

Netflix, Inc.
and Comcast Cable Communications, LLC
v.
Realtime Adaptive Streaming LLC
IPR2018-01630
IPR2018-01187
U.S. Patent No. 9,769,477

Petitioners' Demonstratives
Oral Argument
October 10, 2019

U.S. Patent No. 9,769,477
IPR2018-01187 Petition

Ground No.	References	Statutory Basis	Claims Challenged
1	Imai (Ex. 1005)	Obviousness (§103)	1, 3–5, 12–14
2	Pauls (Ex. 1007)	Obviousness (§103)	1, 3–6, 9–14
3	Imai (Ex. 1005) Pauls (Ex. 1007)	Obviousness (§103)	1, 3–6, 9–14
4	Imai (Ex. 1005) Pauls (Ex. 1007) Chao (Ex. 1016)	Obviousness (§103)	2, 11, 20–22, 25–27

U.S. Patent No. 9,769,477
IPR2018-01630 Petition

Ground No.	References	Statutory Basis	Claims Challenged
1	Imai (Ex. 1005) Pauls (Ex. 1007)	Obviousness (§103)	15-19, 28, 29
2	Imai (Ex. 1005) Pauls (Ex. 1007) Dawson (Ex. 1025)	Obviousness (§103)	7, 23
3	Imai (Ex. 1005) Pauls (Ex. 1007) Lai (Ex. 1016)	Obviousness (§103)	8, 24

U.S. Patent No. 9,769,477

- Remaining Disputes for the 1187 IPR
 - “Configured to” and Element 1(b)
 - “wherein a first asymmetric data compression encoder... is configured to compress data blocks containing video or image data at a higher data compression rate than a second data compression encoder...”
 - Motivation to combine Imai and Pauls (Grounds 3 & 4)
 - Realtime’s “trade-off” argument relying upon *Winner Intern. Royalty Corp.*
 - Claim 20 limitations
 - Combination of Imai, Pauls, and Chao (Ground 4)

U.S. Patent No. 9,769,477

- Remaining Disputes for the 1630 IPR
 - “Configured to” and Element 1(b)
 - “wherein a first asymmetric data compression encoder... is configured to compress data blocks containing video or image data at a higher data compression rate than a second data compression encoder...”
 - Motivation to combine Imai and Pauls
 - Realtime’s “trade-off” argument relying upon *Winner Intern. Royalty Corp.*
 - Claim 20 limitations
 - Combination of Imai, Pauls, and Dawson (Ground 2)

Claim 1

1. A system, comprising:

[a] a plurality of different asymmetric data compression encoders, wherein each asymmetric data compression encoder of the plurality of different asymmetric data compression encoders is configured to utilize one or more data compression algorithms, and

[b] wherein a first asymmetric data compression encoder of the plurality of different asymmetric data compression encoders is configured to compress data blocks containing video or image data at a higher compression rate than a second asymmetric data compression encoder of the plurality of different asymmetric data compression encoders; and

[c] One or more processors configured to:

[d] determine one or more data parameters, at least one of the determined one or more data parameters relating to a throughput of a communications channel measured in bits per second; and

[e] select one or more asymmetric data compression encoders from among the plurality of different asymmetric data compression encoders based upon, at least in part, the determined one or more data parameters.

Claim 20

20. A system, comprising:

a plurality of video data compression encoders;

wherein at least one of the plurality of video data compression encoders is configured to utilize an asymmetric data compression algorithm, and

wherein at least one of the plurality of video data compression encoders is configured to utilize an arithmetic data compression algorithm,

wherein a first video data compression encoder of the plurality of video data compression encoders is configured to compress at a higher compression ratio than a second data compression encoder of the plurality of data compression encoders; and

one or more processors configured to:

determine one or more data parameters, at least one of the determined one or more data parameters relating to a throughput of a communications channel; and

select one or more video data compression encoders from among the plurality of video data compression encoders based upon, at least in part, the determined one or more data parameters.

The '477 patent relies heavily upon the knowledge of a POSITA.

