrovic, Rade, et al.	
	WO-0208945A1	1/31/2002	Levy, Kenneth	
	WO-03096337A2	11/20/2003	Van Der Veen, Minne, et al.	
	WO-05006758A1	1/20/2005	Oostveen, Job C., et al.	
	WO-2001061508A1	8/23/2001	RAMOS, D. O, et al.	
	WO-2001071960A1	9/27/2001	LEVY, K. L, et al.	
	WO-2003043329A2	5/22/2003	MASSON, J. M	

**OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS**

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 10/564,297 Non-Final Office Action mailed 07-12-10", 11 pgs	
	"Application Serial No. 10/564,297, Examiner Interview Summary 10-12-10", 4 pgs	
	"Application Serial No. 10/564,297, Examiner Interview Summary mailed 10-12-10", 1 pg	
	"Application Serial No. 10/564,297, Final Office Action mailed 12-22-10", 10 pgs	
	"Application Serial No. 10/564,297, Final Office Action mailed 4-1-10", 13 pgs.	
	"Application Serial No. 10/564,297, Non Final Office Action mailed 10-26-09", 11 pgs.	

EXAMINER /Lisa Lewis/

DATE CONSIDERED 10/06/2014

\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

ALL REFERENCES CONSIDERED EXCEPT WHERE INDICATED OTHERWISE. /L.L./

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	14/151,879
	<b>Filing Date</b>	January 10, 2014
	<b>First Named Inventor</b>	Job Cornelis Oostveen
	<b>Group Art Unit</b>	2178
	<b>Examiner Name</b>	Unknown
Sheet 2 of 3	Attorney Docket No: 2167.052US3	

### OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 10/564,297, Notice of Allowance mailed 05-13-11", 5 pgs	
	"Application Serial No. 10/564,297, Preliminary Amendment filed 1-10-06", 4 pgs.	
	"Application Serial No. 10/564,297, Response filed 06-29-10 to Final Office Action mailed 04-01-10", 13 pgs	
	"Application Serial No. 10/564,297, Response filed 1-26-10 to Non Final Office Action mailed 10-26-09", 13 pgs.	
	"Application Serial No. 10/564,297, Response filed 10-12-10 to Non Final Office Action mailed 7-12-10", 14 pgs.	
	"Application Serial No. 10/564,297, Response filed 3-16-11 to Final Office Action mailed 12-22-10", 11 pgs.	
	"Application Serial No. 10/564,297, Response filed 8-10-09 to Restriction Requirement mailed 7-10-09", 4 pgs.	
	"Application Serial No. 10/564,297, Restriction Requirement mailed 7-10-09", 6 pgs.	
	"Application Serial No. 13/220,267, Non Final Office Action mailed 03-20-13", 12 pgs	
	"Application Serial No. 13/220,267, Notice of Allowance mailed 10-11-13", 9 pgs	
	"Application Serial No. 13/220,267, Preliminary Amendment Filed 09-01-2011", 11 pgs.	
	"Application Serial No. 13/220,267, Response filed 06-18-13 to Non Final Office Action mailed 03-20-13", 15 pgs.	
	<b>"European Application Serial No. 04744496.3, Decision to Refuse mailed 05-17-10", 2 pgs</b>	
	<b>"European Application Serial No. 04744496.3, Examination Report mailed 08-04-08", 4 pgs</b>	
	<b>"European Application Serial No. 04744496.3, Office Action mailed 03-09-06", 2 pgs</b>	
	<b>"European Application Serial No. 04744496.3, Office Action mailed 06-04-07", 1 pg</b>	
	<b>"European Application Serial No. 04744496.3, Office Action mailed 12-21-06", 2 pgs</b>	
	<b>"European Application Serial No. 04744496.3, Response filed 01-12-09 to Examination Report mailed 08-04-08", 16 pgs</b>	
	<b>"European Application Serial No. 04744496.3, Response filed 07-30-07 to Office Action mailed 12-21-06", 3 pgs</b>	
	<b>"International Application Serial No. PCT/IB2004/051128, International Preliminary Report on Patentability mailed 01-16-06", 7 pgs</b>	
	<b>"International Application Serial No. PCT/IB2004/051128, International Search Report mailed 11-10-04", 3 pgs</b>	
	<b>"International Application Serial No. PCT/IB2004/051128, Written Opinion mailed 11-10-04", 6 pgs</b>	
	"Japanese Application Serial No. 2006-518477, Office Action mailed 05-25-10", with English translation of claims, 5 pgs	
	<b>OOSTVEEN, J., et al., "Feature Extraction and a Database Strategy for Video Fingerprinting", Lecture Notes in Computer Science, 2314, (3/11/2002), 117-128</b>	

EXAMINER /Lisa Lewis/

DATE CONSIDERED

10/06/2014

\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

ALL REFERENCES CONSIDERED EXCEPT WHERE INDICATED OTHERWISE. /L.L./



Receipt date: 04/02/2014

14151879 - GAU: 2495

Modified form PTO/SB/08A(04-07) OMB 651-0031  
US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	14/151,879
	<b>Filing Date</b>	January 10, 2014
	<b>First Named Inventor</b>	Job Cornelis Oostveen
	<b>Group Art Unit</b>	2178
	<b>Examiner Name</b>	Unknown
Sheet 3 of 3		Attorney Docket No: 2167.052US3

**OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS**

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	TEN KATE, W., "trigg&link - A New Dimension in Television Program Making", Lecture Notes in Computer Science 1997, Multimedia Applications, Services and Techniques — ECMAST '97, (1997), 51-65	

EXAMINER


/Lisa Lewis/

DATE CONSIDERED

10/06/2014

\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

ALL REFERENCES CONSIDERED EXCEPT WHERE IN ENGLISH. /L.L./

<b>Search Notes</b>  	<b>Application/Control No.</b>  14151879	<b>Applicant(s)/Patent Under Reexamination</b>  OOSTVEEN ET AL.
	<b>Examiner</b>  LISA LEWIS	<b>Art Unit</b>  2495

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
380	204, 54	10/6/2014	LL
713	150, 176-180	10/6/2014	LL
725	32, 34-35, 86	10/6/2014	LL

SEARCH NOTES		
Search Notes	Date	Examiner
Searched EAST	10/6/2014	LL
NPL Search	10/6/2014	LL
DP Search	10/6/2014	LL

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/LISA LEWIS/ Primary Examiner.Art Unit 2495
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	57	(time or ((segment or frame) near3 (identif\$4 or identification))) near9 (media or audio or video or song) near9 (lookup or look up or table or database) near9 (trigger or action) and (@rlad or @ad or @prad or @pd)<"20030711"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2014/10/06 09:53
L2	24	trigger\$4 near4 time near5 database near5 stor\$4 and (@rlad or @ad or @prad or @pd)<"20030711"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2014/10/06 09:53
L3	21452	(380/204,54 or 713/150,176-180 or 725/32,34-35,86).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2014/10/06 09:54
L4	262	(380/204,54 or 713/150,176-180 or 725/32,34-35,86).ccls. and (@rlad or @ad or @pd or @prad)<"20030711" and (trigger or action) with (fingerprint or checksum or check sum or signature or hash\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2014/10/06 09:55
L5	10	(time near9 (media or audio or video or song) near9 (frame or segment or portion or section or part) near9 (lookup or look up or table or database) near9 (action or trigger)) and (@rlad or @ad or @prad or @pd)<"20030711"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2014/10/06 09:56
S1	36	"20020178410"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2014/09/16 09:00
S2	4	"5307410".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2014/09/17 08:12

**C:\Users\llewis1\Documents\EAST\Workspaces\14151879.wsp**



# UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3	4055

21186 7590 12/12/2014  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

EXAMINER
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LEWIS, LISA C

ART UNIT	PAPER NUMBER
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2495

NOTIFICATION DATE	DELIVERY MODE
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12/12/2014

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@slwip.com  
SLW@blackhillsip.com

<b><i>Applicant-Initiated Interview Summary</i></b>	<b>Application No.</b> 14/151,879	<b>Applicant(s)</b> OOSTVEEN ET AL.	
	<b>Examiner</b> Lisa Lewis	<b>Art Unit</b> 2495	

All participants (applicant, applicant's representative, PTO personnel):

(1) Lisa Lewis. (3) \_\_\_\_.

(2) Mr Joseph Wang, attorney. (4) \_\_\_\_.

Date of Interview: 08 December 2014.

Type:    ☒ Telephonic    ☐ Video Conference  
              ☐ Personal [copy given to: ☐ applicant    ☐ applicant's representative]

Exhibit shown or demonstration conducted:    ☐ Yes    ☐ No.  
     If Yes, brief description: \_\_\_\_.

Issues Discussed    ☐101    ☐112    ☒102    ☒103    ☐Others  
 (For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: all.

Identification of prior art discussed: Haitsma, Petrovic.

**Substance of Interview**  
 (For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Examiner and applicant discussed differences between Haitsma, Petrovic and the claimed invention. Applicant explained the differences between a "time point" versus the intervals/multiple points in time taught by Haitsma, as well as the differences between a fingerprint (does not alter the data) versus a watermark (inserted in the data, thus altering it). At first consideration, the examiner feels these arguments are convincing and will consider them further when submitted formally.

**Applicant recordation instructions:** The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

**Examiner recordation instructions:** Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Lisa Lewis/ Primary Examiner, Art Unit 2495	
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## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

#### Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s): Job Cornelis Oostveen et al. Examiner: Lisa Lewis  
Serial No.: 14/151,879 Group Art Unit: 2495  
Filed: January 10, 2014 Docket: 2167.052US3  
Customer No.: 21186 Confirmation No.: 4055  
Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

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**COMMUNICATION RE: LATE SUBMISSION OF DECLARATION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

In a compliance with 37 CFR 1.63, we submit the Signed Declaration. Corresponding fees with regard to the late submission were paid with the filing of the application on January 10, 2014 therefore applicants believe no additional fees are due at this time.

Applicants assume the application is now in proper order and in condition for allowance. Please direct any inquiries to the undersigned at (408) 278-4048. If necessary, please charge any additional fees or credit overpayment to Deposit Account 19-0743.

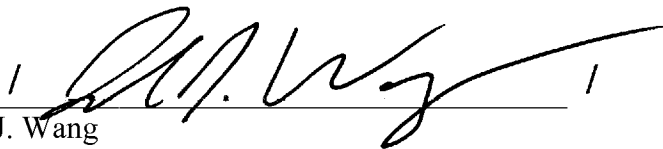
Respectfully submitted,

Schwegman Lundberg & Woessner, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(408) 278-4048

Date \_\_\_\_\_

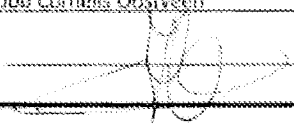
By \_\_\_\_\_

Joseph J. Wang  
Reg. No. 61,123





**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN  
APPLICATION DATA SHEET (37 CFR 1.76)**

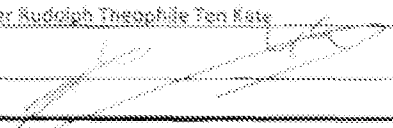
Title of Invention	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<p>As the below named inventor, I hereby declare that:</p> <p>This declaration is directed to: <input type="checkbox"/> The attached application, or</p> <p><input checked="" type="checkbox"/> United States application or PCT international application number <u>14/151,879</u>, filed on <u>January 10, 2014</u>.</p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.</p> <p>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than (5) years, or both.</p> <p style="text-align: center;"><b>WARNING:</b></p> <p>Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.</p>	
<p><b>LEGAL NAME OF INVENTOR</b></p> <p>Inventor: <u>John Cornelis Oostveen</u> Date (Optional): _____</p> <p>Signature:  _____</p>	
<p>Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/AIA/01 form for each additional inventor.</p>	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.61 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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2167.05ZUS3

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN  
APPLICATION DATA SHEET (37 CFR 1.76)**

Title of Invention	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<p>As the below named inventor, I hereby declare that:</p> <p>This declaration is directed to: <input type="checkbox"/> The attached application, or</p> <p><input checked="" type="checkbox"/> United States application or PCT international application number <u>1A/151,879</u>, filed on <u>January 10, 2014</u>.</p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.</p> <p>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than (5) years, or both.</p> <p><b>WARNING:</b></p> <p>Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.</p> <p><b>LEGAL NAME OF INVENTOR</b></p> <p>Inventor: <u>Warner Rudolph Theophile Ten Kate</u> Date (Optional): <u>29 Oct 2014</u></p> <p>Signature: </p> <p>Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/AIA/01 form for each additional inventor.</p>	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or serve a benefit by the public. Submit it to the post by the USPTO to process an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.12 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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2167.052U53

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**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN  
APPLICATION DATA SHEET (37 CFR 1.76)**

Title of Invention	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
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As the below named inventor, I hereby declare that:

This declaration  
is directed to:

- ☐ The attached application, or
- ☒ United States application or PCT international application number 14/151,879  
filed on January 10, 2014.

