IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner

v.

VEVEO, INC.
Patent Owner

Patent No. 7,937,394
Filing Date: August 2, 2010
Issue Date: May 3, 2011
TITLE: METHOD AND SYSTEM FOR DYNAMICALLY PROCESSING AMBIGUOUS, REDUCED TEXT SEARCH QUERIES AND HIGHLIGHTING RESULTS THEREOF

Inter Partes Review No.: IPR2019-00291

PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.100 *et seq.*

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EXHIBITS

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Ex. 1102:	Portions of File Wrapper for U.S. Patent Application Number 11/312,908
Ex. 1103:	U.S. Provisional Application 60/716,101 ("the '101 Provisional application")
Ex. 1104:	Excerpts from *Modern Information Retrieval* (ACM Press Books, New York, 1999) (ISBN 0-201-39829-X)
Ex. 1105:	U.S. Patent No. 8,433,696 ("the '696 Patent")
Ex. 1106:	IPR2017-00715, Paper 33 ("the '696 Final Written Decision")
Ex. 1107:	U.S. Publication No. 2007/0027848 ("Howard")
Ex. 1108:	U.S. Patent No. 6,011,554 ("King")
Ex. 1109:	U.S. Patent No. 6,370,518 ("Payne")
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Ex. 1111:	U.S. Publication No. 2004/0133564 ("Gross")
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Ex. 1131:	Declaration of Carlos A. Goldie

Comcast Cable Communications, LLC ("Petitioner") hereby petitions for *inter partes* review ("IPR") under 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 *et seq*. of claims 1-11 of U.S. Patent No. 7,937,394 ("the '394 Patent"), attached as Ex. 1121.

I. MANDATORY NOTICES PURSUANT TO 37 C.F.R. § 42.8(A)(1)

A. 37 C.F.R. § 42.8(b)(1)&(2): Real Parties in Interest & Related Matters

The real parties-in-interest are: (i) Comcast Corporation; (ii) Comcast Business Communications, LLC; (iii) Comcast Cable Communications Management, LLC; (iv) Comcast Cable Communications, LLC; (v) Comcast Financial Agency Corporation, (vi) Comcast Holdings Corporation; (vii) Comcast Shared Services, LLC; (viii)Comcast STB Software I, LLC; (ix) Comcast of Massachusetts I, Inc.; (x) Comcast of Milton, Inc.; (xi) Comcast of Southern New England, Inc.; (xii) Comcast of Massachusetts/New Hampshire, LLC; (xiii) Comcast of Needham, Inc.; (xiv) Comcast of Massachusetts/Virginia, Inc.; (xv) Comcast of Boston, Inc.; (xvi) Comcast of Brockton, Inc.; (xvii) Comcast of California/Massachusetts/Michigan/Utah, LLC; (xviii) Comcast of Connecticut/Georgia/Massachusetts/New Hampshire/New York/North Carolina/Virginia/Vermont, LLC; (xix) Comcast of Massachusetts II, Inc.; and (xx) Comcast of Massachusetts III, Inc. These entities are referenced below as "Comcast entity __" or as "Comcast entities __," where "__" is one of or more of

(i) through (xx). No unnamed entity is funding, controlling, or directing the Petition for *Inter Partes* Review of U.S. Patent No. 7,937,394, or otherwise has an opportunity to control or direct this Petition or Petitioner's participation in any resulting IPR.

The '394 Patent was asserted against Comcast entities (i)-(iv), (vi), (vii), and (ix)-(xx), as well as other Comcast entities, in *Veveo Inc. v. Comcast Corporation, et al.*, U.S. District Court for the District of Massachusetts, Case No. 1:18-cv-10056-GAO ("Massachusetts litigation"). The earliest date of service on any of the Comcast entities named in the Massachusetts litigation was January 10, 2018. In addition, the '394 Patent has been asserted against Comcast entities (i)-(iv), (vi), and (vii) in *In the Matter of Certain Digital Video Receivers and Related Hardware and Software Components*, Investigation No. 337-TA-1103 ("ITC Investigation"). The earliest date of service on any of the Comcast entities named in the ITC Investigation was February 8, 2018.

The '394 Patent is the subject of three other requests for *inter partes* review concurrently filed by Petitioner in *Inter Partes* Review Nos. IPR2019-00290, IPR2019-00292, and IPR2019-00293. Additionally, U.S. Patent No. 7,779,011, a parent of the '394 Patent, is the subject of three requests for *inter partes* review concurrently filed by Petitioner in *Inter Partes* Review Nos. IPR2019-00237, IPR2019-00238, and IPR2019-00239.

The ’394 Patent is also related to U.S. Patent No. 8,433,696 (Ex. 1105), which was held unpatentable in IPR2017-00715 in a Final Written Decision (Ex. 1106) issued July 25, 2018. The PTAB’s decision is currently on appeal at the Federal Circuit in Case No. 18-2422. The ’696 Patent and the ’394 patent are both assigned to Patent Owner, name overlapping inventors, and claim priority to the same provisional applications.

B. 37 C.F.R. § 42.8(b)(3)&(4): Lead & Back-Up Counsel and Service Information

Petitioner designates counsel listed below. A power of attorney for counsel is being filed herewith.

Lead Counsel Frederic M. Meeker (Reg. No. 35,282) fmeeker@bannerwitcoff.com Back-Up Counsel Bradley C. Wright (Reg. No. 38,061) bwright@bannerwitcoff.com Banner & Witcoff, Ltd. 1100 13th Street, NW, Suite 1200 Washington, DC 20005 Tel: (202) 824-3000 Fax: (202) 824-3001	Additional Back-Up Counsel John R. Hutchins (Reg. No. 43,686) jhutchins@bannerwitcoff.com Chunhsi Andy Mu (Reg. No. 58,216) amu@bannerwitcoff.com Blair A. Silver (Reg. No. 68,003) bsilver@bannerwitcoff.com R. Gregory Israelsen (Reg. No. 72,805) risraelsen@bannerwitcoff.com Banner & Witcoff, Ltd. 1100 13th Street, NW, Suite 1200 Washington, DC 20005 Tel: (202) 824-3000 Fax: (202) 824-3001 Bennett Ingvoldstad (Reg. No. 73,367) bingvoldstad@bannerwitcoff.com Banner & Witcoff, Ltd. 71 S. Wacker Dr., Suite 3600 Chicago, IL 60606 Tel: (312) 463-5000 Fax: (312) 463-5001

Petitioner further consents to electronic service by email to the addresses listed above for each counsel, and at the following address:

ComcastIPRService@bannerwitcoff.com.

II. COMPLIANCE WITH THE REQUIREMENTS FOR A PETITION FOR *INTER PARTES* REVIEW

A. Payment of Fees Pursuant to 37 C.F.R. § 42.103

The undersigned authorizes the charge of any required fees to Deposit Account No. 19-0733.

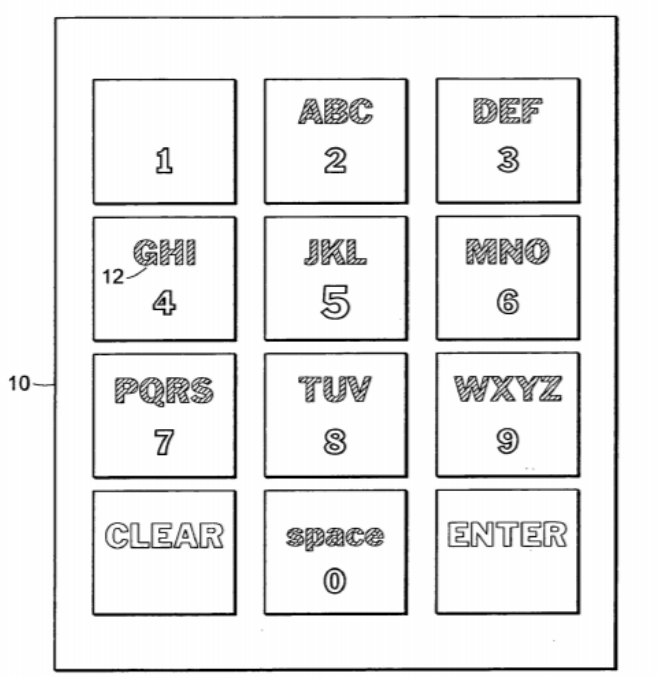
B. Grounds for Standing Pursuant to 37 C.F.R. § 42.104(a)

Petitioner certifies that the '394 Patent is available for IPR and that Petitioner is not barred or estopped from requesting an IPR challenging claims 1-11 on the grounds identified herein.