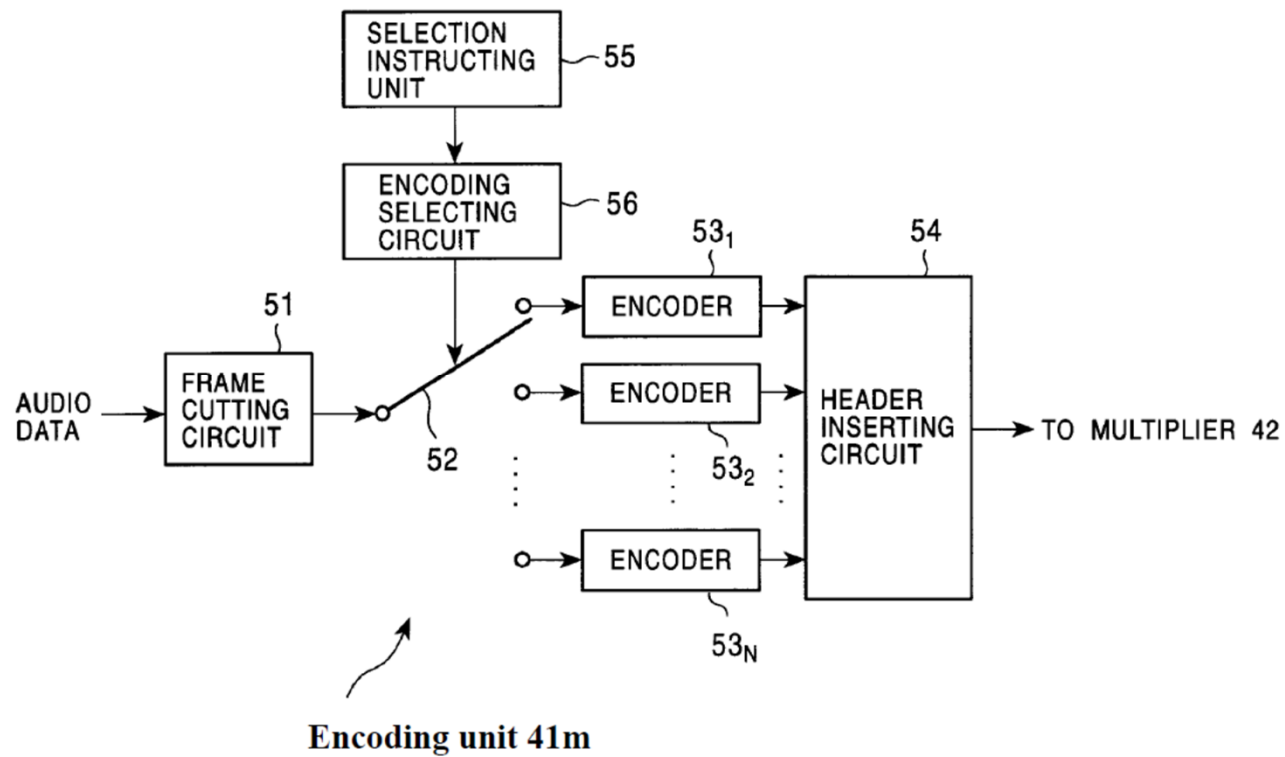
- Does not explain how to track the throughput of the communication channel for the purposes of selecting the appropriate encoder. (Ex. 1187-1003 ¶¶77, 82; Ex 1630-1003 ¶¶75, 80)
- Detailed description in specification is devoid of any reference or explanation of data “resolution”. (Ex. 1187-1003 ¶82; Ex. 1630-1003 ¶80)
- Directed to compressing audio or video data but the specification does not describe any audio or video compressors and mentions video only twice. (Ex. 1187-1003 ¶79; Ex. 1630-1003 ¶77)
- Does not describe how to implement or connect compression algorithms to each other or to any other component of a system. (Ex. 1187-1003 ¶78; Ex. 1630-1003 ¶76)
- Five and a half pages and five figures are the support for 205 claims issued in eight patents. (Ex. 1187-1003 ¶83; Ex. 1630-1003 ¶81)

Combination of Imai and Pauls

Overview of Imai (Ex. 1005)

- Imai teaches using a plurality of asymmetric data compression encoders 53_1 to 53_N . (Ex. 1005 at [0067])
- Teaches a system for encoding and transmitting digital signals to a client where they are decoded and reproduced. (*Id.* at [0001])
- System is equipped with “a plurality of coding methods” and selects the appropriate coding method to encode the digital signals, or part of the digital signals, based on different factors. (*Id.* at [0007])
 - Factors include transmission rate of the network (*Id.* at [0145]-[0166])
- Teaches including asymmetric encoders such as MPEG and ATRAC. (*Id.* at [0067]-[0068])

Imai's Figure 5



Imai's Teachings (Ex. 1005)