The above identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001  
by fine or imprisonment of not more than (5) years, or both.

**WARNING:**

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**LEGAL NAME OF INVENTOR**

Inventor: Adrianus Johannes Maria Derissen Date (Optional) : \_\_\_\_\_

Signature: \_\_\_\_\_

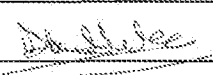
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Use an additional PTO/AIA/01 form for each additional inventor.

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2167.052US3

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN  
APPLICATION DATA SHEET (37 CFR 1.76)**

Title of Invention	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<p>As the below named inventor, I hereby declare that:</p> <p>This declaration is directed to: <input type="checkbox"/> The attached application, or</p> <p><input checked="" type="checkbox"/> United States application or PCT international application number <u>14/151,879</u>, filed on <u>January 10, 2014</u>.</p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.</p> <p>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than (5) years, or both.</p> <p style="text-align: center;"><b>WARNING:</b></p> <p>Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.</p> <p>LEGAL NAME OF INVENTOR</p> <p>Inventor: <u>David K. Roberts</u> Date (Optional): <u>19 December 2014</u></p> <p>Signature: <u></u></p> <p>Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/AIA/01 form for each additional inventor.</p>	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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2167.052US3

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	21145992
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Mark Victor Muller/LaTasha Hill
<b>Filer Authorized By:</b>	Mark Victor Muller
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	07-JAN-2015
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	16:12:41
<b>Application Type:</b>	Utility under 35 USC 111(a)

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1		2167052us3dec.pdf	1949525 92885da4565ce18c520937a4a91207292fd dface	yes	6

	Multipart Description/PDF files in .zip description		
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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Job Cornelis Oostveen et al.

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Docket No.: 2167.052US3  
Filed: January 10, 2014  
Examiner: Lisa Lewis  
Customer No.: 21186

Serial No.: 14/151,879  
Due Date: N/A  
Group Art Unit: 2495  
Confirmation No.: 4055

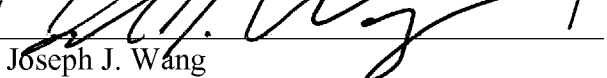
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We are transmitting herewith the attached:

☒ Communication Re: Late Submission of Declaration (1 pg.).  
☒ Signed Declaration (4 pgs.).

**It is believed that no additional fee is required. However, if necessary, please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.**

Schwegman Lundberg & Woessner, P.A.  
Customer No: 21186  
JJW:CMG:lrh

By:   
Joseph J. Wang  
Reg. No. 61,123

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LaTasha Hill  
Name

/LaTasha Hill/  
Signature

**S/N 14/151,879**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventors:	Job Cornelis Oostveen <i>et al.</i>	Examiner:	Lisa Lewis
Serial No.:	14/151,879	Group Art Unit:	2495
Filed:	January 10, 2014	Docket No.:	2167.052US3
Customer No.:	21186	Confirmation No.:	4055
Title:	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		

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**AMENDMENT & RESPONSE UNDER 37 C.F.R. § 1.111**

Mail Stop Amendment  
Commissioner for Patents  
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Alexandria, VA 22313-1450

In response to the Office Action dated October 10, 2014, please consider the amendments and remarks contained herein.



### IN THE CLAIMS

The following listing of the claims will replace all prior listings of claims in the application. Inserted text is underlined, and deleted text is either struck through or shown in double enclosing brackets. No new matter is added, and all claimed elements are supported by the specification as originally filed.

1. (Previously Presented) A method comprising:

determining a plurality of trigger fingerprints from content being played back on a playback device, each trigger fingerprint identifying a corresponding trigger time point of a sequence of trigger time points in the content and at which trigger time point at least one corresponding action is to be triggered, the determining being performed by a processor;

accessing a database that includes a plurality of reference fingerprints, previously derived from the content, and a plurality of reference actions, each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint;

identifying the corresponding reference action by obtaining a match in the database between a trigger fingerprint among the plurality of trigger fingerprints and a reference fingerprint among the plurality of reference fingerprints; and

performing a reference action that corresponds to the reference fingerprint on the playback device.

2. (Previously Presented) The method of claim 1, wherein:

different corresponding actions are to be performed at different trigger time points in the sequence of trigger time points in the content.

3. (Previously Presented) The method of claim 1, wherein:

the trigger fingerprint is determined from a segment of the content, the segment ending at the trigger time point at which the reference action is to be performed.

4. (Previously Presented) The method of claim 1, wherein:

the trigger fingerprint is determined from a segment of the content, the segment beginning at the trigger time point at which the reference action is to be performed.

5. (Previously Presented) The method of claim 1, wherein:

the trigger fingerprint is determined from a segment of the content, the segment beginning or ending at a predetermined distance before or after the trigger time point at which the reference action is to be performed.

6. (Currently Amended) The method of claim 1, wherein:

the reference action ~~that~~ corresponds to multiple reference fingerprints that include the reference fingerprint.

7. (Previously Presented) The method of claim 1, wherein:

multiple reference actions correspond to the reference fingerprint and are to be performed at the trigger time point; and  
the performing of the reference action is part of performing the multiple reference actions that correspond to the reference fingerprint.

8. (Previously Presented) A system comprising:

a fingerprint detector configured to determine a plurality of trigger fingerprints from content being played back on a playback device, each trigger fingerprint identifying a corresponding trigger time point of a sequence of trigger time points in the content and at which trigger time point at least one corresponding action is to be triggered; and

a processor configured to:

access a database that includes a plurality of reference fingerprints, previously derived from the content, and a plurality of reference actions, each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint;

identify the corresponding reference action by obtaining a match in the database between a trigger fingerprint among the plurality of trigger fingerprints and a reference fingerprint among the plurality of reference fingerprints; and

perform a reference action that corresponds to the reference fingerprint on the playback device.

9. (Currently Amended) The system of claim 8, wherein:

the reference action ~~that~~ corresponds to multiple reference fingerprints that include the reference fingerprint.

10. (Previously Presented) A non-transitory machine-readable storage medium comprising instructions that, when executed by one or more processors of a machine, cause the machine to perform operations comprising:

determining a plurality of trigger fingerprints from content being played back on a playback device, each trigger fingerprint identifying a corresponding trigger time point of a sequence of trigger time points in the content and at which trigger time point at least one corresponding action is to be triggered;

accessing a database that includes a plurality of reference fingerprints, previously derived from the content, and a plurality of reference actions, each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint;

identifying the corresponding reference action by obtaining a match in the database between a trigger fingerprint among the plurality of trigger fingerprints and a reference fingerprint among the plurality of reference fingerprints; and

performing a reference action that corresponds to the reference fingerprint on the playback device.

11. (Previously Presented) A method comprising:

accessing segments of content, a segment among the segments being associated with a corresponding action to be triggered during playback of the segment;  
generating a reference fingerprint of the segment associated with the corresponding action, the generating being performed by a processor;  
assigning the reference fingerprint of the segment to the corresponding action that is to be triggered during playback of the segment of the content;  
providing access to the reference fingerprint of the segment to a playback device configured to match the reference fingerprint to a playback fingerprint derived from the segment by the playback device; and  
providing the identifier of the corresponding action to the playback device based on the reference fingerprint matching the playback fingerprint, the provided identifier causing the playback device to trigger the corresponding action during the playback of the segment.

12. (Previously Presented) The method of claim 11, wherein:

the assigning of the reference fingerprint to the identifier of the corresponding action includes storing the reference fingerprint with the identifier of the corresponding action in a database; and  
the playback device is configured to search the database to match the reference fingerprint to the playback fingerprint.

13. (Previously Presented) The method of claim 11, wherein:

the playback device is configured to trigger the corresponding action at a time point that is a predetermined distance from a start of the segment of the multimedia content.

14. (Previously Presented) The method of claim 11, wherein:

the playback device is configured to trigger the corresponding action at a time point that is a predetermined distance from an end of the segment of the multimedia content.

15. (Previously Presented) The method of claim 11, wherein:

the playback device is further configured to present the corresponding action and await confirmation of the corresponding action in response to the playback device triggering the corresponding action during the playback of the segment of the content.

16. (Previously Presented) The method of claim 11, wherein:

the corresponding action for the reference fingerprint and for the segment of the content includes retrieving and displaying on a display additional information selected from a group consisting of:  
biography data for an actor that appears in the segment of the content,  
a link to a website,  
a local weather forecast, and  
a local commercial.

17. (Previously Presented) The method of claim 11, wherein:

the corresponding action for the reference fingerprint and for the segment of the content includes retrieving and playing via a speaker additional information selected from a group consisting of:  
biography data of an actor that appears in the segment of the content,  
a local weather forecast, and  
a local commercial.

18. (Previously Presented) The method of claim 11, wherein:

the corresponding action for the reference fingerprint and for the segment of the content is selected from a group consisting of:

- replacing the content with different content for a period of time,
- pausing playback of the content,
- stopping playback of the content,
- executing a control command, and
- preparing the playback device to receive user input.

19. (Previously Presented) The method of claim 11, wherein:

the content includes at least one of audio content or video content.

20. (Previously Presented) A non-transitory machine-readable storage medium comprising instructions that, when executed by one or more processors of a machine, cause the machine to perform operations comprising:

- accessing segments of content, a segment among the segments being associated with a corresponding action to be triggered during playback of the segment;
- generating a reference fingerprint of the segment associated with the corresponding action;
- assigning the reference fingerprint of the segment to the corresponding action that is to be triggered during playback of the segment of the content;
- providing access to the reference fingerprint of the segment to a playback device configured to match the reference fingerprint to a playback fingerprint derived from the segment by the playback device; and
- providing the identifier of the corresponding action to the playback device based on the reference fingerprint matching the playback fingerprint, the provided identifier causing the playback device to trigger the corresponding action during the playback of the segment.

21. (Previously Presented) A system comprising:

an input module configured to access segments of content, a segment among the segments being associated with a corresponding action to be triggered during playback of the segment; and

a fingerprint module implemented in a processor and configured to:

generate a reference fingerprint of the segment associated with the corresponding action;

assign the reference fingerprint of the segment to the corresponding action that is to be triggered during playback of the segment of the content;

provide access to the reference fingerprint of the segment to a playback device configured to match the reference fingerprint to a playback fingerprint derived from the segment by the playback device; and

provide the identifier of the corresponding action to the playback device based on the reference fingerprint matching the playback fingerprint, the provided identifier causing the playback device to trigger the corresponding action during the playback of the segment.

22. (Previously Presented) The system of claim 21, wherein:

the system further comprises a database;

the fingerprint module is configured to store the reference fingerprint with the identifier of the corresponding action in the database; and

the playback device is configured to search the database to match the reference fingerprint to the playback fingerprint.

23. (Previously Presented) The system of claim 21, wherein:

the corresponding action is to be triggered by the playback device at a time point that is a predetermined distance from a start of the segment of the multimedia content.