III. OVERVIEW OF THE '394 PATENT

A. Brief Description

The '394 Patent relates to "processing ambiguous, reduced text, search queries and highlighting results thereof." Ex. 1121 at 1:28-31. The queries are ambiguous because they are entered using a "keypad with overloaded keys" in which "[t]he same key can be pressed to enter different characters," as shown in Figure 1 below. *Id*. at 1:46-50, Fig. 1 (reproduced below). For example, "the '2' key can be used to enter the number '2' and the letters 'A', 'B' and 'C'." *Id*. These keypads were "common" in "cell phones and other mobile devices" and, increasingly, in "television remote control devices." *Id.* at 1:41-43, Fig. 1.



PRIOR ART

FIG. 1

Ex. 1121 at Fig. 1

The ’394 Patent describes initially creating an index “by performing a many-to-many mapping from the alphanumeric space of terms to numeric strings corresponding to the various prefixes of each alphanumeric term constituting the query string.” *Id.* at 3:49-55. The system retrieves search results “incrementally,” “matching the ambiguous alphanumeric input query, as the user types in each character of the query.” *Id.* at 3:60-62. For example, a query of “866” matches items with names including letters such as “TOO,” “TOM,” or “TON” (8 matches “T” and 6 matches M, N, and O). *Id.* at 7:9-55, Figs. 6A-B. The system displays the results with “the characters in the search result that match the overloaded

single-word search prefix characters [being] highlighted," as shown in Figure 6B below. *Id.* at 7:49-55, Fig. 6B.

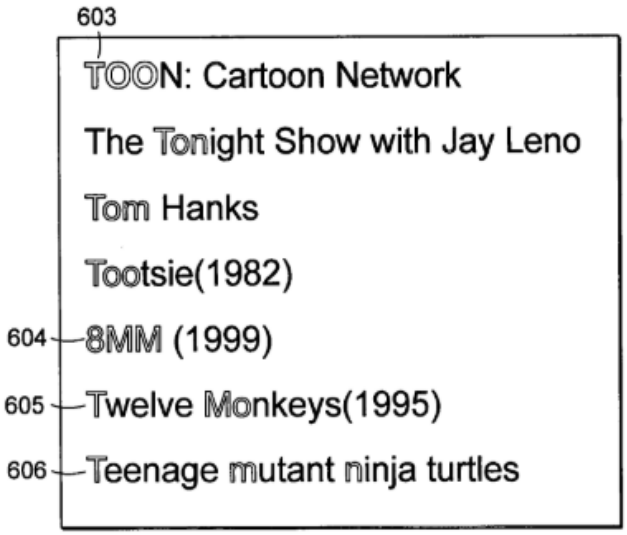


FIG. 6B

Ex. 1121 at Fig. 6B

B. Prosecution History

The application that became the '394 Patent was filed August 2, 2010, and issued on May 3, 2011, after the Applicant filed a terminal disclaimer to obviate a double patenting rejection over the parent patent, U.S. Pat. No. 7,779,011 ("the '011 Patent"). Ex. 1122 at 7, 10, 15-18. Because the claims at issue in the '394 Patent are very similar to the claims of the '011 Patent, the prosecution history of the '011 Patent is relevant to the '394 Patent. Ex. 1114, ¶ 68, Appendix A.

During prosecution of the ’011 Patent, the Applicant argued that the patentable feature of the claims was the incremental highlighting of search results. Ex. 1102 at 86-87, 110-113, 143, 151-154. The Examiner repeatedly rejected this argument. *Id*. at 43-44, 76; Ex. 1114, ¶¶ 69-71.

The Applicant then amended the claims to add a new step to then-pending claim 35 (issued claim 1) requiring “determining letters and numbers” “that correspond to” the unresolved keystrokes mapped to the items, and then highlighting the determined letters and numbers. Ex. 1102 at 15; Ex. 1114, ¶¶ 72-73. The Applicant distinguished the prior art highlighting techniques because it highlighted letters and numbers that match ambiguous search queries. Ex. 1102 at 20-22; Ex. 1114, ¶¶ 74-75.

The Examiner, with Applicant’s authorization, then amended the claims to require “determining **which** letters and numbers present in the information” associated with the indexed items “**caused** said items to be associated” with the strings of unresolved keystrokes in the direct mapping and allowed the claim. Ex. 1102 at 8 (emphases added); Ex. 1114, ¶¶ 76-77. The Examiner neither explained the reason for the amendment nor identified any specification support for this claim language. Ex. 1102 at 7-10. The Examiner allowed the claims because they

> recite a method for indexing a database for access using a device with overloaded keys; wherein the index is created by associating each item in the database with a string of unresolved keystrokes and upon

receipt of a search request using said overloaded keys comparing the received unresolved keystrokes to the unresolved keystrokes mapped to the items in the database.

Id. at 10. The Examiner did not mention the highlighting feature in the Notice of Allowance. Ex. 1114, ¶ 78.

IV. IDENTIFICATION OF CHALLENGE PURSUANT TO 37 C.F.R. § 42.104(B) AND STATEMENT OF THE RELIEF REQUESTED

A. Claims for Which Review is Requested and Grounds on Which the Challenge Is Based

Petitioner requests review on the following grounds:

References	Basis	Claims Challenged
Zigmond, Smith, and Payne	§ 103(a)	1, 2, 4, 5, 6, 8, 9, 10, 11
Zigmond, Smith, Payne, and Sanders	§ 103(a)	3
Zigmond, Smith, Payne, and Weeren	§ 103(a)	7

This Petition is not redundant to others filed concurrently herewith, as the grounds in the other petitions present additional ways of arriving at the claims completely different from those presented herein.

Petition 1 relies primarily on Howard (Ex. 1107), King (Ex. 1108), and Payne (Ex. 1109), whereas this Petition relies primarily on Zigmond (Ex. 1112), Smith (Ex. 1113), and Payne. Howard teaches a search system embodied within a mobile client device. *See* Ex. 1107, ¶¶ [0005], [0116]. By contrast, Zigmond

teaches a client-server system. *See* Section VI.A, *infra*. Moreover, King (in Petition 1) teaches a tree index, whereas Zigmond and Smith teach other types of indices. *See* Ex. 1108, FIG. 4A, 11:10-22; Sections VI.A-B, *infra*. Payne's disclosure of highlighting is cited in both Petition 1 and this Petition.

Petition 3 cites Gross (Ex. 1111) and Smith (Ex. 1113). Gross teaches incremental searching, indexing, and highlighting in a single reference, and Smith teaches the use of overloaded keys. Ex. 1111, ¶¶ [0010]-[0012], [0049]; Ex. 1113, FIG. 5C, 5:20-32. In comparison to the references of this petition, Gross provides fewer details about the index, but teaches more details about highlighting.

Petition 4 cites Venkataraman (Ex. 1123) and Samuelson (Ex. 1124), which are prior art because the '394 Patent is not entitled to its priority dates. In comparison to this Petition, Venkataraman (which is the publication of the '011 Patent) teaches most of the features of the claims, and Samuelson teaches the remaining features of the claims. Venkataraman is a strong intervening reference that is not prior art unless the '394 Patent is not entitled to the priority date of the '011 Patent.

B. How the Claims Are to Be Construed and Level of Ordinary Skill

1. How the Claims Are to Be Construed

An unexpired claim subject to IPR "shall be given its broadest reasonable construction in light of the specification of the patent in which it appears" (the

"BRI"). 37 C.F.R. § 42.100(b). Any other claim term not specifically discussed below, for the purposes of this IPR only, should be given its plain and ordinary meaning in accordance with this standard.

i. "directly mapped"

For this IPR, under BRI, "directly mapped" should be construed as "each alphanumeric character of a search query prefix substring associated with an item is matched with its corresponding numeric key equivalent on an overloaded keypad." Ex. 1114, ¶¶ 79-89.

This parallels the construction for "direct mapping" the PTAB adopted in a previous IPR proceeding that invalidated related US Patent No. 8,433,696 ("the '696 Patent"). *See* Ex. 1106 at 7-9. The '696 Patent and '394 Patents are related; they are assigned to the same Patent Owner, name overlapping inventors, and claim priority to the same provisional applications. *See* Ex. 1121 at 1; Ex. 1105 at 1. Moreover, the '696 Patent describes the operation of a search system similarly to the '394 Patent. Ex. 1114, ¶ 81, 83; Ex. 1121 at Abstract, 2:20-22; Ex. 1105 at Abstract, 2:10-12. The '696 Patent also claims a system with a similar direct mapping. Ex. 1114, ¶¶ 81, 84-85; Ex. 1121 at 8:44-9:16; Ex. 1105 at 7:62-8:20. The following table shows the pertinent claim language in the two patents:

’696 Patent – Claim 1	’394 Patent – Claim 1
associating subsets of content items with corresponding strings of one or more overloaded keys of a keypad so that the subsets of content items are **directly mapped** to the corresponding strings of one or more overloaded keys by a **direct mapping**	providing access to an index of the items, the index having an association between subsets of the items and corresponding strings of one or more unresolved keystrokes for overloaded keys so that the subsets of items are **directly mapped** to the corresponding strings of unresolved keystrokes for various search query prefix substrings

See Ex. 1114, ¶ 84. The claim language is similar, although the ’394 Patent contains the extra phrase “for various search query prefix substrings.” Ex. 1114, ¶¶ 84, 86.