“[0067] The encoders 53_1 to 53_N (N is two or more) are constructed to encode the audio signal with different coding methods from each other (for example, linear PCM (Pulse Code Modulation), ADPCM (Adaptive Differential PCM), layers 1, 2, 3 of MPEG (Moving Picture Experts Group), ATRAC (Adaptive Transform Acoustic Coding), ATRAC 2, and HVXC (Harmonic Vector Excitation Coding)). Stated otherwise, in the embodiment, the encoders 53_1 to 53_N are prepared by using encoders which perform encoding of the audio signal with various coding methods, including a method which provides a relatively large (high) bit rate of the resulting coded data, but can reproduce an audio signal with relatively good reproducibility, a method which can provides a relatively small (low) bit rate of the resulting coded data, but reproduces an audio signal with relatively poor reproducibility, a method which requires a larger amount of computation for decoding (such a method usually also requires a larger amount of computation for coding), a method which requires a not so large amount of computation for decoding, and a method particularly suitable for coding a voice (human voice).”

Imai's Teachings (Ex. 1005)

“[0068] Here, one example of the coding method, which provides a relatively many bit rate of the resulting coded data, is the linear PCM (the coded data resulted with this coding method is the same as that obtained by outputting a digital audio signal after A/D conversion as it is). Furthermore, example of the coding method, which provides a relatively less bit rate of the resulting coded data (i.e., which provides a high compression rate), are MPEG layer 3 and ATRAC 2. One example of the coding method, which requires a not so large amount of computation for decoding, is ATRAC. In addition, examples of the coding method suitable for a voice are HVXC and a method utilizing a linear estimation factor....”

Pauls' Teachings (Ex. 1007)

- Undisputed that it teaches adaptive transferring of video data over communication networks, including selecting of encoders based upon various parameters, such as throughput of the communication channel.
 - Teaches using MPEG, MPEG2, and H.263 techniques ([0017], [0024], FIG. 5)
 - “[0003] The present invention is a method for improving data transfer performance over communications networks connecting data networks and users using adaptive communications formatting. Adaptive communications formatting includes encoding (or compressing) the data and applying error control schemes to reduce the amount of data being transmitted... The particular sets of transcoding techniques... selected to format the data are adaptive to factors, such as the nature of the communications network connecting a user to an access server on the data network...”

Pauls' Teachings (Ex. 1007)

“[0009] At the access server 20, the data is formatted using a mixture of transcoding techniques... FIG. 2 illustrates a bitstream 23 entering and a bitstream 25 exiting the access server 20. When the bitstream 23 arrives at the access server, the bitstream 23 includes the data and user indicator-control information for identifying the user to whom the data is intended. The data is formatted by the access server 20 and transmitted to the user 14 via the bitstream 25, which includes encoded data, error control information for controlling and/or concealing errors resulting from data transmission, and data type indicator-control information for identifying the data type of the associated (encoded) data, as will be described herein.”