24. (Previously Presented) The system of claim 21, wherein:

the corresponding action is to be triggered by the playback device at a time point that is a predetermined distance from an end of the segment of the multimedia content.

25. (Previously Presented) The system of claim 21, wherein:

the corresponding action is to be presented by the playback device in response to the playback device triggering the corresponding action during the playback of the segment of the content, the playback device being further configured to await confirmation of the corresponding action prior to executing the corresponding action.

### **REMARKS**

This communication responds to the Office Action dated October 10, 2014. Claims 6 and 9 are presently amended. No claims are presently or previously canceled, and no new claims are presently added. As a result, claims 1-25 remain pending in this application.

#### **Interview Summary**

The undersigned wishes to thank Examiner Lisa Lewis for the courtesy of a telephone interview on December 8, 2014. The interview included a discussion of an action performed in response to identifying an entire song, as described in Haitsma *et al.* (U.S. Patent Application Publication No. 2002/0178410; “Haitsma”), in contrast with an action that corresponds to a time point within a piece of content, as well as a discussion of content containing watermarks, as described in Petrovic *et al.* (International Publication No. WO 2001/61987; “Petrovic”), in contrast with fingerprints of content. It was agreed that a formal response would be filed. The time and attention of the Examiner to this application are appreciated.

#### **Claim Amendments & Claim Objections**

Claims 6 and 9 were objected to on grounds of informality and are presently amended, solely to correct minor typographical errors. No new matter is added. It is therefore respectfully requested that the present amendments be entered and considered.

#### **Double Patenting Rejections**

Claims 1-25 were rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being obvious over claims 1-13 of U.S. Patent No. 8,020,000 (Attorney Docket No. 2167.053US1). Claims 1-25 were rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. 8,660,267 (Attorney Docket No. 2167.053US2).

Without any admission, express or implied, that any of the instant claims are obvious in view of U.S. Patent No. 8,020,000 or U.S. Patent No. 8,660,267, the undersigned will consider

filing a Terminal Disclaimer in compliance with 37 C.F.R. § 1.321(b) to obviate these rejections at a later date, since the claims of the present application may change before they reach a state of allowance.

*The Rejections of Claims Under § 112*

Claims 8, 9, and 21-25 were rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as allegedly being indefinite. The pre-AIA law is applicable here. Specifically, the Office Action referred to the phrases “detector configured to” (recited in claim 8 from which claim 9 depends) and “module configured to” (recited in claim 21 from which claims 22-25 depend) and stated that “the written description fails to clearly link or associate the disclosed structure, material, or acts to the claimed function . . . .”<sup>1</sup>

Regarding the phrase “detector configured to,” which is recited in claim 8 within the claim element of “a fingerprint detector configured to . . .,” the originally filed specification describes such a “fingerprint detector” in at least the following passages:

**FIG. 3, fingerprint detector 302;**

**page 9, line 32 – page 10, line 2** (e.g., “a playback device (300) comprising . . . a *fingerprint detector* (302), . . . communicating via a bus (205) or the like under the control of one or more microprocessors”);<sup>2</sup> and

**page 10, lines 8-13** (e.g., “The received multimedia signal is fed to the *fingerprint detector* (302) that derives a fingerprint stream or segments thereof and determines if there are any matches with fingerprints stored in the database as explained in connection with Figure 1b. If a match is found then a representation of the associated action(s) is also retrieved. The appropriate time point for the associated action(s) is given by the matching fingerprint as described above.”).<sup>3</sup>

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<sup>1</sup> Office Action at 4.

<sup>2</sup> Emphasis added.

<sup>3</sup> Emphasis added.

It is therefore respectfully submitted that the originally filed specification clearly links and associates the recited “fingerprint detector” in claim 8 with its claimed function. Accordingly, at least claims 8 and 9 are not indefinite under 35 U.S.C. § 112 (pre-AIA). Thus, it is respectfully requested that these rejections be reconsidered and withdrawn with respect to claims 8 and 9.

Regarding the phrase “module configured to,” which is recited in claim 21 within the claim elements of “an input module configured to . . .” and “a fingerprint module configured to . . .,” the originally filed specification describes such an “input module” and such a “fingerprint module” in at least the following passages:

**FIG. 2, AV input module 201 and fingerprint generator 202;**

**page 9, lines 6-9** (e.g., “fingerprint generation device (200) comprising a multi-media signal *input module* (201), a *fingerprinting module* (202), . . . communicating via a bus (205) or the like under the control of one or more microprocessors”);<sup>4</sup> and

**page 9, lines 13-26** (e.g., “The multi-media signal *input module* (201) receives multimedia content e.g. in the form of an analog or digital audio and/or video signal and feeds the multimedia content to the *fingerprinting module* (202). The *fingerprinting module* (202) *computes a fingerprint* on the basis of the received multi-media content. A fingerprint may be derived for the entire content or for a part of the content. Alternatively, several fingerprints may be derived each from a different part. . . . A representation of the time point(s) is also supplied to the fingerprinting module (202). The *fingerprinting module* (202) then supplies the computed fingerprint(s) to the database (203) preferably together with the associated one or more actions for each fingerprint. As shown in Figure 4, the database (203) comprises fingerprints . . . and [their] respective associated actions”).<sup>5</sup>

It is therefore respectfully submitted that the originally filed specification clearly links and associates the recited “input module” and the recited “fingerprint module” in claim 21 with their claimed functions. Accordingly, at least claims 21-25 are not indefinite under 35 U.S.C. §

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<sup>4</sup> Emphasis added.

<sup>5</sup> Emphasis added.

112 (pre-AIA). Thus, it is respectfully requested that these rejections be reconsidered and withdrawn with respect to claims 21-25.

*The Rejections of Claims Under § 102/103*

Claims 1, 8, and 10 were rejected under pre-AIA 35 U.S.C. § 102(b) as allegedly being anticipated by, or in the alternative, under 35 U.S.C. § 103(a), as allegedly being obvious over Haitsma.

*1). The Applicable Law under § 102 or § 103*

To anticipate a claim, a reference must disclose **each and every element** of the claim,<sup>6</sup> as arranged in the claim,<sup>7</sup> and in as complete detail as in the claim.<sup>8</sup> “There must be **no difference** between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention.”<sup>9</sup>

The question of obviousness is resolved on the basis of underlying factual determinations including (1) “the scope and content of the prior art,” (2) “differences between the claimed subject matter and the prior art,” (3) “the level of ordinary skill in the art,” and (4) where in evidence, “secondary considerations.”<sup>10</sup> Here, no determination of obviousness is properly established for at least the reason that the scope and content of the cited references, even if combined, do not teach or suggest all claim elements, or support rational inferences that a person

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<sup>6</sup> “A claim is anticipated only if **each and every element** as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987), cited in *Ex parte Frye*, Appeal No. 2009-006013 (BPAI 2010) (precedential), emphasis added.

<sup>7</sup> “To establish anticipation, every element and limitation of the claimed invention must be found in a single prior art reference, **arranged as in the claim.**” *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383; 58 U.S.P.Q.2d 1286, 1291 (Fed. Cir. 2001), cited in *Ex parte Frye*, Appeal No. 2009-006013 (BPAI 2010) (precedential), emphasis added.

<sup>8</sup> “The identical invention must be shown **in as complete detail** as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989), cited in MPEP § 2131, emphasis added.

<sup>9</sup> *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991), emphasis added.

<sup>10</sup> *Graham v. John Deere*, 383 U.S. 1, 17-18, 148 U.S.P.Q. 459, 467; *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406-7, 82 U.S.P.Q.2d 1385, 1390 (2007), cited in *Ex parte Frye*, Appeal No. 2009-006013 (BPAI 2010) (precedential).

skilled in the art reasonably would employ to reach all claim elements, of the independent claims.

2). Application of the Law to the Rejections

Each of independent claims 1, 8, and 10 recites, in part, “**each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint.**”<sup>11</sup> It is respectfully asserted that Haitsma does not disclose, teach, or suggest at least this claim element.

In setting forth these rejections, the Office Action cited exclusively to paragraphs 0026, 0040, and 0055-0059 of Haitsma as allegedly disclosing the above-quoted claim element.<sup>12</sup> However, the cited paragraph 0026 of Haitsma merely discusses “dividing [an audio] signal into *overlapping frames*”<sup>13</sup> in the context of “subdivid[ing] audio signals into *time intervals* or frames.”<sup>14</sup> Simply dividing an audio signal into overlapping time intervals makes no disclosure of “**each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint.**”<sup>15</sup> As a result, the cited paragraph 0026 of Haitsma fails to disclose, teach, or suggest at least this claim element.

The cited paragraph 0040 of Haitsma merely describes “*matching extracted hash blocks to the hash blocks in a large database*”<sup>16</sup> in the context of “*identifying an information signal.*”<sup>17</sup> However, simply matching hash blocks to other hash blocks as part of identifying an entire information signal makes no disclosure of “**each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the**

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<sup>11</sup> Emphasis added.

<sup>12</sup> Office Action at 6.

<sup>13</sup> Haitsma at paragraph 0026, emphasis added.

<sup>14</sup> *Id.* at paragraph 0025, emphasis added.

<sup>15</sup> Emphasis added.

<sup>16</sup> Haitsma at paragraph 0040, emphasis added.

<sup>17</sup> *Id.* at paragraph 0001, emphasis added.

**reference fingerprint.”**<sup>18</sup> As a result, the cited paragraph 0040 of Haitsma fails to disclose, teach, or suggest at least this claim element.

The cited paragraphs 0055-0059 of Haitsma merely discuss “applications of robust hashing”<sup>19</sup> in the context of “*identifying an information signal.*”<sup>20</sup> Although the cited paragraphs of Haitsma mention “extract[ing] a hash block from the audio,”<sup>21</sup> “a watermark in a piece of multimedia [directing] a user to a certain URL,”<sup>22</sup> and “determining the [bit error rate] of the extracted hash words,”<sup>23</sup> nothing in the cited paragraphs of Haitsma contain any discussion of **“each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint.”**<sup>24</sup> As a result, the cited paragraphs 0055-0059 of Haitsma fails to disclose, teach, or suggest at least this claim element.

The remainder of Haitsma is similarly silent with respect to the claim element of “*each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint.*”<sup>25</sup> Indeed, Haitsma is directed to “*identifying an information signal,*”<sup>26</sup> and none of the actions in Haitsma that are triggered by identification of an information signal are described by Haitsma as corresponding to any particular time point “within” that information signal. As a result, the entirety of Haitsma fails to disclose, teach, or suggest the claim element of **“each reference fingerprint identifying at least one corresponding reference action to be performed at a reference time point identified by the reference fingerprint.”**<sup>27</sup>

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<sup>18</sup> Emphasis added.

<sup>19</sup> Haitsma at paragraph 0055, emphasis added.

<sup>20</sup> *Id.* at paragraph 0001, emphasis added.

<sup>21</sup> *Id.* at paragraph 0056.

<sup>22</sup> *Id.* at paragraph 0058.

<sup>23</sup> *Id.* at paragraph 0059.

<sup>24</sup> Emphasis added.

<sup>25</sup> Emphasis added.

<sup>26</sup> *Id.* at paragraph 0001, emphasis added.

<sup>27</sup> Emphasis added.

Because **each and every element** of independent claims 1, 8, and 10 is not disclosed in Haitsma, as arranged in the claims and in as complete detail as in the claims, no *prima facie* case of anticipation is established with respect to independent claims 1, 8, and 10, and their respective dependent claims. For at least the same reasons, the scope and content of Haitsma do not teach or suggest all claim elements, or support rational inferences that a person skilled in the art reasonably would employ to reach all claim elements, of independent claims 1, 8, and 10. As a result, a determination of obviousness is not established with respect to any of independent claims 1, 8, and 10, and their respective dependent claims. Moreover, the dependent claims are each asserted to be patentable based on limitations recited therein. Thus, it is respectfully requested that these rejections be reconsidered and withdrawn and that the claims be allowed.