In the ’696 IPR, the Panel construed “direct mapping” as “matching each alphanumeric character of a descriptor identifying a content item with its corresponding numeric key equivalent on an overloaded keypad.” Ex. 1106 at 9. The Panel based its decision on the ’696 Patent’s explanation that “[t]he system dynamically identifies a group of one or more [content] items from the set of [content] items having one or more *descriptors matching the search query* as the

user enters each character of the search query." *Id*. (original emphasis); Ex. 1105 at 3:19-22. The '394 Patent contains a similar disclosure, but does not use the term descriptors: "[t]he system dynamically identifies a group of one or more items from the set of items having one or more words in the names thereof matching said search query as the user enters each character of said search query." Ex. 1121 at 3:38-41 (emphasis added); Ex. 1114, ¶¶ 82-83.

Petitioner's construction starts with the '696 construction, but swaps the '696 Patent's term "descriptor" for the '394 Patent's claim term "search query prefix substrings." This comports with the '394 Patent specification's description of generating a mapping by "performing a many-to-many mapping from the alphanumeric space of terms to numeric strings corresponding to the **various prefixes of each alphanumeric term constituting the query string**." Ex. 1121 at 3:51-55 (emphasis added); Ex. 1114, ¶¶ 86-87.

The following compares the PTAB's construction of "direct mapping" for the '696 Patent and Petitioner's proposed construction of "directly mapped" for the '394 Patent:

'696 Patent – "direct mapping"	'394 Patent – "directly mapped"
matching each alphanumeric character of a descriptor identifying a content item with its corresponding numeric key equivalent on an overloaded keypad.	each alphanumeric character of a search query prefix substring associated with an item is matched with its corresponding numeric key equivalent on an overloaded keypad.

Ex. 1114, ¶ 88.

In a related ITC proceeding, Patent Owner proposed construing the term "directly mapped" as "each alphanumeric character of a prefix substring for at least one word in the information associated with an item is matched with its corresponding numeric key equivalent on an overloaded keypad." Ex. 1117 at 24-25. The ITC declined to adopt this, reasoning that it would exclude a mapping to the item itself, as opposed to information associated with the item, and that the term "word" would unnecessarily exclude alphanumeric characters as opposed to just letters. *Id*. at 26-27.

The ITC construed it to mean "each alphanumeric character of a prefix substring associated with an item is matched with its corresponding numeric key equivalent on an overloaded keypad." *Id*. at 24-25. As discussed below, the claims are obvious under any of these constructions. Ex. 1114, ¶ 89.

ii. "letters and numbers"

For this IPR, under BRI, "letters and numbers" should be construed as "alphanumeric characters." Ex. 1114, ¶¶ 90-92.

The phrase "letters and numbers" appears in independent claim 1 in both the "determining" and the "highlighting" steps. Ex. 1121 at 8:44-9:16; Ex. 1114, ¶ 90. Claim 1 indicates that the "letters and numbers" are "present in the information associated with and describing the indexed items of said subset." Ex. 1121 at claim 1. This same information is described as "alphanumeric" in the specification. *Id*. at 3:47-59, 7:21-46; Ex. 1114, ¶ 90.

The '394 Patent refers to its keypad as having keys that "are overloaded with alpha-numeric characters" such that, for example, "the '2' key can be used to enter the **number** '2' and the **letters** 'A', 'B' and 'C'." Ex. 1121 at 1:33-48 (emphasis added). A person of ordinary skill in the art ("POSA") would thus recognize "alphanumeric characters" as meaning "letters and numbers," and would know that the term "alphanumeric" is a well-understood term that refers to the set "consisting of both letters and numbers . . . ." Ex. 1120 at 1; Ex. 1114, ¶¶ 91-92.

The construction "alphanumeric characters" is also appropriate because not every item is associated with information that has both letters and numbers; instead, each character of the information can be either a letter or a number, and some of the information does not contain any numbers. *See* Ex. 1121 at Fig. 6B;

Ex. 1114, ¶ 92. Therefore, the BRI of "letters and numbers" does not require both letters and numbers, but instead requires the information to be "alphanumeric characters," each of which could be a letter or a number. Ex. 1114, ¶ 92.

iii. "caused the items to be associated with the strings of one or more unresolved keystrokes that directly mapped to the subset"

The claims require determining which characters "caused the items to be associated with the strings of one or more unresolved keystrokes that directly mapped to the subset." For this IPR, this should be construed as determining the characters that "match a string of unresolved keystrokes directly mapped to the subset." Ex. 1114, ¶¶ 93-98.

This phrase appears in the "determining" step (*i.e.*, limitation 1[b]), which is recited after "providing access to an index" but before "receiving from a user a search query." Ex. 1121, 8:51-67. The characters determined in limitation 1[b] are later highlighted in limitation 1[e]. Ex. 1121, 9:7-16.

The '394 Patent's system matches alphanumeric characters to strings of unresolved keystrokes to generate the association in the direct mapping. Ex. 1114, ¶¶ 94-95. The specification describes "performing a many-to-many mapping from the alphanumeric space of terms to numeric strings corresponding to the various prefixes of each alphanumeric term constituting the query string." Ex. 1121 at 3:49-55. The system thus starts with alphanumeric terms and then matches the

alphanumeric terms to corresponding numeric equivalents, which are "strings of unresolved keystrokes." Ex. 1114, ¶¶ 94-95; Ex. 1121, 3:49-62. This match between alphanumeric terms and numeric equivalents constitutes the direct mapping, so the particular alphanumeric characters that match the numeric equivalents are what caused the association in the mapping. *See* Ex. 1114, ¶ 95; *see also* Section IV.B.1.i, *supra*.

2. Level of Ordinary Skill

The alleged invention relates to the field of search-query processing. Ex. 1121, 1:28-31; Ex. 1114, ¶¶ 42-47. A POSA would have had at least a bachelor's degree in computer science and at least two years of experience in the field of search-query processing spent designing, constructing, and/or testing systems that utilize data and/or information search techniques. Ex. 1114, ¶ 46.

V. SUMMARY OF ARGUMENT

The '394 Patent claims the basic idea of incremental searching using overloaded key inputs, and highlighting the matching portions of the results. But, Zigmond teaches incremental searching, Smith teaches searching using overloaded key inputs, and Payne teaches highlighting the results of incremental searching using overloaded key inputs. The Sanders and Weeren references and corresponding combinations render obvious some additional dependent claims.

For the reasons explained below, it would have been obvious to combine these well-known techniques to yield the claimed subject matter.

VI. SCOPE AND CONTENT OF THE PRIOR ART

The prior art disclosed numerous techniques covering the claimed information retrieval and display, including the claimed indexing, incremental searching, and highlighting of results in an overloaded keypad environment. Ex. 1114, ¶¶ 49-58. For example, the basic concepts of information retrieval were well known. Ex. 1104 at 38; Ex. 1114, ¶ 50. Matching characters, including those entered via overloaded keyboards, was also known. Ex. 1104 at 93; Ex. 1114, ¶ 51. Mapping words in an index to aid in fast retrieval was known, as were various data structures for storing indices. Ex. 1104 at 129, 133, 136, 138-139; Ex. 1114, ¶¶ 52-54. User interfaces were known, including interfaces that highlighted the occurrences of terms that match a user's query. Ex. 1104, 165, 197; Ex. 1114, ¶¶ 56-57.

A. U.S. Publication No. 2005/0256846 (Zigmond)

Zigmond (Ex. 1112) was published November 17, 2005, and was filed May 12, 2004, and thus qualifies as prior art under 35 U.S.C. § 102(e). Zigmond was not considered during the prosecution of either the '011 Patent or the '394 Patent.

Zigmond relates to incremental searching of data in an index, for instance, when a cable television user is searching for a title of a television show.

Incremental searching, in which matching results are displayed and updated as each new alphanumeric character is entered by the user, was described by Zigmond as already known in the prior art. Ex. 1112, ¶ [0003]; Ex. 1114, ¶¶ 109-110.