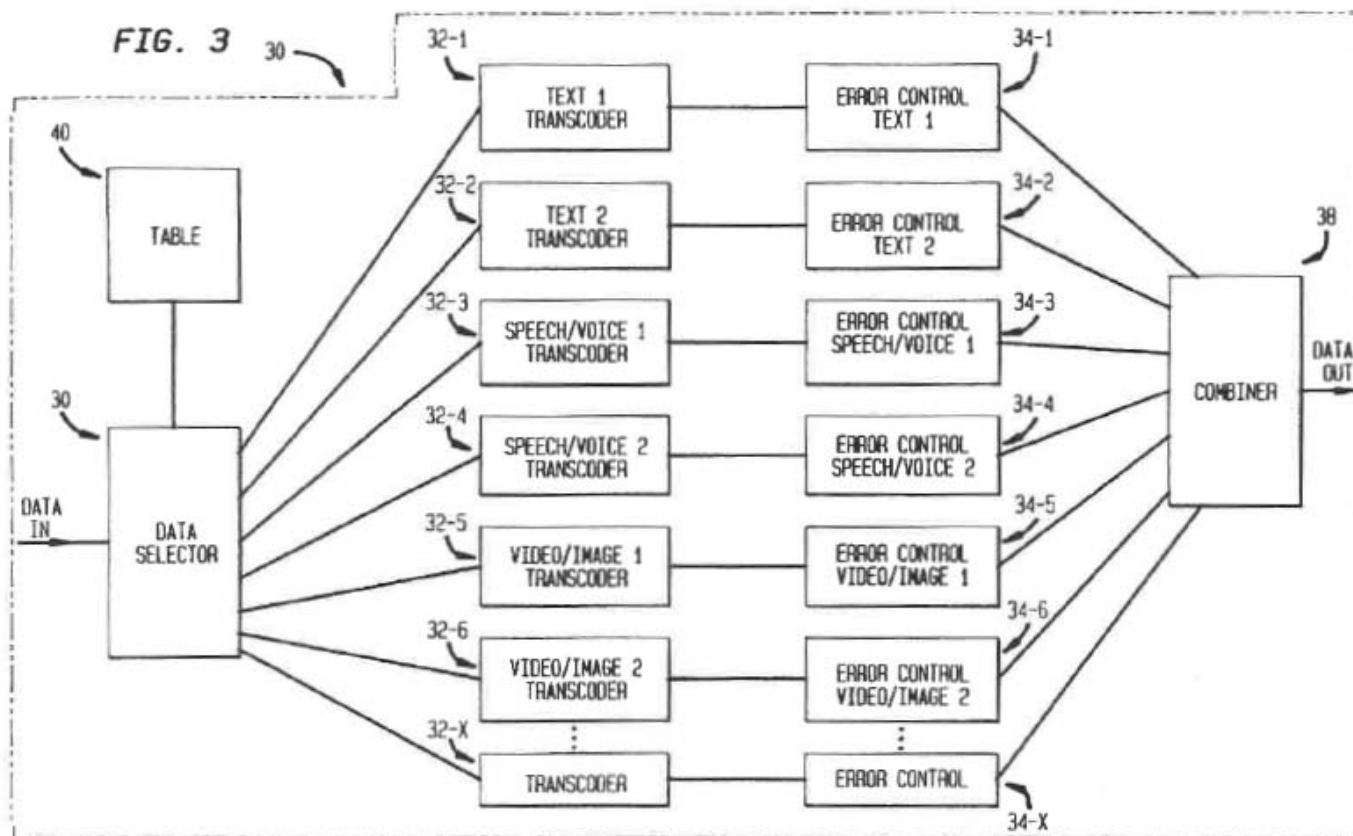
Pauls' Teachings (Ex. 1007)

“[0010] Transcoding techniques include encoding algorithms for encoding (or compressing) the data. Encoding (or compressing) the data facilitates data transmission by reducing the amount of data to be transmitted... Algebraic Code Excited Linear Prediction (ACELP), Vector Sum Excited Linear Prediction (VSELP), Enhanced Variable Rate Coder (EVRC), h.263 (which is a set of guidelines being considered by the International Telecommunications Union for implementation into standards), pkzip (by PKWare, 2 Inc.), MPEG and MPEG2 (Moving Pictures Experts Group), and JPEG (Joint Pictures Experts Group) are some examples of encoding algorithms which are well-known in the art. Each of the aforementioned encoding algorithms have associated different levels or percentages of compression.”

Pauls' Teachings (Ex. 1007)

“[0017] The third factor is the data type of the data, Certain transcoding techniques and error control schemes are more effective when used to format particular data types. Thus, the transcoding techniques and error control schemes selected to format the data should be adaptive to the data type, as will be described herein. Transcoding techniques include encoding algorithms for encoding or compressing particular data types: gzip and pkzip for text data; VCELP, ASELP and EVRC for speech/voice data; and h.263 for video/image data, Using a text transcoding technique (e.g., a transcoding technique with gzip) to compress speech/voice data may not be as effective as using a speech transcoding technique (e.g., a transcoding technique with VCELP) to compress the same data - that is, the amount of data compression may not be the same.”

Pauls' Figure 3 (Ex. 1007)