*The Rejections of Claims Under § 103*

Claims 3-5 were rejected under pre-AIA 35 U.S.C. § 103(a) as allegedly being obvious over Haitsma, in view of Petrovic. As discussed above, Haitsma fails to disclose all claim elements of independent claim 1, from which claims 3-5 depend. The claim elements shown above to be absent from Haitsma are similarly absent from Petrovic, and nothing in the Office Action alleges otherwise. Accordingly, at least by virtue of their dependency from their base claim, claims 3-5 are patentable over the combination of Haitsma and Petrovic. Moreover, claims 3-5 each are asserted to be patentable based on limitations recited therein. Thus, it is respectfully requested that these rejections be reconsidered and withdrawn and that the claims be allowed.

Claim 7 was rejected under pre-AIA 35 U.S.C. 103(a) as allegedly being obvious over Haitsma, in view of Levy (International Publication No. WO 2002/08945). As discussed above, Haitsma fails to disclose all claim elements of independent claim 1, from which claim 7 depends. The claim elements shown above to be absent from Haitsma are similarly absent from Levy, and nothing in the Office Action alleges otherwise. Accordingly, at least by virtue of its dependency from its base claim, claim 7 is patentable over the combination of Haitsma and Levy. Moreover, claim 7 is asserted to be patentable based on limitations recited therein. Thus, it is respectfully requested that this rejection be reconsidered and withdrawn and that the claim be allowed.



**CONCLUSION**


It is respectfully submitted that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone the undersigned at (408) 278-4048 to facilitate prosecution of this application.

If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(408) 278-4048

Date Jan 12, 2015

By /   
Joseph J. Wang  
Reg. No. 61,123

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	21180473
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall
<b>Filer Authorized By:</b>	Gregory M. Stark
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	12-JAN-2015
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	12:49:20
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2167052US3_resp_011215.pdf	5341352 3cc2e83e7d21644cad548604a84a842b67710a43	yes	19

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Miscellaneous Incoming Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	2
	Claims	3	11
	Applicant Arguments/Remarks Made in an Amendment	12	19

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	5341352
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Job Cornelis Oostveen et al.

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Docket No.: 2167.052US3

Serial No.: 14/151,879

Filed: January 10, 2014

Due Date: January 10, 2015

Examiner: Lisa Lewis

Group Art Unit: 2495

Customer No.: 21186

Confirmation No.: 4055

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450


We are transmitting herewith the following attached items (as indicated with an "X"):

X Amendment and Response under 37 C.F.R. § 1.111 (19 pgs.)

**If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. § 1.7(a), the response period falling on a Federal Holiday, Saturday or Sunday being extended to the next succeeding business day.**

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

Customer No.: 21186

1 

Joseph J. Wang  
Reg. No. 61,123

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>14/151,879</b>	Filing Date <b>01/10/2014</b>	<input type="checkbox"/> To be Mailed
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 ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

### APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

### APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

	01/12/2015	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 6	Minus	*** 6	= 0	X \$420 =	0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
	TOTAL ADD'L FEE						0

(Column 1)

(Column 2)

(Column 3)

	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
	TOTAL ADD'L FEE					

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

 LIE  
 /TARA WASHINGTON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number

Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

21186

OR



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR

Firm or  
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Gracenote, Inc.



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

### SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

Name

Title

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.



Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	21236345
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Mark Victor Muller/LaTasha Hill
<b>Filer Authorized By:</b>	Mark Victor Muller
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	16-JAN-2015
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	17:18:16
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2167052us3package.pdf	1006013 57fe3d481480e04345b399b5a11eb05b4e15ca08	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Transmittal Letter	1	1
	Miscellaneous Incoming Letter	2	2
	Application Data Sheet	3	8
	Miscellaneous Incoming Letter	9	10
	Power of Attorney	11	11

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	1006013
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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Job Cornelis Oostveen et al.

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Docket No.: 2167.052US3  
Filed: January 10, 2014  
Examiner: Lisa Lewis  
Customer No.: 21186

Serial No.: 14/151,879  
Due Date: N/A  
Group Art Unit: 2495  
Confirmation No.: 4055

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

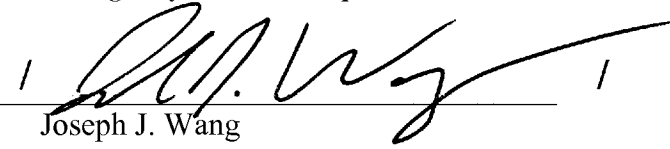
We are transmitting herewith the attached:

☒ Communication Re: Update to Application Data Sheet (1 Pg.).  
☒ Marked Up Application Data Sheet (6 Pgs.).  
☒ Statement Under 37 CFR 3.73 ( 2 Pgs.).  
☒ Power of Attorney (1 Pgs.).

**It is believed that no additional fee is required. However, if necessary, please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.**

Schwegman Lundberg & Woessner, P.A.

By

  
Joseph J. Wang  
Reg. No. 61,123

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 16 day of January, 2015.

LaTasha Hill  
Name

/LaTasha Hill/  
Signature

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s): Job Cornelis Oostveen et al. Examiner: Lisa Lewis  
Serial No.: 14/151,879 Group Art Unit: 2495  
Filed: January 10, 2014 Docket: 2167.052US3  
Customer No.: 21186 Confirmation No.: 4055  
Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A  
FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A  
MULTIMEDIA SIGNAL

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**COMMUNICATION RE: UPDATE TO APPLICATION DATA SHEET**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Applicants hereby request that the information provided on the Application Data Sheet filed in the above-referenced application on January 10, 2014, be updated with the information as provided on the enclosed marked up Application Data Sheet.

We therefore submit a marked up copy of the Application Data Sheet which shows an update to the applicant information.

It is respectfully requested that the USPTO update their records and provide confirmation of the above request.

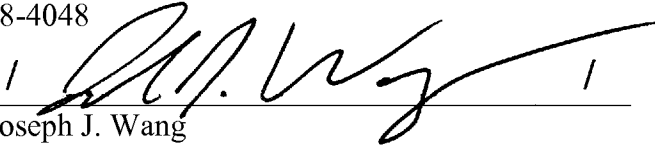
It is believed that no fee is required to fulfill this request, however, if necessary, please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

Schwegman Lundberg & Woessner, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(408) 278-4048

Date \_\_\_\_\_

By \_\_\_\_\_

  
Joseph J. Wang  
Reg. No. 61,123

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	2167.052US3
		<b>Application Number</b>	14/151,879
<b>Title of Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

## Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Inventor Information:

<b>Inventor 1:</b> Job Cornelis Oostveen				
<b>Legal Name</b>				
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>
Mr.	Job	Cornelis	Oostveen	
<b>Residence Information (Select One)</b>				
<input type="checkbox"/> US Residency <input checked="" type="checkbox"/> Non US Residency <input type="checkbox"/> Active US Military Service				
<b>City</b>	Haren	<b>State/Province</b>		<b>Country of Residence</b> Netherlands
<b>Mailing Address of Inventor:</b>				
<b>Address 1</b>	2000 Powell Street			
<b>Address 2</b>	Suite 1380			
<b>City</b>	Emeryville	<b>State/Province</b>	CA	
<b>Postal Code</b>	94608	<b>Country</b>	United States of America	
<b>Inventor 2:</b> Warner Rudolph Theophile Ten Kate				
<b>Legal Name</b>				
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>
	Warner	Rudolph Theophile	Ten Kate	
<b>Residence Information (Select One)</b>				
<input type="checkbox"/> US Residency <input checked="" type="checkbox"/> Non US Residency <input type="checkbox"/> Active US Military Service				
<b>City</b>	Eindhoven	<b>State/Province</b>		<b>Country of Residence</b> Netherlands
<b>Mailing Address of Inventor:</b>				
<b>Address 1</b>	2000 Powell Street			
<b>Address 2</b>	Suite 1380			
<b>City</b>	Emeryville	<b>State/Province</b>	CA	
<b>Postal Code</b>	94608	<b>Country</b>	United States of America	

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<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	2167.052US3
		<b>Application Number</b>	14/151,879
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<b>Inventor 3:</b> Adrianus Johannes Maria Denissen				
<b>Legal Name</b>				
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>
	Adrianus	Johannes Maria	Denissen	
<b>Residence Information (Select One)</b>				
<input type="checkbox"/> US Residency <input checked="" type="checkbox"/> Non US Residency <input type="checkbox"/> Active US Military Service				
<b>City</b>	Eindhoven	<b>State/Province</b>		<b>Country of Residence</b> Netherlands
<b>Mailing Address of Inventor:</b>				
<b>Address 1</b>	2000 Powell Street			
<b>Address 2</b>	Suite 1380			
<b>City</b>	Emeryville	<b>State/Province</b>	CA	
<b>Postal Code</b>	94608	<b>Country</b>	United States of America	
<b>Inventor 4:</b> David K. Roberts				
<b>Legal Name</b>				
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>
	David	K.	Roberts	
<b>Residence Information (Select One)</b>				
<input type="checkbox"/> US Residency <input checked="" type="checkbox"/> Non US Residency <input type="checkbox"/> Active US Military Service				
<b>City</b>	Cheddar	<b>State/Province</b>		<b>Country of Residence</b> United Kingdom
<b>Mailing Address of Inventor:</b>				
<b>Address 1</b>	2000 Powell Street			
<b>Address 2</b>	Suite 1380			
<b>City</b>	Emeryville	<b>State/Province</b>	CA	
<b>Postal Code</b>	94608	<b>Country</b>	United States of America	

### Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).	
<input type="checkbox"/> An Address is being provided for the correspondence information of this application.	
<b>Customer Number</b>	21186
<b>Email Address</b>	request@slwip.com

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<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	2167.052US3
		<b>Application Number</b>	14/151,879
<b>Title of Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		
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## Application Information:

<b>Title of the Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		
<b>Attorney Docket Number</b>	2167.052US3	<b>Small Entity Status Claimed</b> <input type="checkbox"/>	
<b>Application Type</b>	Non-Provisional		
<b>Subject Matter</b>	Utility - CON		
<b>Suggested Class (if any)</b>		<b>Sub Class (if any)</b>	
<b>Suggested Technology Center (if any)</b>			
<b>Total Number of Drawing Sheets (if any)</b>	3	<b>Suggested Figure for Publication (if any)</b>	
<b>Filing By Reference:</b>			
<p><u>Only compete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a).</u> Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").</p> <p>For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).</p>			
<b>Application number of the previously filed application</b>	<b>Filing date (YYYY-MM-DD)</b>	<b>Intellectual Property Authority or Country Publication</b>	

## Publication Information:

<input type="checkbox"/> <b>Request Early Publication (Fee required at time of Request 37 CFR 1.219)</b>
<input type="checkbox"/> <b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

## Representative Information:

<p>Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.</p>			
<b>Please Select One:</b>	<input checked="" type="checkbox"/> <b>Customer Number</b>	<input type="checkbox"/> <b>US Patent Practitioner</b>	<input type="checkbox"/> <b>Limited Recognition (37 CFR 11.9)</b>
<b>Customer Number</b>	21186		

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	2167.052US3
		<b>Application Number</b>	14/151,879
<b>Title of Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
<b>Prior Application Status</b>	Pending		
<b>Application Number</b>	<b>Continuity Type</b>	<b>Prior Application Number</b>	<b>Filing Date (YYYY-MM-DD)</b>
This application	continuation of	13/220,267	2011-08-29
<b>Prior Application Status</b>	Patented		
<b>Application Number</b>	<b>Continuity Type</b>	<b>Prior Application Number</b>	<b>Filing Date (YYYY-MM-DD)</b>
13/220,267	continuation of	10/564,297	2006-01-10
<b>Prior Application Status</b>	Expired		
<b>Application Number</b>	<b>Continuity Type</b>	<b>Prior Application Number</b>	<b>Filing Date (YYYY-MM-DD)</b>
10/564,297	a 371 of international	PCT/IB2004/051128	2004-07-05

## Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the POX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).			
<b>Application Number</b>	<b>Country</b>	<b>Parent Filing Date (YYYY-MM-DD)</b>	<b>Access Code (if applicable)</b>
03102116.5	European Patent Office	2003-07-11	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	2167.052US3
		<b>Application Number</b>	14/151,879
<b>Title of Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

## Authorization to Permit Access:

<input checked="" type="checkbox"/> <b>Authorization to Permit Access to the Instant Application by the Participating Offices</b>
<p>If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.</p> <p>In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.</p> <p>In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.</p>

## Applicant Information:

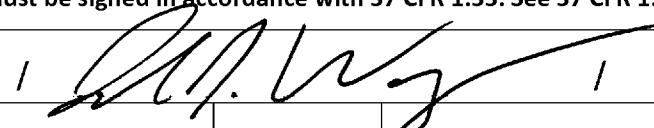
Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
<b>Applicant:</b> Koninklijke Philips Electronics N.V. Gracenote, Inc.				
<p><u>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed.</u> The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p>				
<input checked="" type="checkbox"/> Assignee	<input type="checkbox"/> Legal Representative under 35 U.S.C. 117		<input type="checkbox"/> Joint Inventor	
<input type="checkbox"/> Person to whom the inventor is obligated to assign		<input type="checkbox"/> Person who shows sufficient proprietary interest		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:				
<input type="checkbox"/> Deceased		<input type="checkbox"/> Legally incapacitated		
Name of the Deceased or Legally Incapacitated Inventor :				
If the Applicant is an Organization check here: <input checked="" type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	2167.052US3
		<b>Application Number</b>	<u>14/151,879</u>
<b>Title of Invention</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

<b>Mailing Address Information:</b>			
<b>Address 1</b>	<u>Greenwoodseweg 1 2000 Powell Street</u>		
<b>Address 2</b>	<u>Suite 1380</u>		
<b>City</b>	<u>Eindhoven Emeryville</u>	<b>State/Province</b>	<u>CA</u>
<b>Country</b>	<u>Netherlands United States of America</u>	<b>Postal Code</b>	<u>NL-5621 BA 94608</u>
<b>Phone Number</b>			
<b>Email Address</b>			

## Signature:

<b>NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications</b>					
<b>Signature</b>					<b>Date (YYYY-MM-DD)</b>
<b>First Name</b>	Joseph	<b>Last Name</b>	Wang	<b>Registration Number</b>	61,123

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-14**



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**STATEMENT UNDER 37 CFR 3.73(c)**Applicant/Patent Owner: Gracernote, Inc.Application No./Patent No.: 14/151,879 Filed/Issue Date: January 10, 2014Titled: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNALGracernote, Inc. a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is \_\_\_\_\_. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Job Cornelis Oostveen, Werner Rudolph Theophile Ten Kate, Adrianus Johannes Maria Denissen and David Keith Roberts To: Koninklijke Philips Electronics, N.V.

The document was recorded in the United States Patent and Trademark Office at

Reel 017460, Frame 0261, or for which a copy thereof is attached.

2. From: Koninklijke Philips Electronics, N.V. To: Gracernote, Inc.

The document was recorded in the United States Patent and Trademark Office at

Reel 024530, Frame 0208, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

IPR2020-00216

Gracernote EX2009 Page 261

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**STATEMENT UNDER 37 CFR 3.73(c)**

3. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

4. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

5. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

6. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.☐ Additional documents in the chain of title are listed on a supplemental sheet(s).☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature

Joseph J. Wang  
Printed or Typed Name

Date

USPTO Reg. No. 61,123  
Title or Registration Number

[Page 2 of 2]



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3

21186  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

**CONFIRMATION NO. 4055**  
**POA ACCEPTANCE LETTER**



Date Mailed: 01/28/2015

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 01/16/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/tlulu/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/151,879	01/10/2014	2495	3400	2167.052US3	1	1

**CONFIRMATION NO. 4055**

21186  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

**CORRECTED FILING RECEIPT**



\*OC000000073010553\*

Date Mailed: 01/28/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**

Job Cornelis Oostveen, Haren, NETHERLANDS;  
Warner Rudolph Theophile Ten Kate, Eindhoven, NETHERLANDS;  
Adrianus Johannes Maria Denissen, Eindhoven, NETHERLANDS;  
David K. Roberts, Cheddar, UNITED KINGDOM;

**Applicant(s)**

Gracernote, Inc., Emeryville, CA

**Power of Attorney:** The patent practitioners associated with Customer Number 21186

**Domestic Priority data as claimed by applicant**

This application is a CON of 13/220,267 08/29/2011 PAT 8660267  
which is a CON of 10/564,297 01/10/2006 PAT 8020000  
which is a 371 of PCT/IB2004/051128 07/05/2004

**Foreign Applications** (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)  
EUROPEAN PATENT OFFICE (EPO) 03102116.5 07/11/2003

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to**

**Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

**If Required, Foreign Filing License Granted:** 01/23/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/151,879**

**Projected Publication Date:** Not Applicable

**Non-Publication Request:** No

**Early Publication Request:** No  
**Title**

METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING  
AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

**Preliminary Class**

380

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

**LICENSE FOR FOREIGN FILING UNDER**  
**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

**S/N 14/151,879**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s): Job Cornelis Oostveen et al.

Examiner: Lisa Lewis

Serial No.: 14/151,879

Group Art Unit: 2495

Filed: January 10, 2014

Docket No.: 2167.052US3

Customer No.: 21186

Confirmation No.: 4055

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

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**TERMINAL DISCLAIMER**

MS Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

I, Domenico L. Ippolito, am an attorney of record for the above-identified patent application as evidenced by the Power of Attorney filed in the present application on January 16, 2015. This Terminal Disclaimer is submitted on behalf of Gracernote, Inc., the assignee of the present invention. As an attorney of record, I am empowered to act on behalf of the assignee and, in accordance with 37 C.F.R. § 1.321(b)(1)(iv), to sign this Terminal Disclaimer.

**Certificate Under 37 C.F.R. § 3.73(b)**

The assignee, Gracernote, Inc., hereby certifies that it is the owner of the entire right, title and interest in and to both the above-identified application (U.S. Application Serial No. 14/151,879) and to U.S. Patent No. 8,660,267, by virtue of the executed and filed assignment transferring title of both of these applications. An assignment for U.S. Patent No. 8,020,000 was recorded on June 14, 2010 at Reel 024530, Frames 0208-0211. That assignment assigned the application underlying U.S. Patent No. 8,020,000, as well as, *inter alia*, all continuations and divisionals based upon that application. The above-identified application is a continuation of U.S. Patent 8,660,267, which is a continuation of U.S. Patent No. 8,020,000. The above-identified application and U.S. Patent No. 8,660,267 were both thus assigned to the assignee by the identified assignment.

The undersigned representative of the assignee has reviewed the evidentiary documents of title and certifies that to the best of assignee's knowledge and belief, title is in the assignee seeking to take the action set forth in this disclaimer.



**TERMINAL DISCLAIMER**

Serial Number: 14/151,879

Filing Date: January 10, 2014

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER  
IN A MULTIMEDIA SIGNAL**Page 2**

Dkt: 2167.052US3

Terminal Disclaimer

The assignee of the above-identified application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the above-identified patent application, which would extend beyond the expiration date of the full statutory term, as presently shortened by any terminal disclaimers, of U.S. Patent No. 8,660,267. The assignee hereby agrees that any patent to be granted on the above-identified application shall be enforceable only for and during such period as such patent is commonly owned with U.S. Patent No. 8,660,267. This agreement shall run with any patent granted on the above-identified application and shall be binding upon the assignee's successors and assigns.

Limitations on the Disclaimer

The assignee does not disclaim any terminal part of any patent granted on the above-identified application prior to the expiration date of the full statutory term as presently shortened by any terminal disclaimer of U.S. Patent No. 8,660,267 in the event that it later expires before such term for failure to pay a maintenance fee, is held unenforceable, is found invalid, is statutorily disclaimed, is the subject of a reexamination certificate cancelling all claims, or is otherwise terminated prior to the expiration date of its statutory term as presently shortened by any terminal disclaimer.

**TERMINAL DISCLAIMER**

Serial Number: 14/151,879

Filing Date: January 10, 2014

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER  
IN A MULTIMEDIA SIGNAL

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**Page 3**

Dkt: 2167.052US3

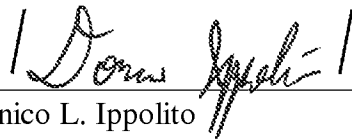
Fee Status

Please charge Deposit Account 19-0743 in the amount of \$160.00 which is required under 37 C.F.R. § 1.20(d) to file a statutory disclaimer. The Commissioner of Patents and Trademarks is hereby authorized to charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(408) 278-4048

Date 18 Feb. 2015

By   
Domenico L. Ippolito  
Reg. No. 66,058

**S/N 14/151,879**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s): Job Cornelis Oostveen et al.

Examiner: Lisa Lewis

Serial No.: 14/151,879

Group Art Unit: 2495

Filed: January 10, 2014

Docket No.: 2167.052US3

Customer No.: 21186

Confirmation No.: 4055

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

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**TERMINAL DISCLAIMER**

MS Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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The undersigned representative of the assignee has reviewed the evidentiary documents of title and certifies that to the best of assignee's knowledge and belief, title is in the assignee seeking to take the action set forth in this disclaimer.

**TERMINAL DISCLAIMER**

Serial Number: 14/151,879

Filing Date: January 10, 2014

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER  
IN A MULTIMEDIA SIGNAL**Page 2**

Dkt: 2167.052US3

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Terminal Disclaimer

The assignee of the above-identified application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the above-identified patent application, which would extend beyond the expiration date of the full statutory term, as presently shortened by any terminal disclaimers, of U.S. Patent No. 8,020,000. The assignee hereby agrees that any patent to be granted on the above-identified application shall be enforceable only for and during such period as such patent is commonly owned with U.S. Patent No. 8,020,000. This agreement shall run with any patent granted on the above-identified application and shall be binding upon the assignee's successors and assigns.

Limitations on the Disclaimer

The assignee does not disclaim any terminal part of any patent granted on the above-identified application prior to the expiration date of the full statutory term as presently shortened by any terminal disclaimer of U.S. Patent No. 8,020,000 in the event that it later expires before such term for failure to pay a maintenance fee, is held unenforceable, is found invalid, is statutorily disclaimed, is the subject of a reexamination certificate cancelling all claims, or is otherwise terminated prior to the expiration date of its statutory term as presently shortened by any terminal disclaimer.