However, Zigmond discloses an improved indexing system mapping items to incremental user search inputs. Ex. 1112 at Abstract, ¶¶ [0031], [0035]-[0036]; Ex. 1114, ¶¶ 110-111. Zigmond uses multiple indexes that each store pre-mapped content items in different subsets, which Zigmond refers to as "bins." Ex. 1112, ¶¶ [0042]-[0043]. A content item is included in a subset (*i.e.*, bin) when any word or a prefix of any word in its title (or other attribute) corresponds to a character string assigned to that subset. *Id.*, ¶¶ [0046], [0048], [0081]. For example, titles including a word beginning with "A" are mapped to an "A" bin, titles including a word beginning with "B" are mapped to the "B" bin, titles including a word beginning with "TA" are mapped to the "TA" bin, and so on. *Id.*, ¶¶ [0042], [0044], [0048], Figs. 2, 3. Example indexes for different prefixes which might be entered by a user, each of which is linked to a different bin ("subset of items"), are shown in Figures 2 and 3 of Zigmond, reproduced below:

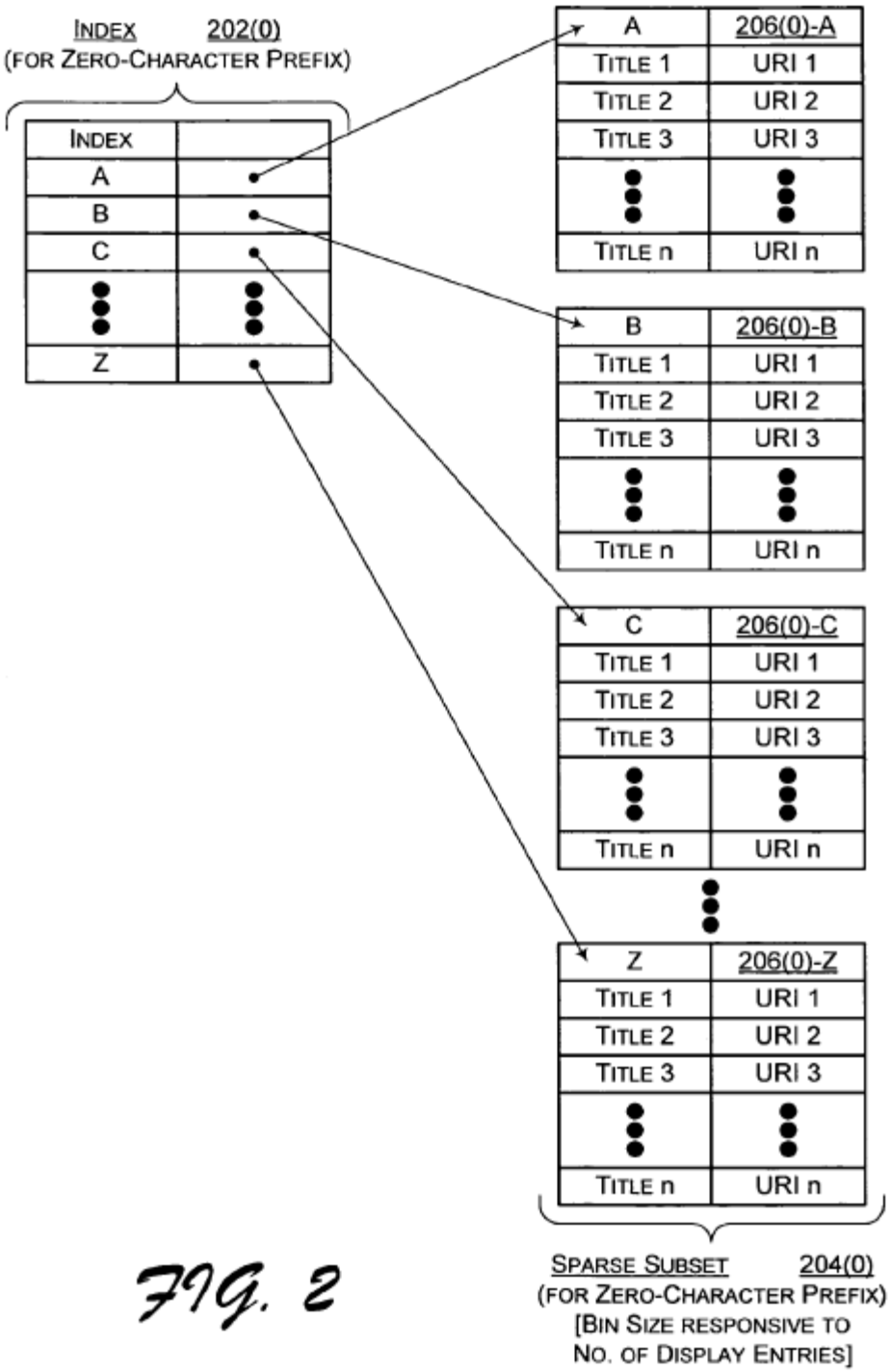


FIG. 2

Ex. 1112 at Fig. 2.

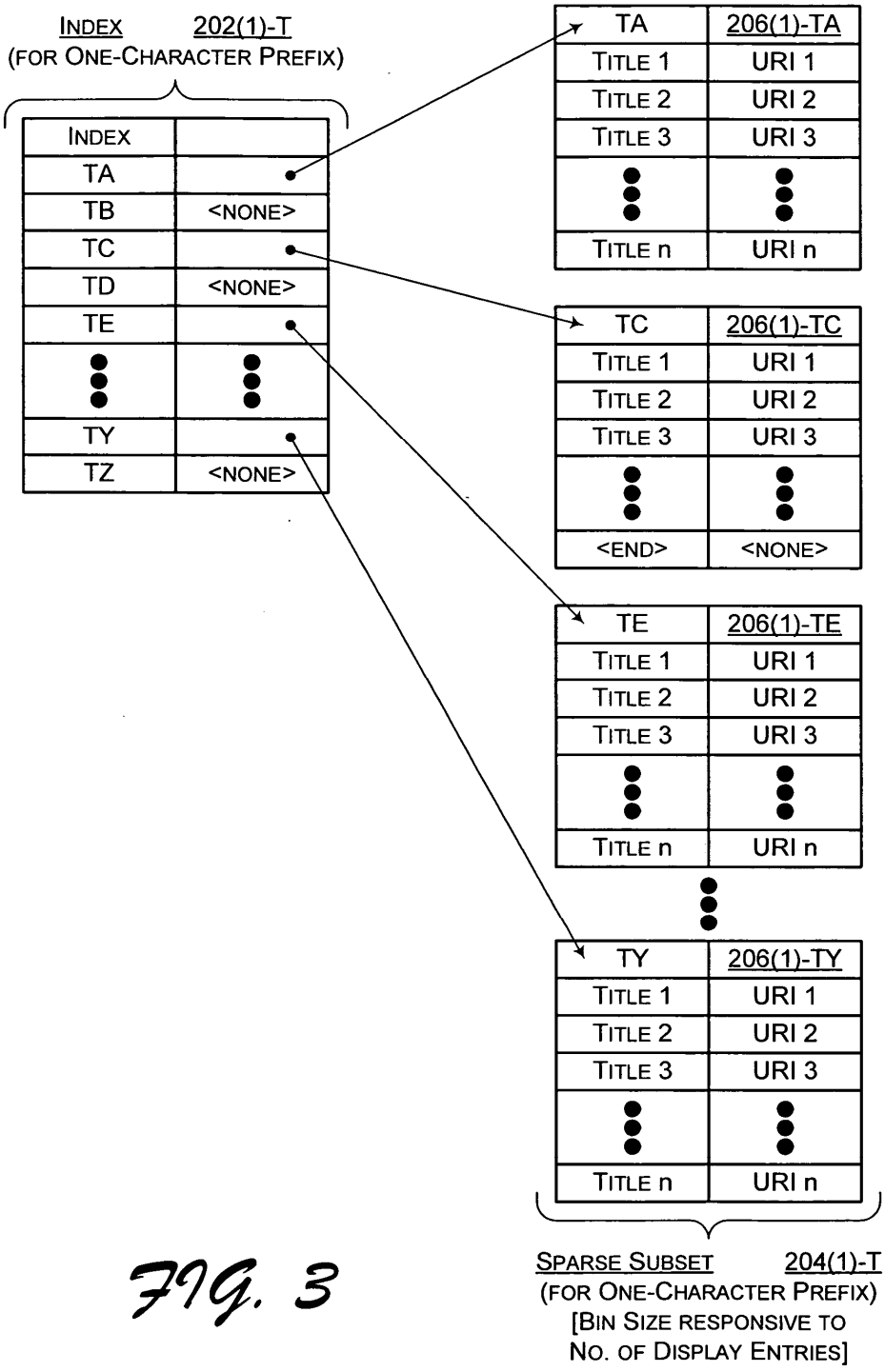
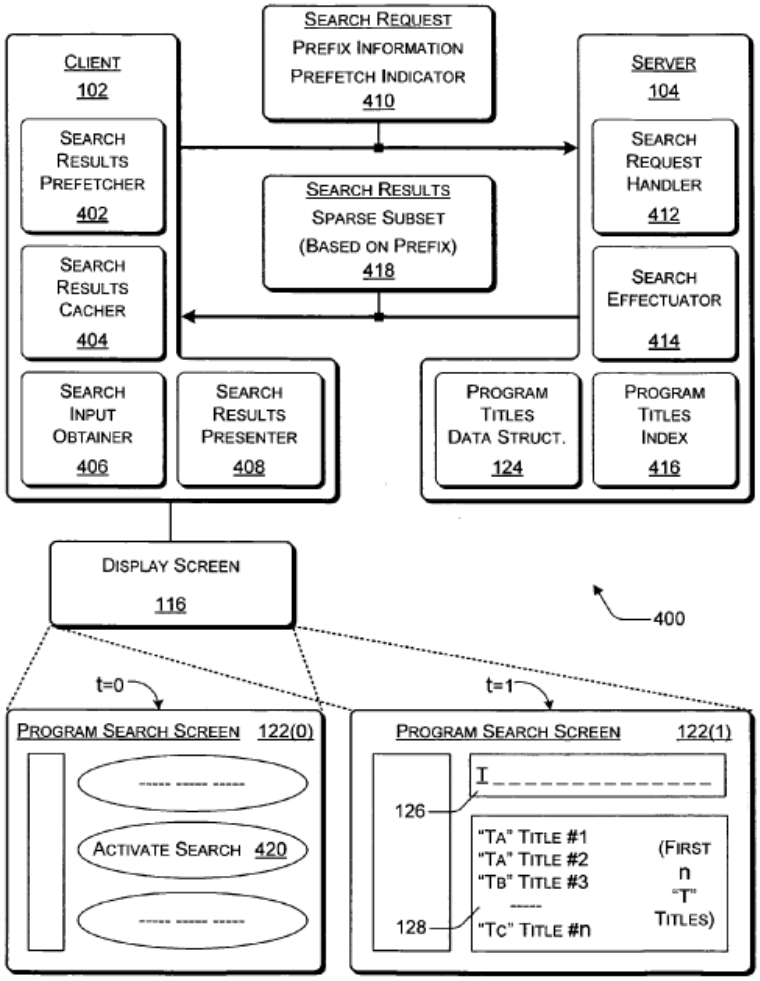