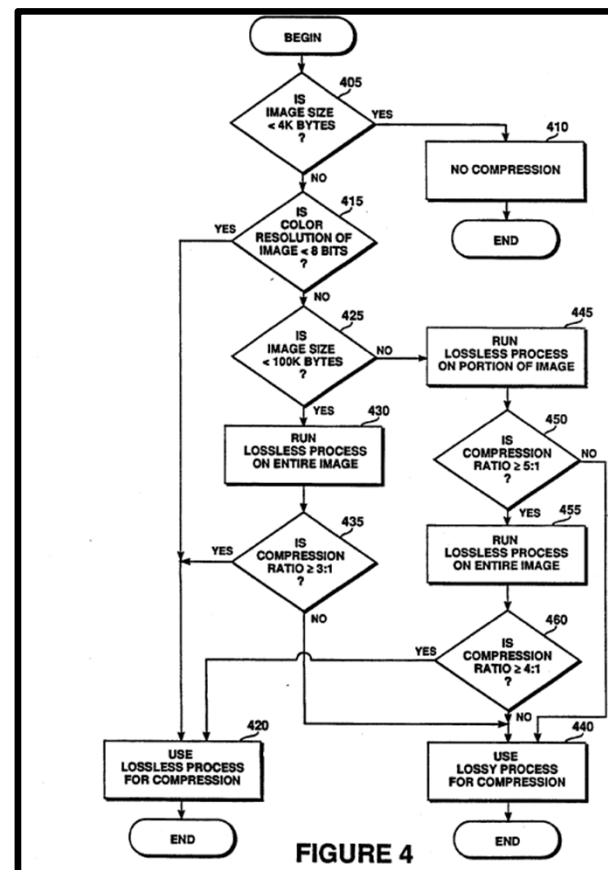
Pet. 1630 at 13–15; Pet. 1187 at 13–14.

18

Dawson's Teachings (Ex. 1025)

Petition explains that Dawson determines selection of compression algorithm based upon image resolution.

(Ex. 1630-1025 at 9:57–59;
Pet. 1630 at 15–16.)



Ex. 1630-1025, at Fig. 4, Pet. 1630 at 15–16.

Dr. Zeger admits term “compression rate” was a known concept
but the term is not commonly used.

Q: Have you ever seen this particular way of measuring data compression rate being described in writing relative to this field of art at the time of the invention?

A: I've certainly seen this concept being used before, but not necessarily with this particular terminology as calling it "data compression rate," so the terminology is somewhat particular to this patent.

Q. What terminology do you commonly or more often see used for this concept?

A: Often there is -- when somebody measures the rate of an algorithm, there may not be a specific terminology, but rather a practitioner of the terminology or a theoretician or a programmer would just describe the method of measuring a particular compression rate with an equation or a formula or a descriptive sentence involving it. So there may not be a terminology.

And, in fact, part of the problem is that the word rate by itself, r-a-t-e, is used in many, many different contexts outside of this patent. So often it can be confusing without proper context as to what is meant, but this patent certainly provides the context to clarify that, so there is no issue here. But the word "rate" does get overused outside of this patent.

Dr. Storer explains why Imai's system needs encoders with different data compression rates to maintain throughput for realtime production

Really fast doesn't help you if the compression ratio is not enough because it won't go over the channel, and really good compression doesn't help you if you don't do it fast enough.

So Imai has multiple encoder -- it has the idea of multiple encoders that have different properties in terms of speed and compression ratio and, of course, data type.

Imai talks specifically how a different encoder may do a better job with one data type than the other. So when you talk about a first and second, Imai talks about the idea that you can have a tradeoff where one encoder may be -- may do a better job for that throughput than another encoder; for example, for a particular type of data where you know a different compressor is more appropriate and will achieve, for example, higher speed or the speed necessary in order to assure this end-to-end throughput.

And so the end-to-end is a very important aspect of Imai. It's actually taking into account several -- several considerations, including both speed and compression ratio, because they're related.

Well, optimizing only one will not necessarily give you that end-to-end that you need -- in fact, **Imai even goes further to talk about measuring the speed of the decoder because that's also necessary as part of the chain in order to guarantee the end-to-end throughput.**

Realtime's Arguments

“The Petition never identified a specific ‘first asymmetric data encoder’ that is ‘configured to’ compress faster than a ‘second asymmetric data encoder.’”

(POR 1187 at 1; POR 1630 at 1)

“The Petition also fails to provide an adequate motivation to combine, notwithstanding the Federal Circuit’s decision in *Realtime v. Iancu*.”