**TERMINAL DISCLAIMER**

Serial Number: 14/151,879

Filing Date: January 10, 2014

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER  
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**Page 3**

Dkt: 2167.052US3

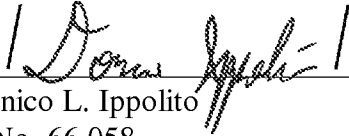
Fee Status

Please charge Deposit Account 19-0743 in the amount of \$160.00 which is required under 37 C.F.R. § 1.20(d) to file a statutory disclaimer. The Commissioner of Patents and Trademarks is hereby authorized to charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(408) 278-4048

Date 18 Feb. 2015

By   
Domenico L. Ippolito  
Reg. No. 66,058

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	14151879			
<b>Filing Date:</b>	10-Jan-2014			
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL			
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen			
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall			
<b>Attorney Docket Number:</b>	2167.052US3			
Filed as Large Entity				
<b>Filing Fees for    Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Statutory or Terminal Disclaimer	1814	2	160	320

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>320</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	21533799
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall
<b>Filer Authorized By:</b>	Gregory M. Stark
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	18-FEB-2015
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	18:53:53
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 320
RAM confirmation Number	14307
Deposit Account	190743
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

IPR2020-00216



Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

## File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2167052US3_TD_021915.pdf	165223 5b80a439c1d71dacb75edc8782ef8f58e1e7af90	yes	7

### Multipart Description/PDF files in .zip description

Document Description	Start	End
Miscellaneous Incoming Letter	1	1
Terminal Disclaimer Filed	2	4
Terminal Disclaimer Filed	5	7

## Warnings:

## Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30824 6a83f92df1095d6f425f85c5c0719248ae1dc475	no	2
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## Warnings:

## Information:

**Total Files Size (in bytes):** 196047

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

### New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

### National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

### New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Job Cornelis Oostveen et al.

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Docket No.: 2167.052US3  
Filed: January 10, 2014  
Examiner: Lisa Lewis  
Customer No.: 21186

Serial No.: 14/151,879  
Due Date: N/A  
Group Art Unit: 2495  
Confirmation No.: 4055

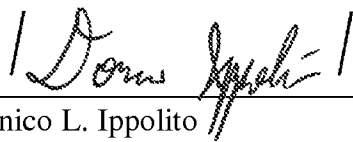
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

- ☒ Terminal Disclaimer over U.S. Patent No. 8,020,000 (3 pgs.)
- ☒ Terminal Disclaimer over U.S. Patent No. 8,660,267 (3 pgs.)
- ☒ Authorization to charge Deposit Account 19-0743 in the amount of \$320.00 to cover the fee for the Terminal Disclaimer

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. § 1.7(a), the response period falling on a Federal Holiday, Saturday or Sunday being extended to the next succeeding business day.

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By:   
Domenico L. Ippolito  
Reg. No. 66,058



# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3	4055

21186 7590 02/24/2015  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

EXAMINER
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LEWIS, LISA C

ART UNIT	PAPER NUMBER
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2495

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

02/24/2015

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@slwip.com  
SLW@blackhillsip.com

<b>Office Action Summary</b>	<b>Application No.</b> 14/151,879	<b>Applicant(s)</b> OOSTVEEN ET AL.	
	<b>Examiner</b> Lisa Lewis	<b>Art Unit</b> 2495	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01/12/2015.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims\*

- 5) ☒ Claim(s) 1-25 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-25 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

#### Certified copies:

- a) ☐ All    b) ☐ Some\*\*    c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 3) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)<br>Paper No(s)/Mail Date ____. | 4) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments have been carefully considered and are deemed persuasive.

### *Double Patenting*

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

2. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

3. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Art Unit: 2495

4. Claims 1-25 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 8,020,000. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim methods involving using fingerprints to associate trigger time points for actions which are based on the start or end time of content.

5. Claims 1-25 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. 8,660,267. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim methods involving using fingerprints to associate trigger time points for actions which are based on the start or end time of content.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa Lewis whose telephone number is (571)270-7724. The examiner can normally be reached on Monday - Friday, 6:30 a.m. - 3:30 p.m.

Art Unit: 2495

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Farid Homayounmehr can be reached on (571) 272-3739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lisa Lewis/  
Primary Examiner, Art Unit 2495

<b>Search Notes</b>  	<b>Application/Control No.</b>  14151879	<b>Applicant(s)/Patent Under Reexamination</b>  OOSTVEEN ET AL.
	<b>Examiner</b>  LISA LEWIS	<b>Art Unit</b>  2495

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner


US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
380	204, 54	10/6/2014	LL
713	150, 176-180	10/6/2014	LL
725	32, 34-35, 86	10/6/2014	LL

SEARCH NOTES		
Search Notes	Date	Examiner
Searched EAST	10/6/2014	LL
NPL Search	10/6/2014	LL
DP Search	10/6/2014	LL
Search updated	2/2/2015	LL

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	General interference search		

	/LISA LEWIS/ Primary Examiner.Art Unit 2495
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<b>Application Number</b> 	<b>Application/Control No.</b> 14/151,879	<b>Applicant(s)/Patent under Reexamination</b> OOSTVEEN ET AL.
<b>Document Code - DISQ</b>		<b>Internal Document – DO NOT MAIL</b>

<b>TERMINAL DISCLAIMER</b>	<input checked="" type="checkbox"/> <b>APPROVED</b>	<input type="checkbox"/> <b>DISAPPROVED</b>
<b>Date Filed : 2/18/15</b>	<b>This patent is subject to a Terminal Disclaimer</b>	

**Approved/Disapproved by:**

Felicia D. Roberts

2 TDs approved with this filing date



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
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## NOTICE OF ALLOWANCE AND FEE(S) DUE

21186 7590 03/06/2015  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

EXAMINER

LEWIS, LISA C

ART UNIT

PAPER NUMBER

2495

DATE MAILED: 03/06/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/151,879

01/10/2014

Job Cornelis Oostveen

2167.052US3

4055

TITLE OF INVENTION: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	06/08/2015

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

21186 7590 03/06/2015  
**SCHWEGMAN LUNDBERG & WOESSNER, P.A.**  
**P.O. BOX 2938**  
**MINNEAPOLIS, MN 55402**

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3	4055

TITLE OF INVENTION: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	06/08/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEWIS, LISA C	2495	380-204000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_
- 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3	4055

21186 7590 03/06/2015  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

EXAMINER

LEWIS, LISA C

ART UNIT PAPER NUMBER

2495

DATE MAILED: 03/06/2015

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

<b><i>Notice Requiring Inventor's Oath or Declaration</i></b>	Application No. 14/151,879	Applicant(s) Job Cornelis Oostveen	
	Examiner LEWIS, LISA C	Art Unit 2495	

This notice is an attachment to the Notice of Allowability (PTOL-37), or the Notice of Allowability For A Design Application (PTOL-37D).

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor has not yet been submitted.

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor (for any inventor for which a compliant oath, declaration, or substitute statement has not yet been submitted) **MUST** be filed no later than the date on which the issue fee is paid. See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application.

A properly executed inventor's oath to declaration has not been received for the following inventor(s):

If applicant previously filed one or more oaths, declarations, or substitute statements, applicant may have received an informational notice regarding deficiencies therein.

The following deficiencies are noted:

#### INFORMAL ACTION PROBLEMS

- A properly executed inventor's oath or declaration has not been received for the following inventor(s): **Job Cornelis Oostveen, Warner Rudolph Theophile Ten Kate, Adrianus Johannes Maria Denissen, and David K. Roberts.**

Applicant may submit the inventor's oath or declaration at any time before the Notice of Allowance and Fee(s) Due, PTOL-85, is mailed.

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IPR2020-00216

<b>Notice of Allowability</b>	<b>Application No.</b> 14/151,879	<b>Applicant(s)</b> OOSTVEEN ET AL.	
	<b>Examiner</b> Lisa Lewis	<b>Art Unit</b> 2495	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the response filed 01/12/2015.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1-25. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a) ☒ All    b) ☐ Some    \*c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Examiner's Amendment/Comment                             |
| 2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 7. <input type="checkbox"/> Other _____  |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____                      |  |

/Lisa Lewis/  
Primary Examiner, Art Unit 2495

Art Unit: 2495

## **DETAILED ACTION**

### ***Allowable Subject Matter***

Claims 1-25 are allowed.

### ***Reasons for Allowance***

This communication warrants No Examiner's Reason for Allowance, applicant's reply make evident the reasons for allowance, satisfying the "record as a whole" proviso of the rule 37 CFR 1.104(e). Specifically, the applicant's arguments on 01/12/2015 are considered, as such the reasons for allowance are in all probability evident from the record and no statement is deemed necessary (see MPEP 1302.14).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa Lewis whose telephone number is (571) 270-7724. The examiner can normally be reached on Monday - Friday, 6:30 a.m. - 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Farid Homayounmehr can be reached on (571) 272-3739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2495

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lisa Lewis/

Primary Examiner, Art Unit 2495




## UNITED STATES PATENT AND TRADEMARK OFFICE

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 United States Patent and Trademark Office  
 Address: COMMISSIONER FOR PATENTS  
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 Alexandria, Virginia 22313-1450  
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## BIB DATA SHEET

CONFIRMATION NO. 4055

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
14/151,879	01/10/2014	380	2495	2167.052US3		
<b>RULE</b>						
<b>APPLICANTS</b> Gracenote, Inc., Emeryville, CA <b>INVENTORS</b> Job Cornelis Oostveen, Haren, NETHERLANDS; Warner Rudolph Theophile Ten Kate, Eindhoven, NETHERLANDS; Adrianus Johannes Maria Denissen, Eindhoven, NETHERLANDS; David K. Roberts, Cheddar, UNITED KINGDOM; <b>** CONTINUING DATA *****</b> This application is a CON of 13/220,267 08/29/2011 PAT 8660267 which is a CON of 10/564,297 01/10/2006 PAT 8020000 which is a 371 of PCT/IB2004/051128 07/05/2004 <b>** FOREIGN APPLICATIONS *****</b> EUROPEAN PATENT OFFICE (EPO) 03102116.5 07/11/2003 <b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b> 01/23/2014						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Verified and Acknowledged <u>/LISA C LEWIS/</u> Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> NETHERLANDS	<b>SHEETS DRAWINGS</b> 3	<b>TOTAL CLAIMS</b> 1	<b>INDEPENDENT CLAIMS</b> 1
<b>ADDRESS</b> SCHWEGMAN LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402 UNITED STATES						
<b>TITLE</b> METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL						
<b>FILING FEE RECEIVED</b> 3400	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

<b>Search Notes</b>  	<b>Application/Control No.</b>  14151879	<b>Applicant(s)/Patent Under Reexamination</b>  OOSTVEEN ET AL.
	<b>Examiner</b>  LISA LEWIS	<b>Art Unit</b>  2495

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
380	204, 54	10/6/2014	LL
713	150, 176-180	10/6/2014	LL
725	32, 34-35, 86	10/6/2014	LL

SEARCH NOTES		
Search Notes	Date	Examiner
Searched EAST	10/6/2014	LL
NPL Search	10/6/2014	LL
DP Search	10/6/2014	LL
Search updated	2/2/2015	LL

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	General interference search		


	/LISA LEWIS/ Primary Examiner.Art Unit 2495
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	10	(time near9 (media or audio or video or song) near9 (frame or segment or portion or section or part) near9 (lookup or look up or table or database ) near9 (action or trigger)) and (@rlad or @ad or @prad or @pd)<"20030711"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2015/02/02 09:22
L2	57	(time or ((segment or frame) near3 (identif\$4 or identification))) near9 (media or audio or video or song) near9 (lookup or look up or table or database) near9 (trigger or action) and (@rlad or @ad or @prad or @pd)<"20030711"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2015/02/02 09:22
L3	24	trigger\$4 near4 time near5 database near5 stor\$4 and (@rlad or @ad or @prad or @pd)<"20030711"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	OFF	2015/02/02 09:22

2/ 2/ 2015 9:23:57 AM  
C:\ Users\ llewis1\ Documents\ EAST\ Workspaces\ 14151879.wsp

<b>Issue Classification</b> 	<b>Application/Control No.</b> 14151879	<b>Applicant(s)/Patent Under Reexamination</b> OOSTVEEN ET AL.	
	<b>Examiner</b> LISA LEWIS	<b>Art Unit</b> 2495	

CPC						
Symbol					Type	Version
H04N		21	/	23418	F	2013-01-01
H04N		21	/	23109	I	2013-01-01
H04N		21	/	433	I	2013-01-01
H04N		21	/	8126	I	2013-01-01
H04N		19	/	467	I	2014-11-01
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CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		<b>Total Claims Allowed:</b>	
		25	
(Assistant Examiner)	(Date)		
/LISA LEWIS/ Primary Examiner.Art Unit 2495	02/02/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	25	1b







# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3	4055
7590 03/26/2015 SCHWEGMAN LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			EXAMINER LEWIS, LISA C	
			ART UNIT	PAPER NUMBER
			2495	
			NOTIFICATION DATE	DELIVERY MODE
			03/26/2015	ELECTRONIC

## Letter Withdrawing a Notice Requiring Inventor's Oath or Declaration

The Notice Requiring Inventor's Oath or Declaration mailed on 3/6/15 was sent in error, and is hereby withdrawn. The time period set forth in the Notice of Allowance and Fee(s) Due to file a reply and pay the required fees continues to run from the mailing date of the Notice of Allowance and Fee(s) Due. Any time period set forth in the Notice of Allowability continues to run from the mailing date of the Notice of Allowability.