FIG. 3

Ex. 1112 at Fig. 3.

The pre-mapped lists of items in a particular bin are accessed and displayed on a client device in response to a search query that includes the alphanumeric character-string prefix directly mapped to that particular bin. Ex. 1112, ¶¶ [0065]-[0066]; Ex. 1114, ¶ 112. For example, if a user enters a "T," program titles from the "T" bin of the first index (shown in FIG. 2 of Zigmond, reproduced above) are displayed to the user, as shown in FIG. 4 (reproduced below):



Ex. 1112 at Fig. 4.

If the user then enters an "E," program titles from the "TE" bin (shown in FIG. 3 above) are displayed to the user. Ex. 1112, ¶ [0048]. Thus, Zigmond teaches the same incremental mapping and return of search results as described and claimed in the '394 patent.

Zigmond also teaches that input may be received through various input devices, including a remote control, a mobile phone, and a PDA. *Id*., ¶¶ [0025], [0037], [0082].

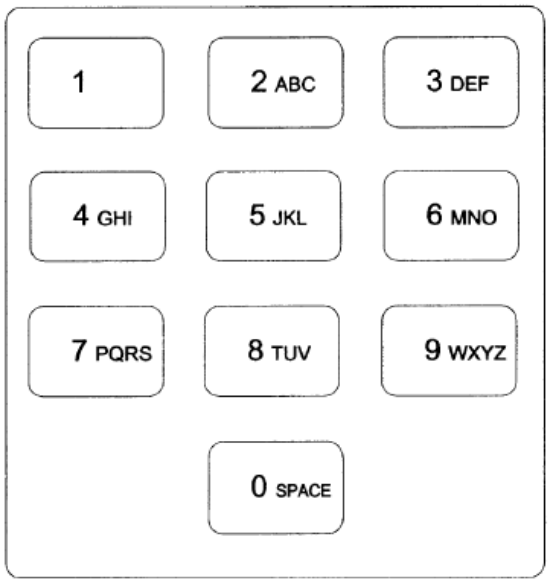
B. U.S. Patent No. 6,529,903 (Smith)

Smith (Ex. 1113) issued March 4, 2003, and thus is prior art under 35 U.S.C. § 102(b). Although Smith is listed on the face of the '394 Patent, Smith was not discussed in any Office Action during prosecution of either the '011 Patent or the '394 Patent.

While Zigmond teaches that its incremental searching can be used with input devices such as phones and remote controls, Smith relates particularly to receiving search inputs on the overloaded keypads found on such devices. Ex. 1114, ¶¶ 113-114.

Smith describes "[a] system [that] allows a user to submit an ambiguous search query and to receive potentially disambiguated search results. . . . The user's ambiguous search query is compared to this ambiguated index, and the corresponding documents are provided to the user as search results." Ex. 1113 at

Abstract. Smith particularly discloses an indexing system that directly maps content items to strings of numeric keys originating from an overloaded keypad. *Id.* at FIGS. 5A-5C, 1:24-30, 4:57-5:62, FIG. 5B (below); Ex. 1114, ¶¶ 114-115.



Ex. 1113 at Fig. 5B

Because the keypad uses numbered keys, Smith teaches a numeric index. Ex. 1114, ¶ 115. FIG. 4A (reproduced below) "illustrates a conventional alphanumeric index" and FIG. 5C (also reproduced below) "illustrates a numeric index corresponding to the alphanumeric index." Ex. 1113 at 2:36, 2:45-46. The numeric index may be generated by translating the alphanumeric index. *Id*. at FIG. 5A, 5:3-32. Smith also states that "the invention could generate a single index that contains information of the same type as that employed at the user's input device." *Id.* at 6:6-10, 6:36-41, 5:1-32.

Using Smith's numeric index, ambiguous entries received from an overloaded keypad may be compared directly to the numeric index, which reduces the number of keystrokes required to find an item. For example, using prior techniques, to enter a "b" character for a search query, a user would press the "2" key twice. *Id.* at 1:40-65. Using Smith's technique, the user only has to press the "2" key once, and the search system finds items matching "b" (as well as items matching "2," "a," or "c") using Smith's numeric index. *Id.* at 1:40-65, 5:33-62; Ex. 1114, ¶ 115.

TERM	LOCATION (DOCUMENT)
3	DOCUMENT 1
BAR	DOCUMENT 3
CAR	DOCUMENT 1
CHAMPAGNE	DOCUMENT 3
ITEMS	DOCUMENT 3
RENTAL	DOCUMENTS 1 AND 2
REPAIR	DOCUMENT 1
VIDEO	DOCUMENT 2
WINE	DOCUMENT 3

Ex. 1113 at Fig. 4A

TERM	LOCATION (DOCUMENT)
3	DOCUMENT 1
227	DOCUMENTS 1 AND 3
242672463	DOCUMENT 3
48367	DOCUMENT 3
736825	DOCUMENTS 1 AND 2
737247	DOCUMENTS 1
84336	DOCUMENT 2
8463	DOCUMENT 3

Ex. 1113 at Fig. 5C

Thus, the ’394 patent’s methodology of retrieving indexed items of content in response to user input on an overloaded keypad by mapping the items in the index to the numeric key equivalents of the search query is taught by Smith.

C. U.S. Patent No. 6,370,518 (Payne)

Payne (Ex. 1109) issued April 9, 2002, and thus is prior art under 35 U.S.C. § 102(b). Payne is not cited by the ’394 Patent and was not considered during prosecution of either the ’011 Patent or the ’394 Patent.