(POR 1187 at 2; POR 1630 at 2)

Difference in Data Compression Rates Do Not Arise “By Happenstance”

Realtime’s Allegation:

- “The Petition argues that if Imai were to use at least two encoders, it is likely that one of them would be faster than another by mere happenstance.” (POR 1187 at 22; POR 1630 at 13)

Actual Explanation from Petition and Dr. Storer:

- “As discussed above, Imai teaches using a plurality of asymmetric data compression encoders 53₁ to 53_n... It would have been obvious to a POSITA that a first encoder of a plurality of asymmetric data compression encoders in Imai would compress data blocks at a higher data compression rate than a second encoder for several reasons.” (Pet. 1187 at 20; Pet. 1630 at 29)
- “A POSITA would have understood that it is only a remote possibility that any two different asymmetric data compression encoders would have the same execution speed, and therefore the obvious result of including two or more different asymmetric compression encoders is that one encoder would have a higher data compression rate than another encoder.” (Pet. 1187 at 21; Pet. 1630 at 29)

Realtime's "Configured to" Argument Isn't Based On Claim Language

"[T]he 'configured to' limitation cannot be met by either (1) an accidental difference in compression rates; or (2) a difference in compression rates arising as a side effect of some other design choice, because the invention relies on the *predictable* relationship... The invention would not function if the relationship were reversed. Specifically, **the specification** describes switching from an encoder having a relatively slow compression rate to one having a 'faster rate of compression' when the 'throughput falls below a predetermined threshold' 'so as to increase the throughput.' Ex. 1001 at 8:12–18. If the arrangement or configuration of the encoders were reversed, the opposite would occur: the system would switch from the relatively fast encoder to the relatively slow encoder, *reducing* the throughput and *exacerbating* the bottleneck at the encoder it was seeking to alleviate." (POR 1630 at 11; POR 1187 at 20-21)

Petitions explain how Imai and Paul would have been combined.

- Dr. Storer explains how and why teachings of Imai and Pauls would be combined:
 - Imai teaches selection mechanisms using generic encoders that can be easily modified and replaced to include the video compression algorithms of Pauls. (Ex. 1187-1003 ¶211; Ex. 1630-1003 ¶119)
 - Motivated to apply Imai's more accurate bandwidth estimation to Pauls' multiple video data compression encoders to achieve the predictable results of a video encoding and transmission system. (Ex. 1187-1003 ¶212; Ex. 1630-1003 ¶120)
 - Reasonable expectation of success because both references choose algorithms based on data type and properties of the communication channel, and standard compression algorithms existed that apply to both video and audio. (Ex. 1187-1003 ¶213; Ex. 1630-1003 ¶121–22)
 - Given the similar purposes (effective compression to increase throughput) and technology (choice of compression methods based on data type and channel properties), POSITA would have been motivated to combine them for an overall improved system (Ex. 1187-1003 ¶214; Ex. 1630-1003 ¶123)

Petitions explain how Imai teaches a system configured to have at least two encoders with different compression rates.

“Imai teaches using a plurality of asymmetric data compression encoders 53_1 to 53_N . It would have been obvious to a POSITA that a first encoder of a plurality of asymmetric data compression encoders in Imai would compress data blocks at a higher data compression rate than a second encoder for several reasons. The '477 Patent uses the term 'data compression rate' to refer to the execution or algorithmic speed of a compression encoder. Ex. 1001 at 2:63-67; 8:10-18; 14:11-38...” (Pet. 1630 at 29; Pet. 1187 at 20)

1630 IPR - Ground 3: Petitioner has shown motivation to combine Dawson's image resolution selection criteria with Imai and Pauls teachings.

Realtime's Allegation:

- “But the petition says nothing about how a POSITA would achieve ‘improv[ing] the encoder/transcoder selection process’ by means of ‘accounting for content resolution,’ as it must.” (POR at 47)

Actual Explanation from Petition and Dr. Storer:

- “A POSITA would have been motivated to combine the encoder selection techniques taught by Imai, Pauls, and Dawson... to create an improved system with predictable results (a data compression system that is better at optimizing compression algorithm selection.).” (Pet. at 56 citing Ex. 1003 at 212)
- “A POSITA would have sought to incorporate the teachings of Dawson into the combination of Imai and Pauls to improve the encoder/transcoder selection process by accounting for content resolution in addition to considering the data type and other characteristics of the content.” (Ex. 1003 at 212)
- All three teach selecting a compression encoder based on data parameters of the input data, and It would have been well known at the time that data resolution can be a parameter of both images and video data that could also be used to select a compression encoder. (Ex. 1003 at 210-11)

1187 IPR, Ground 4: Combining Chao with Imai and Pauls

- Realtime does not dispute that Chao teaches asymmetric video compression that uses an arithmetic algorithm.
- Realtime does not dispute that Imai teaching multiple encoders, including asymmetric encoders.
- Petition and Dr. Storer's declaration explain the motivation to combine Chao's arithmetic teachings with those of Imai and Pauls
 - That arithmetic encoders were well-known (Pet. at 59)
 - That arithmetic encoders possess the highest degree of algorithmic effectiveness (*Id.*)
 - Improve upon compression ratio and speed of encoders (Pet. at 62-63)

Dr. Zeger admits that execution speed relates to measuring computation.