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

*Debra Duncan*

(571)-272-4200 or 1(888)-786-0101

Patent Publication Branch

Office of Data Management



## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

21186 7590 03/06/2015  
**SCHWEGMAN LUNDBERG & WOESSNER, P.A.**  
**P.O. BOX 2938**  
**MINNEAPOLIS, MN 55402**

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Kasie Grover	(Depositor's name)
/Kasie Grover/	(Signature)
May 19, 2015	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3	4055

TITLE OF INVENTION: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER  
 MARKER IN A MULTIMEDIA SIGNAL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	06/08/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEWIS, LISA C	2495	380-204000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☒ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Schwegman Lundberg &  
 2 Woessner, P.A.  
 3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Gracenote, Inc.

Emeryville, CA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
- ☒ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 19-0743 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature

Date May 19, 2015

Typed or printed name

Domenico L. Ippolito

Registration No. 66,058

**S/N 14/151,879**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s):	Job Cornelis Oostveen et al.	Examiner:	Lisa Lewis
Serial No.:	14/151,879	Group Art Unit:	2495
Filed:	January 10, 2014	Docket No.:	2167.052US3
Customer No.:	21186	Confirmation No.:	4055
Title:	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL		

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**COMMUNICATION RE: FEE ADDRESS**

Mail Stop Issue Fee  
Commissioner for Patents  
P.O.Box 1450  
Alexandria, VA 22313-1450

In response to the Notice of Allowance and Issue Fee Due, please record the Fee Address under the provisions of 37 CFR 1.363 as the following:

**Customer Number 21186**

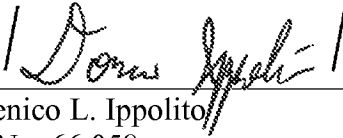
Please direct any inquiries to the undersigned attorney at (612) 373-6900.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 373-6900

Date May 19, 2015

By

  
Domenico L. Ippolito  
Reg. No. 66,058

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	14151879			
<b>Filing Date:</b>	10-Jan-2014			
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL			
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen			
<b>Filer:</b>	Robert E. Scheid/Kasie Grover			
<b>Attorney Docket Number:</b>	2167.052US3			
Filed as Large Entity				
<b>Filing Fees for    Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Utility Appl Issue Fee	1501	1	960	960
Publ. Fee- Early, Voluntary, or Normal	1504	1	0	0
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>960</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	22389005
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Robert E. Scheid/Kasie Grover
<b>Filer Authorized By:</b>	Robert E. Scheid
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	19-MAY-2015
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	15:10:53
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$960
RAM confirmation Number	1590
Deposit Account	190743
Authorized User	IPPOLITO, DOMENICO

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

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IPR2020-00216

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

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Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2167052US3IssueFee.pdf	451063 56da0bfdc02f6209f59910e128513c3e39b56a76	yes	3

#### Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Letter	1	1
Issue Fee Payment (PTO-85B)	2	2
Miscellaneous Incoming Letter	3	3

#### Warnings:

#### Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32479 190678a2ecd81393906e000cff0e452567a74ef	no	2
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#### Warnings:

#### Information:

**Total Files Size (in bytes):** 483542

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

#### New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

#### National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

#### New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s): Job Cornelis Oostveen et al.  
Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Docket No.:	2167.052US3	Serial No.:	14/151,879
Filed:	January 10, 2014	Due Date:	June 6, 2015
Examiner:	Lisa Lewis	Group Art Unit:	2495
Customer No.:	21186	Confirmation No.:	4055

Notice of Allowance Date: March 6, 2015

**Mail Stop Issue Fee**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450


We are transmitting herewith the following:

- ☒ Authorization to charge Deposit 19-0743 in the amount of \$960.00 to cover the Large Entity Issue Fee Payment.
- ☒ Issue Fee Transmittal (Form PTOL-85).
- ☒ Communication Re: Fee Address (1 page).

**Please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By

  
Domenico L. Ippolito  
Reg. No. 66,058



# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/151,879	06/23/2015	9066114	2167.052US3	4055

21186 7590 06/03/2015  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Job Cornelis Oostveen, Haren, NETHERLANDS;  
Gracenote, Inc., Emeryville, CA  
Warner Rudolph Theophile Ten Kate, Eindhoven, NETHERLANDS;  
Adrianus Johannes Maria Denissen, Eindhoven, NETHERLANDS;  
David K. Roberts, Cheddar, UNITED KINGDOM;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).



**Patent 9,066,114 B2**

**PATENT**

**IN UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent No.: 9,066,114 B2

Docket No: 2167.052US3

Issue Date: Jun. 23, 2015

Patentee: Oostveen et al.

Customer No.: 21186

Confirmation No.: 4055

Title           METHOD AND DEVICE FOR GENERATING AND DETECTING A  
FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A  
MULTIMEDIA SIGNAL

---

**REQUEST FOR CERTIFICATE OF CORRECTION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450  
ATTN: CERTIFICATE OF CORRECTION BRANCH

It is requested that a Certificate of Correction be issued correcting printing errors appearing in the above-identified United States patent. A copy of the text of the Certificate in the suggested form is enclosed.

**Authorization to charge Deposit Account No. 19-0743 in the amount of \$100.00 to cover the Certificate of Correction Fee.**

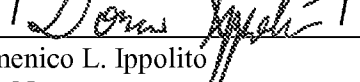
Issuance of the Certificate of Correction would neither expand nor contract the scope of the claims as properly allowed, and re-examination is not required.

The Examiner is authorized to charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully Submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A  
P.O. Box 2938  
Minneapolis, MN 55402  
(408) 660-2987

Date : August 11, 2015

By:   
Domenico L. Ippolito  
Reg. No: 66,058

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## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 9,066,114 B2

Page (1) of 3

DATED : Jun. 23, 2015

INVENTOR(S) : Oostveen et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the face page, in field (30), in "Foreign Application Priority Data", in column 1, line 1, delete "03102116" and insert --03102116.5--, therefor

On page 2, in column 2, under "Other Publications", line 2, delete "Aug." and insert --Jul.--, therefor

In column 1, line 51, delete "requiting" and insert --requiring--, therefor

In column 1, line 52, delete "stream," and insert --stream.--, therefor

In column 1, line 53, delete "Insertion;" and insert --Insertion:--, therefor

In column 1, line 62, delete "load" and insert --local--, therefor

In column 2, line 59, delete "and" and insert --(and--, therefor

In column 3, line 27, delete "etc" and insert --etc.--, therefor

In column 3, line 29, delete "pr sent" and insert --present--, therefor

In column 3, line 40, delete "invention," and insert --invention.--, therefor

In column 3, line 44, delete "fingerprint" and insert --fingerprints--, therefor

In column 4, line 1, delete "UPL" and insert --URL--, therefor

In column 4, line 12, delete "example" and insert --example,--, therefor

In column 4, line 43, before "each", insert --of--, therefor

In column 4, line 53, delete "fingerprinting," and insert --fingerprinting--, therefor

MAILING ADDRESS OF SENDER:

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
Minneapolis, MN 55402

Atty Docket No: 2167.052US3

PATENT NO. 9,066,114

No. of additional copies



IPR2020-00216

Gracenote EX2009 Page 310

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## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 9,066,114 B2

Page (2) of 3

DATED : Jun. 23, 2015

INVENTOR(S) : Oostveen et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 5, line 4, delete "nor" and insert --not--, therefor

In column 5, line 39, delete "generating," and insert --generating--, therefor

In column 6, line 6, delete "1a" and insert --1a.--, therefor

In column 6, line 11, delete "(Tn," and insert --(Tn;--, therefor

In column 6, line 11, delete "hi" and insert --In--, therefor

In column 6, line 27, delete "art" and insert --an--, therefor

In column 6, line 32, delete "identity" and insert --identify--, therefor

In column 6, line 37, after "to", insert --the--, therefor

In column 6, line 52, delete "data base" and insert --database--, therefor

In column 6, line 66, delete "front" and insert --from--, therefor

In column 7, line 1, delete "dine" and insert --time--, therefor

In column 7, line 1, delete "bigger" and insert --trigger--, therefor

In column 7, line 3, delete "tune" and insert --time--, therefor

In column 7, line 4, delete "fingerprinting" and insert --fingerprinting--, therefor

In column 7, line 9, delete "FF3" and insert --FP3--, therefor

In column 7, line 9, delete "FF5" and insert --FP5--, therefor

MAILING ADDRESS OF SENDER:

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
Minneapolis, MN 55402

Atty Docket No: 2167.052US3

PATENT NO. \_\_\_\_\_ 9,066,114 \_\_\_\_\_

No. of additional copies



IPR2020-00216

Gracenote EX2009 Page 311

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.  
(Also Form PTO-1050)

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 9,066,114 B2

Page (3) of 3

DATED : Jun. 23, 2015

INVENTOR(S) : Oostveen et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 7, line 10, before "A3'," , insert --'A2',--, therefor

In column 7, line 15, delete "4" and insert --4--, therefor

In column 7, line 22, delete "data base" and insert --database--, therefor

In column 7, line 34, delete "steam" and insert --stream--, therefor

In column 7, line 42, after "the", delete "a", therefor

In column 7, line 61, delete "these" and insert --those--, therefor

In column 7, line 63, delete "elements," and insert --elements.--, therefor

MAILING ADDRESS OF SENDER:

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
Minneapolis, MN 55402

Atty Docket No: 2167.052US3

PATENT NO. \_\_\_\_\_9,066,114\_\_\_\_\_

No. of additional copies



IPR2020-00216

Gracenote EX2009 Page 312

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	14151879			
<b>Filing Date:</b>	10-Jan-2014			
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL			
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen			
<b>Filer:</b>	Robert E. Scheid/Kasie Grover			
<b>Attorney Docket Number:</b>	2167.052US3			
Filed as Large Entity				
<b>Filing Fees for    Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Certificate of Correction	1811	1	100	100

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>100</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	23211734
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Robert E. Scheid/Kasie Grover
<b>Filer Authorized By:</b>	Robert E. Scheid
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	14-AUG-2015
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	13:17:39
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 100
RAM confirmation Number	8855
Deposit Account	190743
Authorized User	IPPOLITO, DOMENICO

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

IPR2020-00216

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

## File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2167052US3COC.pdf	186083 676c97f01f359c47f7a4aad1ee7ae24223006874	yes	5

	<b>Multipart Description/PDF files in .zip description</b>				
	<b>Document Description</b>		<b>Start</b>	<b>End</b>	
	Transmittal Letter		1	1	
	Request for Certificate of Correction		2	5	

## Warnings:

## Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30463 8b5ecae412372a5c0d66cb5d3d5a83d13cd1bde2	no	2
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## Warnings:

## Information:

<b>Total Files Size (in bytes):</b>			216546
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

### New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

### National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

### New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Oostveen et al.

Examiner: Lisa Lewis

Patent No.: 9,066,114 B2

Group Art Unit: 2495

Application No.: 14/151,879

Confirmation No.: 4055

Issue Date: Jun. 23, 2015

Docket No: 2167.052US3

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

ATTN: CERTIFICATE OF CORRECTION BRANCH

We are transmitting herewith the attached:

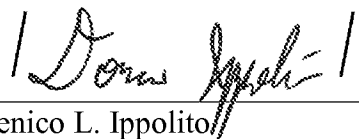
- X Authorization to charge Deposit Account No. 19-0743 in the amount of \$100.00 to cover the Certificate of Correction Fee.
- X Request for Certificate of Correction. (1 pg.)
- X Certificate of Correction Form - PTO-1050 (3 pgs.)