Payne (like Smith) teaches a system that enables efficient searching using input from a “numeric-based keypad” where “each numeric key is commonly assigned to represent certain alphabetical characters,” but (like Zigmond) the searching is incremental Ex. 1109 at Fig. 1, 1:28-46, 2:52-65; Ex. 1114, ¶ 116. Payne’s system finds “a progressively reduced list” of items as the user enters the numeric keys. Ex. 1109 at 2:52-65. For example, if a user enters a query of “2” on the numeric keypad, the search system finds items beginning with “A,” “B,” or “C,” which are mapped to “2” on the keypad. *Id*. at Fig. 1, 8:63-66. When a user enters a query “22”, the search system finds items beginning with “AA,” “AB,” “AC,” “BA,” “BB,” “BC,” “CA,” “CB,” or “CC,” because each character “2” maps to “A,” “B,” or “C.” *Id*. at 8:66-9:3.

Payne describes highlighting the characters of search results to provide visual feedback to the user. *Id*. at 2:47-48, 5:45-50, 5:57-62, 7:13-15, 7:55-59,

13:22-25. "[E]ach of [the] highlighted characters represent[s] one of the symbols that has been entered." Ex. 1109, 13:24-25. Using such visual feedback, a user can better understand the search results. Ex. 1114, ¶¶ 117-118; Ex. 1109, 2:47-51, 5:43-50. For example, as shown in Figure 3D, as a user incrementally enters a search query using numeric keys (*e.g.*, "22"), the characters that match the numeric keys on the keypad (*e.g.*, the various permutations including "AB," "BA," "CA," etc.) are highlighted in bold text:

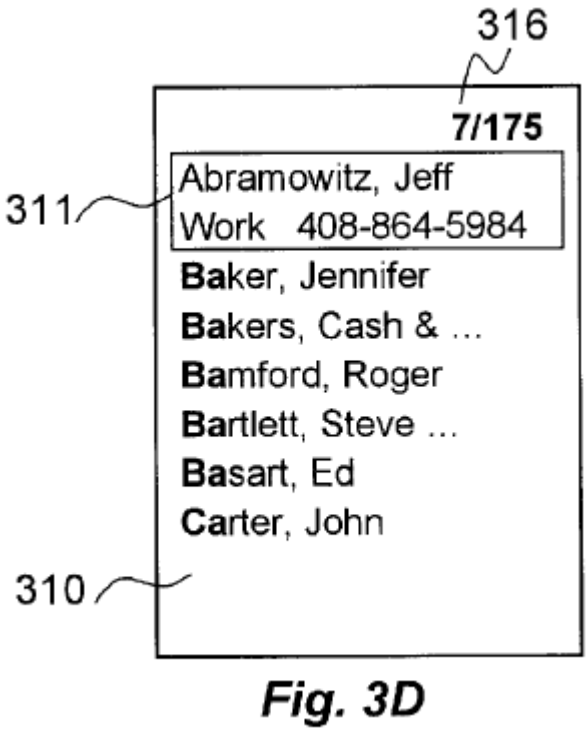


Fig. 3D

Ex. 1109 at Fig. 3D

D. U.S. Patent No. 7,885,963 (Sanders)

Sanders (Ex. 1110) was filed on March 24, 2003, and issued February 8, 2011. Sanders is prior art under 35 U.S.C. § 102(e). Although the pre-grant publication of Sanders is cited on the face of the '394 Patent, Sanders was not considered during prosecution of either the '011 Patent or the '394 Patent.

Sanders provides an interactive television network with an electronic program guide (EPG) that facilitates complex searches, interprets results according to relevancy, and provides various techniques for grouping, ranking, and filtering results for display. *Id.* at Abstract. For example, Sanders discloses abbreviating words to their word stems, then using the stemmed "search term to broaden the scope of a search." Ex. 1110, 6:42-61. Sanders also discloses that its EPG database is "capable of receiving and recording television broadcasts." Ex. 1110, 2:65-3:19; Ex. 1114, ¶ 119.

Sanders also describes an incremental ("progressive") search system that incrementally displays results as a user types in each character of a query. Ex. 1110 at Fig. 5, 2:35-38.

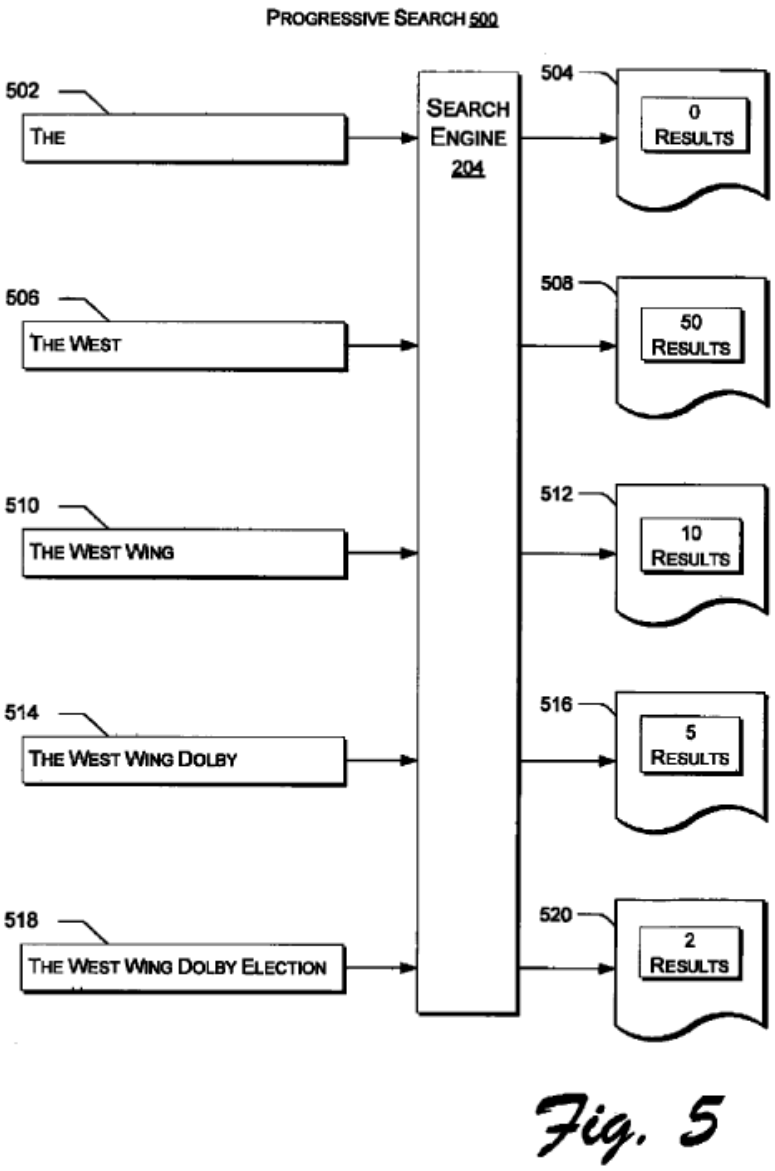


Fig. 5

Ex. 1110 at Fig. 5

Sanders teaches various other ranking methods for ordering items. *Id*. at 12:18-23; Ex. 1114, ¶ 119. In one example, Sanders's system adjusts the relevance of items such that exact matches receive a 100% relevance score—and are thereby ranked higher—whereas matches achieved via some transformation, such as

stemming (abbreviation) or spell correction, receive a lower relevance score. Ex. 1110 at 11:48-62; Ex. 1114, ¶ 120.

E. U.S. Patent No. 6,501,956 (Weeren)

Weeren (Ex. 1125) is a U.S. patent issued December 31, 2002, more than a year before the earliest priority date for the '394 Patent. Weeren qualifies as prior art under 35 U.S.C. § 102(b). Weeren is not cited on the face of the '394 Patent and was not considered during prosecution of either the '011 Patent or the '394 Patent.

Weeren teaches a system that "may access and supply information services from the Internet, corporate databases, and other electronic information media and also provides enhanced interface between the user and the information service." Ex. 1125 at 3:7-11. Weeren further teaches "a simpler user interface which allows a user to control access to information and application functionality using basic inherent skills and minimized device manipulation." *Id*. at 3:11-15. A user may access the information service and user interface via the display of a mobile device. Ex. 1125 at 3:15-25; Ex. 1114, ¶ 121.

Additionally, Weeren teaches that the user interface and information service would desirably be accessed by non-wireless devices such as a "conventional wireline telephone" or a "desk phone." *Id*. at 5:3-18. Ex. 1114, ¶ 122. The user would thus advantageously be able access the services, including "phone

directories, locator services, retail services, or other information services available to the wireless communication device user" using non-wireless phones. Ex. 1125 at 5:3-18.

VII. SPECIFIC GROUNDS FOR UNPATENTABILITY

A. GROUND 1: Claims 1, 2, 4-6, and 8-11 Are Obvious Over Zigmond in view of Smith and further in view of Payne

Claims 1, 2, 4-6, and 8-11 are unpatentable as obvious over Zigmond in view of Smith and Payne. Ex. 1114, ¶¶ 124-223.