Q: How about we ask them what would be the execution speed of a compression algorithm?

A: Okay. Then a person asked that question would say, “Well, it could mean one of several things depending on exactly what you're interested in.” It could be a measurement of how much time it takes from start to finish to execute a particular compression algorithm. It could be something that’s similar to what’s -- what I’m quoting in paragraph 36. It could be the amount of input data that could be compressed per unit of time at a given compression ratio, or it could be lots of other variations on that.

Ultimately, it’s a measure of something, whether it be data process -- how much data is processed, how many seconds it takes for something to happen, how many CPU cycles are used, something of that nature. It’s a counting process.

Dr. Storer explains different bit rates = different data compression rates.

- Imai explains that ATRAC 2 can encode at various compression rates (*e.g.*, “64 Kbps, 32 Kbps, 24 Kbps”).
- POSITA would have found this limitation obvious in view of Imai’s teaching of an embodiment where all of the encoders use a single asymmetric compression algorithm (ATRAC 2) but differ in their output data rates.
- For example, a 32 kbps encoder could be created using a 64 kbps encoder that runs at half its normal execution speed. It would follow that the 64 kbps encoder would have a higher data compression rate than the 32 kbps encoder.
- Imai also teaches using asymmetric MPEG layer 3 to compress data at a higher data compression rate than ATRAC 2 (*e.g.*, at 24 Kbps).

Dr. Zeger admits relationship between
data compression rate and output rate.

Q: So if you use a faster data compression rate, you achieve a higher output rate?

A: Well, if you use a faster data compression rate -- if you go back to the definition of data compression rate as measuring the amount of input data that can compress per unit of time at a given compression ratio, so if you increase the data compression rate, you're pulling in more input data per unit time at a given compression ratio. So that would -- in general, that would increase the output rate of the encoder, so you'd be having to send more data across the channel.

(Ex. 1029 at 148:13-24)

Dr. Zeger admits that separately written encoders unlikely to have the same data compression rates or compression ratios.

Q. If two persons of ordinary skill in the art wrote their own implementations of a compression algorithm, will they have the same execution speed?

A. They could.

Q. Are they certain to have the same execution speed?

A. No.

Q. ...How is it possible that a person of ordinary skill in the art implementing a compression algorithm can write it more efficiently versus less efficiently?

A. Well, a person could use good programming skills or poor programming skills.

Dr. Zeger admits that separately written encoders unlikely to have the same data compression rates or compression ratios.

Q. What are some of the other reasons?

A. A person might just have a high skill level in programming. They might use inefficient techniques. They might make errors when they code. Are you assuming the same programming language when you say same compiler? Okay. I'm sure there is others I just can't think of right now.

Caselaw

Obviousness only requires an “apparent reason” to combine.



“Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.”

KSR International Co. v. Teleflex Inc., 550 U.S. 398, 418 (2007)

Obviousness does not require showing the precise teachings of the claims existed in the prior art.



“As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”

KSR International Co. v. Teleflex Inc., 550 U.S. 398, 418 (2007)

Supreme Court has rejected rigid rules that limit an obviousness analysis.



“Rigid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it.”
KSR International Co. v. Teleflex Inc., 550 U.S. 398, 421 (2007)

Obviousness does not require bodily-incorporation.



“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.”

In re Mouttet, 686 F.3d 1322, 1332 (Fed. Cir. 2012)

Cases Cited by *In re Mouttet*

- *In re Etter*, 756 F.2d 852, 859 (Fed.Cir.1985) (en banc) (“Etter's assertions that Azure cannot be incorporated in Ambrosio are basically irrelevant, the criterion being not whether the references could be physically combined but whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole.”)
- *In re Sneed*, 710 F.2d 1544, 1550 (Fed.Cir.1983) (“[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review.”)
- *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference....”)



In re Epstein



“Rather the Board’s observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board’s finding that one skilled in the art would have known how to implement the features of the references and would have concluded that the reference disclosures would have been enabling.”
In re Epstein, 32 F.3d 1559, 1568 (Fed. Cir. 1994)