**Please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

Customer No: 21186

By: \_\_\_\_\_

  
Domenico L. Ippolito  
Reg. No: 66,058

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 9,066,114 B2  
APPLICATION NO. : 14/151879  
DATED : June 23, 2015  
INVENTOR(S) : Oostveen et al.

Page 1 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the title page, item (30), in “Foreign Application Priority Data”, in column 1, line 1, delete “03102116” and insert --03102116.5--, therefor

On page 2, in column 2, References Cited under “Other Publications”, line 2, delete “Aug.” and insert --Jul.--, therefor

In the specification

In column 1, line 51, delete “requiting” and insert --requiring--, therefor

In column 1, line 52, delete “stream,” and insert --stream.--, therefor

In column 1, line 53, delete “Insertion;” and insert --Insertion:--, therefor

In column 1, line 62, delete “load” and insert --local--, therefor

In column 2, line 59, delete “and” and insert --(and--, therefor

In column 3, line 27, delete “etc” and insert --etc.--, therefor

In column 3, line 29, delete “pr sent” and insert --present--, therefor

In column 3, line 40, delete “invention,” and insert --invention.--, therefor

In column 3, line 44, delete “fingerprint” and insert --fingerprints--, therefor

In column 4, line 1, delete “UPL” and insert --URL--, therefor

In column 4, line 12, delete “example” and insert --example.--, therefor

In column 4, line 43, before “each”, insert --of--, therefor

In column 4, line 53, delete “fingerprinting,” and insert --fingerprinting--, therefor

Signed and Sealed this  
First Day of December, 2015



Michelle K. Lee  
*Director of the United States Patent and Trademark Office*

In column 5, line 4, delete “nor” and insert --not--, therefor

In column 5, line 39, delete “generating,” and insert --generating--, therefor

In column 6, line 6, delete “1a” and insert --1a.--, therefor

In column 6, line 11, delete “(Tn,” and insert --(Tn;--, therefor

In column 6, line 11, delete “hi” and insert --In--, therefor

In column 6, line 27, delete “art” and insert --an--, therefor

In column 6, line 32, delete “identity” and insert --identify--, therefor

In column 6, line 37, after “to”, insert --the--, therefor

In column 6, line 52, delete “data base” and insert --database--, therefor

In column 6, line 66, delete “front” and insert --from--, therefor

In column 7, line 1, delete “dine” and insert --time--, therefor

In column 7, line 1, delete “bigger” and insert --trigger--, therefor

In column 7, line 3, delete “tune” and insert --time--, therefor

In column 7, line 4, delete “fingerprinting” and insert --fingerprinting--, therefor

In column 7, line 9, delete “FF3” and insert --FP3--, therefor

In column 7, line 9, delete “FF5” and insert --FP5--, therefor

In column 7, line 10, before “‘A3’,”, insert --‘A2’,--, therefor

In column 7, line 15, delete “4” and insert --4.--, therefor

In column 7, line 22, delete “data base” and insert --database--, therefor

In column 7, line 34, delete “steam” and insert --stream--, therefor

In column 7, line 42, after “the”, delete “a”, therefor

In column 7, line 61, delete “these” and insert --those--, therefor

In column 7, line 63, delete “elements,” and insert --elements.--, therefor

Patent 9,066,114 B2

PATENT

**IN UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent No.: 9,066,114 B2

Docket No: 2167.052US3

Issue Date: Jun. 23, 2015

Patentee: Oostveen et al.

Customer No.: 21186

Confirmation No.: 4055

Title           METHOD AND DEVICE FOR GENERATING AND DETECTING A  
FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A  
MULTIMEDIA SIGNAL

---

**REQUEST FOR CERTIFICATE OF CORRECTION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450  
ATTN: CERTIFICATE OF CORRECTION BRANCH

It is requested that a Certificate of Correction be issued correcting printing errors appearing in the above-identified United States patent. A copy of the text of the Certificate in the suggested form is enclosed.

**Authorization is given to charge Deposit Account No. 19-0743 in the amount of \$100.00 to cover the Certificate of Correction Fee.**

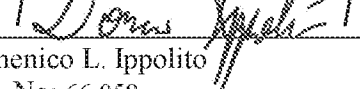
Issuance of the Certificate of Correction would neither expand nor contract the scope of the claims as properly allowed, and re-examination is not required.

The Examiner is authorized to charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully Submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A  
P.O. Box 2938  
Minneapolis, MN 55402  
(408) 660-2987

Date : May 25, 2016

By:   
Domenico L. Ippolito  
Reg. No: 66,058

CERTIFICATE UNDER 37 CFR § 1.8: The undersigned hereby certifies that this correspondence is filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450, on this 25 day of May 2016

Amanda J. Anderson  
Name

/Amanda J. Anderson  
Signature

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.  
(Also Form PTO-1050)

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 9,066,114 B2

Page (1) of 1

DATED : Jun. 23, 2015

INVENTOR(S) : Oostveen et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 8, line 25, in Claim 1, delete "a" and insert --the--, therefor

In column 9, line 6, in Claim 8, delete "a" and insert --the--, therefor

In column 9, line 32, in Claim 10, delete "a" and insert --the--, therefor

MAILING ADDRESS OF SENDER:

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
Minneapolis, MN 55402

Atty Docket No: 2167.052US3

PATENT NO. 9,066,114

No. of additional copies



IPR2020-00216

Gracenote EX2009 Page 321

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	14151879			
<b>Filing Date:</b>	10-Jan-2014			
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL			
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen			
<b>Filer:</b>	Raquel Pacheco/Amanda Anderson			
<b>Attorney Docket Number:</b>	2167.052US3			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Certificate of Correction	1811	1	100	100

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				100

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	25886167
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Raquel Pacheco/Amanda Anderson
<b>Filer Authorized By:</b>	Raquel Pacheco
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	25-MAY-2016
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	16:38:04
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$100
RAM confirmation Number	3297
Deposit Account	190743
Authorized User	IPPOLITO, DOMENICO

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)

IPR2020-00216



Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

## File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2167052US3_COCSigned.pdf	195194 dabf04dcd70a6a00a42ff81b0c9737f1da35a9bb	yes	3

	<b>Multipart Description/PDF files in .zip description</b>				
	<b>Document Description</b>		<b>Start</b>	<b>End</b>	
	Transmittal Letter		1	1	
	Request for Certificate of Correction		2	3	

## Warnings:

## Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30735 ae162f40f52b1cbf76f62041ba15d6dab76a5f21	no	2
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## Warnings:

## Information:

<b>Total Files Size (in bytes):</b>			225929
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

### New Applications Under 35 U.S.C. 111

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

### National Stage of an International Application under 35 U.S.C. 371

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

### New International Application Filed with the USPTO as a Receiving Office

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Oostveen et al.

Examiner: Lisa Lewis

Patent No.: 9,066,114 B2

Group Art Unit: 2495

Issue Date: Jun. 23, 2015

Docket No: 2167.052US3

Title: METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT  
FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

ATTN: CERTIFICATE OF CORRECTION BRANCH

We are transmitting herewith the attached:

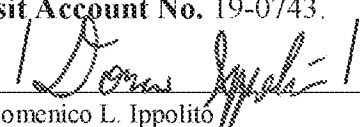
- X Authorization to charge Deposit Account No. 19-0743 in the amount of \$100.00 to cover the Certificate of Correction Fee.
- X Request for Certificate of Correction. (1 pg.)
- X Certificate of Correction Form - PTO-1050 (1 pg.)

**Please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

Customer No: 21186

By: \_\_\_\_\_

  
Domenico L. Ippolito  
Reg. No: 66,058

CERTIFICATE UNDER 37 CFR § 1.8: The undersigned hereby certifies that this correspondence is filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450, on this 25 day of May 2016.

Amanda J. Anderson

\_\_\_\_\_  
Name

/Amanda J. Anderson/

\_\_\_\_\_  
Signature

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 9,066,114 B2  
APPLICATION NO. : 14/151879  
DATED : June 23, 2015  
INVENTOR(S) : Oostveen et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

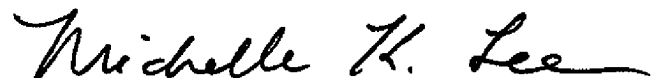
In the Claims:

In column 8, line 25, in Claim 1, delete "a" and insert --the--, therefor

In column 9, line 8, in Claim 8, delete "a" and insert --the--, therefor

In column 9, line 32, in Claim 10, delete "a" and insert --the--, therefor

Signed and Sealed this  
Twenty-fifth Day of October, 2016



Michelle K. Lee  
*Director of the United States Patent and Trademark Office*

## TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	14/151,879
Filing Date	01-10-2014
First Named Inventor	Job Cornelis Oostveen
Title	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
Art Unit	2495
Examiner Name	LEWIS, LISA C
Attorney Docket Number	17-374-US-CON2

### SIGNATURE of Applicant or Patent Practitioner

Signature	/Gavin J. O'Keefe/	Date (Optional)	April 14, 2017
Name	Gavin J. O'Keefe	Registration Number	59,916
Title (if Applicant is a juristic entity)	Patent Practitioner		
Applicant Name (if Applicant is a juristic entity)	Gracernote, Inc.		

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.



\*Total of 2 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IPR2020-00216

Gracernote EX2009 Page 328

## POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number

Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

139404

OR



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR

Firm or  
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Gracernote, Inc.



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

### SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

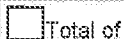
Name

Salvador Karotki

Title

Vice President

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.



Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	28931137
<b>Application Number:</b>	14151879
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4055
<b>Title of Invention:</b>	METHOD AND DEVICE FOR GENERATING AND DETECTING A FINGERPRINT FUNCTIONING AS A TRIGGER MARKER IN A MULTIMEDIA SIGNAL
<b>First Named Inventor/Applicant Name:</b>	Job Cornelis Oostveen
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gavin James O'Keefe
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	2167.052US3
<b>Receipt Date:</b>	18-APR-2017
<b>Filing Date:</b>	10-JAN-2014
<b>Time Stamp:</b>	10:36:08
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	POA_GN_Form_82.pdf	250512	no	2
			a447f96ce5baeabb92f75533be01a72ef1722d84		

### Warnings:

IPR2020-00216

<b>Information:</b>	
<b>Total Files Size (in bytes):</b>	250512
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p>	



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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/151,879	01/10/2014	Job Cornelis Oostveen	2167.052US3

21186  
SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

**CONFIRMATION NO. 4055**  
**POWER OF ATTORNEY NOTICE**



Date Mailed: 04/20/2017

**NOTICE REGARDING CHANGE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 04/18/2017.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/kxaysana/





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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/151,879	01/10/2014	Job Cornelis Oostveen	17-374-US-CON2

**CONFIRMATION NO. 4055**

**POA ACCEPTANCE LETTER**

139404  
McDonnell Boehnen Hulbert & Berghoff LLP/Gracnote  
300 South Wacker Drive, Suite 3100  
Chicago, IL 60606



Date Mailed: 04/20/2017

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 04/18/2017.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/kxaysana/

AO 120 (Rev. 08/10)

<b>TO:</b> <b>Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been  
filed in the U.S. District Court \_\_\_\_\_ for the District of Delaware \_\_\_\_\_ on the following

☐ Trademarks or ☒ Patents. ( ☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO.	DATE FILED 10/17/2018	U.S. DISTRICT COURT for the District of Delaware
PLAINTIFF GRACENOTE, INC.		DEFENDANT FREE STREAM MEDIA CORP. d/b/a SAMBA TV
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,066,114	6/23/2015	Gracernote, Inc.
2 9,479,831	10/25/2016	Gracernote, Inc.
3 9,407,962	8/2/2016	Gracernote, Inc.
4 8,171,030	5/1/2012	Gracernote, Inc.
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading		
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK	
1			
2			
3			
4			
5			

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
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CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director    Copy 3—Upon termination of action, mail this copy to Director  
Copy 2—Upon filing document adding patent(s), mail this copy to Director    Copy 4—Case file copy