1. Motivation to Combine Zigmond with Smith

Zigmond teaches an index that associates subsets of items with alphanumeric characters corresponding to prefix queries. Ex. 1112 at Figs. 2, 3, ¶¶ [0039]-[0048]. Zigmond also teaches that search inputs may be received from a "mobile phone" or "PDA," or other devices including a "remote" or "keypad." *Id*., ¶¶ [0025], [0037]. A POSA would have known that these devices often have overloaded keypads, as the '394 Patent admits and as taught by Smith. Ex. 1114, ¶ 124; Ex. 1121 at 1:33-50; Ex. 1113 at 1:27-30. But Zigmond's indexes 202 contain alphanumeric keystrokes. Ex. 1112 at Figs. 2-3, ¶ [0041].

Smith teaches that, when using an overloaded keypad, a numeric index containing numeric strings should be used. In short, the type of index should match the type of input the user is using. Ex. 1113 at Abstract, 5:1-32, 2:56-64, 6:6-22. Smith also teaches how to convert an alphanumeric index to a numeric

index suitable for use with queries entered on overloaded keypads (such as those of Zigmond). Ex. 1114, ¶ 119.

A POSA would have been motivated to combine Zigmond and Smith, modifying Zigmond's search system to use a numeric index as disclosed by Smith, for several reasons. First, Smith explains that its numeric index allows a user to input a query on an overloaded keypad using fewer unresolved keystrokes than conventional methods, which would have motivated a POSA to modify Zigmond's search system. Ex. 1113 at 1:36-65, 5:33-62; Ex. 1114, ¶ 125. Since Zigmond already teaches using devices with overloaded keypads, such as mobile phones, remote controls, or PDAs, a POSA would have been motivated to adapt Smith's techniques to search more efficiently using input from these devices. Ex. 1114, ¶¶ 124-126; Ex. 1112, ¶¶ [0025], [0037]; Ex. 1113 at 1:36-65, 5:33-62.

Second, a person of ordinary skill in the art would have regarded the combination of Zigmond and Smith as "the mere application of a known technique" (*i.e.*, Smith's technique of creating and using a numeric index for looking up indexed items using an overloaded keypad) "to a piece of prior art ready for the improvement" (Zigmond's search system that receives input from a type of device that has an overloaded keypad). *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007); Ex. 1114, ¶ 126; Ex. 1112 at Figs. 2, 3, ¶¶ [0025], [0037], [0039]-[0048]; Ex. 1113 at 1:36-65, 5:33-62. Using Smith, Zigmond's

alphanumeric indexes would be converted to or replaced with numeric indexes, which would be used when searching based on the unresolved keystrokes from overloaded keypads. Ex. 1114, ¶¶ 125-128; Ex. 1113 at 1:36-65, 5:33-42.

Third, using a numeric index (as taught by Smith) when receiving input from devices with overloaded keypads instead of Zigmond's alphanumeric index would have been nothing more than a combination of prior art elements (*i.e.*, Smith's numeric indexing method with Zigmond's search system) according to known methods (*i.e.*, converting Zigmond's alphanumeric indexes to be numeric indexes as described by Smith), or a simple substitution of one known element for another (*i.e.*, a numeric index for an alphanumeric index). *See KSR*, 550 U.S. at 416; Ex. 1114, ¶ 126. For example, as taught by Smith, the numeric indexes would be used when receiving queries from mobile phones or other devices with overloaded keypads, thus enabling a search using fewer unresolved keystrokes. *Id.*, ¶¶ 125, 127; Ex. 1113 at 4:41-58, 5:1-42. This combination would yield predictable results because both Zigmond and Smith teach search systems using indexes, so modifying Zigmond's index to be alphanumeric would have predictably yielded a system that incrementally searches uses numeric indexes when receiving input from devices with overloaded keypads. Ex. 1114, ¶¶ 126-128; Ex. 1113 at 5:1-42; Ex. 1112, ¶¶ [0039]-[0048], Figs. 2, 3.

A POSA combining Zigmond and Smith would have had an expectation of

success because of the predictability of the art, because Smith teaches how to modify alphanumeric indexes like Zigmond's to be numeric indexes, and because the systems of Zigmond and Smith are both directed to searching based on inputs from overloaded keypads, so the modification would have been straightforward for a POSA. Ex. 1114, ¶ 128; Ex. 1112, ¶¶ [0025], [0037]; Ex. 1113 at 1:27-30, 5:1-32, 6:6-22.

For each of these reasons, a POSA would have been motivated to, and able to, combine Zigmond and Smith.

2. Motivation to Combine Zigmond and Smith with Payne

Zigmond and Smith in combination provide a search system for incrementally searching using overloaded keystrokes. *See* Section VII.A.1, *supra*; Ex. 1114, ¶ 129. Payne teaches highlighting characters of displayed items in an incremental search system using overloaded keystrokes. Ex. 1109 at Figs. 1, 3A, 3B, 3D, 3E, 3G, 1:28-61, 2:38-65, 6:50-8:57.

A POSA would have been motivated to combine Payne with Zigmond and Smith, incorporating Payne's highlighting into the system of Zigmond and Smith, for several reasons. First, Payne's highlighting beneficially indicates how many characters have been entered and which characters correspond to the entered overloaded characters. Ex. 1109 at 7:13-15, 13:22-25; Ex. 1114, ¶ 130. A user can then better understand why the search results match the input query, leading to a

reduced number of keystrokes. *Id*. at 2:47-51, 7:36-45; Ex. 1114, ¶ 130. A POSA would have been motivated to implement these benefits in the system of Zigmond in view of Smith, which also displays search results that match an overloaded search query for exactly the reasons set forth in Payne. Ex. 1114, ¶ 130; Ex. 1109 at 7:35-38, 7:55-58; section VII.A.1, *supra*.

Second, using Payne's highlighting with the system of Zigmond/Smith would have been nothing more than a combination of prior art elements (Payne's highlighting with the search system of Zigmond/Smith) according to known methods (updating the software of Zigmond/Smith to incrementally highlight characters that match an overloaded query) to yield the predicted result (pertinent highlighting of results). *See KSR*, 550 U.S. at 416; Ex. 1114, ¶ 131. Because Payne describes incrementally highlighting the characters that correspond to a numeric search query, a POSA would have been able to apply these teachings to the system of Zigmond/Smith, which incrementally displays items having characters that correspond to a numeric search query. *Id.*, ¶¶ 131-133; Ex. 1112 at Fig. 1, ¶¶ [0018]-[0020]; Ex. 1113 at 5:33-42; Ex. 1109, Figs. 3A-3D, 6:67-7:5. Therefore, incorporating Payne's highlighting in the system of Zigmond/Smith would have predictably yielded a system that incrementally highlights the characters that match the overloaded search query. Ex. 1114, ¶¶ 131-133.

Third, a POSA would have regarded the combination of Zigmond and Smith

with Payne as "the mere application of a known technique" (*i.e.*, Payne's highlighting technique) "to a piece of prior art ready for the improvement." *See KSR*, 550 U.S. at 416; Ex. 1114, ¶ 132. The system of Zigmond/Smith was ready for the improvement taught by Payne because it displays items that match an overloaded search query. *See* Section VI.C, *supra*; Ex. 1114, ¶¶ 130-132; Ex. 1113 at 5:33-42. Payne's highlighting technique beneficially indicates how the items match the overloaded search query, thus improving the understanding of the search for the user. *See* Section VI.C, *supra*; Ex. 1114, ¶ 130. Accordingly, the system of Zigmond/Smith was ready for the improvement disclosed by Payne, and a POSA would have applied Payne's technique to the system of Zigmond/Smith accordingly. Ex. 1114, ¶ 130.

A POSA would have had an expectation of success because of the predictability of the art, because highlighting characters associated with search results was a well-known technique in searching, and because the systems of Zigmond/Smith and Payne are both directed to incrementally searching based on inputs from overloaded keypads. Ex. 1114, ¶ 133; Ex. 1112, Figs. 2, 3, ¶¶ [0018]-[0020], [0025], [0037], [0039]-[0048]; Ex. 1113, 1:36-65, 5:33-62; Ex. 1109, Figs. 1, 3A, 3B, 3D, 3E, 3G, 1:28-61, 2:38-65, 6:50-8:57.

3. Independent Claim 1

Each limitation of claim 1 (and claim 1 as a whole) is obvious over Zigmond in view of Smith and Payne, as described in detail below.

i. 1[Pre]

> *A method of processing unresolved keystroke entries by a user from a keypad with overloaded keys in which a given key is in fixed association with a number and at least one alphabetic character, the unresolved keystroke entries being directed at identifying an item from a set of items, each of the items being associated with information describing the item comprising one or more words, the method comprising:*

To the extent the preamble is limiting, Zigmond combined with Smith teaches all of the limitations of the preamble. Ex. 1114, ¶¶ 134-144.

Zigmond's search system includes a client that is "capable of accepting user input" from various input devices, including "from a remote, a keypad," and other input devices. Ex. 1112, ¶ [0025]. The client device may be a set-top box, a PDA, a mobile phone, or the like. *Id*., ¶ [0037].

Zigmond's inputs are "directed at identifying an item from a set of items, each of the items being associated with information describing the item comprising one or more words" as recited in the claim. Ex. 1114, ¶ 140. Using such inputs, Zigmond's search system searches for television programs (*i.e*., "item from a set of items"). Ex. 1112, ¶¶ [0005]-[0007], [0035]-[0037], [0081]. A user may search

for programs by entering title information associated with the program (*i.e.*, "information describing the item comprising one or more words"). *Id.*, ¶¶ [0003]-[0004], [0017], [0035]-[0037], [0081]. A user may also search for other information associated with the program, such as "subject matter, story synopsis, creative contributors (*e.g.*, director, produce, screenwriter, actors, actresses, etc.), and so forth" as well as "[c]losed captioning text of programs." *Id.*, ¶ [0081].

Because Zigmond describes searching using input "from a remote" or "keypad" as well as a "mobile phone" or "PDA," a POSA would understand that Zigmond's keystroke entries could be "unresolved keystroke entries by a user from a keypad with overloaded keys in which a given key is in fixed association with a number and at least one alphabetic character," as recited in claim 1. Ex. 1114, ¶¶ 153-154. As the '394 Patent admits, it was known to receive unresolved keystroke entries from input devices including the remote controls, mobile phones, and PDAs contemplated by Zigmond. Ex. 1114, ¶ 138; Ex. 1121 at 1:33-50. The '394 Patent recognizes that such an overloaded keypad was "a common twelve-key keypad interface found in many cell phones and other mobile devices, and also increasingly in devices like television remote control devices." *Id.* Therefore, a POSA would conclude that Zigmond's input interfaces would provide the claimed "unresolved keystroke entries." Ex. 1114, ¶¶ 134-138.

To any extent Zigmond fails to explicitly teach the claimed "unresolved keystroke entries," Smith teaches this feature. Ex. 1114, ¶¶ 141-144. That is, Smith explicitly teaches searching based on keystrokes received from a device with an overloaded keypad. Ex. 1113 at Fig. 5B, 2:6-21, 2:56-64, 5:2-9. Particularly, Smith teaches improved techniques for searching based on ambiguous (*i.e.*, unresolved) keystroke entries from these overloaded keypads. *Id*. at 2:6-21, 5:1-62; Ex. 1114, ¶¶ 142-143. Smith's techniques are more efficient than conventional approaches. *See* Ex. 1113 at 1:62-2:3, 4:59-5:62; Ex. 1114, ¶ 142. Smith also teaches that the unresolved keystroke entries are "directed at identifying an item from a set of items" as claimed, and that "each of the items [are] associated with information describing the item comprising one or more words." For example, items stored in the index and retrievable as search results may be associated with words such as "car," "bar," or "wine." Ex. 1113 at 4:18-40, 5:43-62.

A POSA would have been motivated to modify Zigmond's search system to use Smith's numeric index to search using fewer keystrokes when receiving overloaded input, and because the combination was nothing more than the application of a known technique to a piece of prior art ready for the improvement, or a combination of prior art elements according to known methods to yield predictable results. Ex. 1114, ¶¶ 124-128, 143; Ex. 1113 at 1:36-65, 5:20-62; Section VII.A.1, *supra*. This combination would predictably yield a system that

incrementally searches (as taught by Zigmond) using numeric indexes when receiving overloaded input (as taught by Smith). Ex. 1114, ¶¶ 126-128; Ex. 1112 ¶¶ [0018]-[0020]; Ex. 1113 at 1:36-65, 5:1-62. Furthermore, a POSA combining Zigmond and Smith would have had an expectation of success because of the predictability of the art, because indexing was a well-known technique in searching, and because the systems of Zigmond and Smith are both directed to searching based on overloaded inputs. Ex. 1114, ¶ 128, 143; Ex. 1112, ¶¶ [0025], [0037]; Ex. 1113 at 1:27-30, 5:1-32, 6:6-22.

ii. 1[a]

providing access to an index of the items, the index having an association between subsets of the items and corresponding strings of one or more unresolved keystrokes for overloaded keys so that the subsets of items are directly mapped to the corresponding strings of unresolved keystrokes for various search query prefix substrings

Zigmond combined with Smith teaches this feature. Ex. 1114, ¶¶ 145-163.

Zigmond teaches providing multiple indexes that directly map bins (*i.e.*, "subsets of items") with "various search query prefix substrings." Ex. 1114, ¶¶ 147-151; Ex. 1112 at Figs. 2, 3, ¶¶ [0066], [0038]-[0048]. For example, Zigmond teaches an index 202(1) that contains 26 bins directly mapped to corresponding one-character prefix substrings. Ex. 1112 at Fig. 2, ¶¶ [0046]-[0048]. Each bin contains several records (*i.e.*, items) comprising information associated with the

item, such as a title and a URI. Ex. 1114, ¶¶ 149-151; Ex. 1112, ¶¶ [0044], [0048], [0066], [0081]. Zigmond teaches prefetching the subsets before a user enters a corresponding prefix search query such that when a user enters a prefix search query, the corresponding subset may be displayed. Ex. 1112, ¶¶ [0017]-[0020], [0049]-[0068]; Ex. 1114, ¶¶ 150-153.

Although Zigmond teaches inputs that may be from "from a remote" or "keypad," or from a "mobile phone" or "PDA," Zigmond does not explicitly teach that the indexes may contain "strings of one or more unresolved keystrokes for overloaded keys" and "the subsets of items are directly mapped to the corresponding strings of unresolved keystrokes." Ex. 1112 at ¶¶ [0025], [0037]. Instead, Zigmond's indexes 202 directly map subsets of items to alphanumeric keystrokes. *Id*. at Figs. 2-3, ¶ [0041].

Smith teaches a method of searching using a numeric index that directly maps subsets of items to ambiguated, unresolved numeric keystrokes. Ex. 1113 at Abstract, Fig. 5C, 5:1-32. In one embodiment, Smith takes a first alphanumeric index, translates the alphanumeric strings into numeric strings of unresolved keystrokes, and generates a second index mapping the items to the numeric strings of unresolved keystrokes. *Id.*, 4:59-5:32; Ex. 1114, ¶ 154. This numeric index enables an efficient method of searching that compares queries containing unresolved keystrokes to the mapped strings of unresolved keystrokes. Ex. 1113 at

5:33-42; Ex. 1114, ¶ 154. The combined Zigmond/Smith system thus teaches the entirety of limitation 1[a].

A POSA would have been motivated to modify Zigmond's search system to use Smith's numeric index to search using fewer keystrokes when receiving overloaded input, and because the combination was nothing more than the application of a known technique to a piece of prior art ready for the improvement, or a combination of prior art elements according to known methods to yield predictable results. Ex. 1114, ¶¶ 124-128, 155-156; Ex. 1113 at 1:36-65, 5:20-62; Section VII.A.1, *supra*. This combination would predictably yield a system that incrementally searches (as taught by Zigmond) using numeric indexes when receiving overloaded input (as taught by Smith). Ex. 1114, ¶¶ 126-128; Ex. 1112 ¶¶ [0018]-[0020]; Ex. 1113 at 1:36-65, 5:1-62. Furthermore, a POSA combining Zigmond and Smith would have had an expectation of success because of the predictability of the art, because indexing was a well-known technique in searching, and because the systems of Zigmond and Smith are both directed to searching based on overloaded inputs. Ex. 1114, ¶ 128, 155; Ex. 1112, ¶¶ [0025], [0037]; Ex. 1113 at 1:27-30, 5:1-32, 6:6-22.

Such a combination would have predictably yielded numeric versions of Zigmond's alphanumeric indexes, as illustrated by Dr. Fox's annotated Figure 3. *See* Ex. 1114, ¶ 157 (reproduced below). As shown in the annotated figure, the

alphanumeric characters (e.g., "TE") would be converted to equivalent unresolved numeric characters (e.g., "83") using the method disclosed by Smith. Ex. 1114, ¶¶ 158-160. A POSA would have used each of Zigmond's indexes to generate a corresponding numeric index in order to enable an efficient search based on unresolved keystroke entries. *Id*.

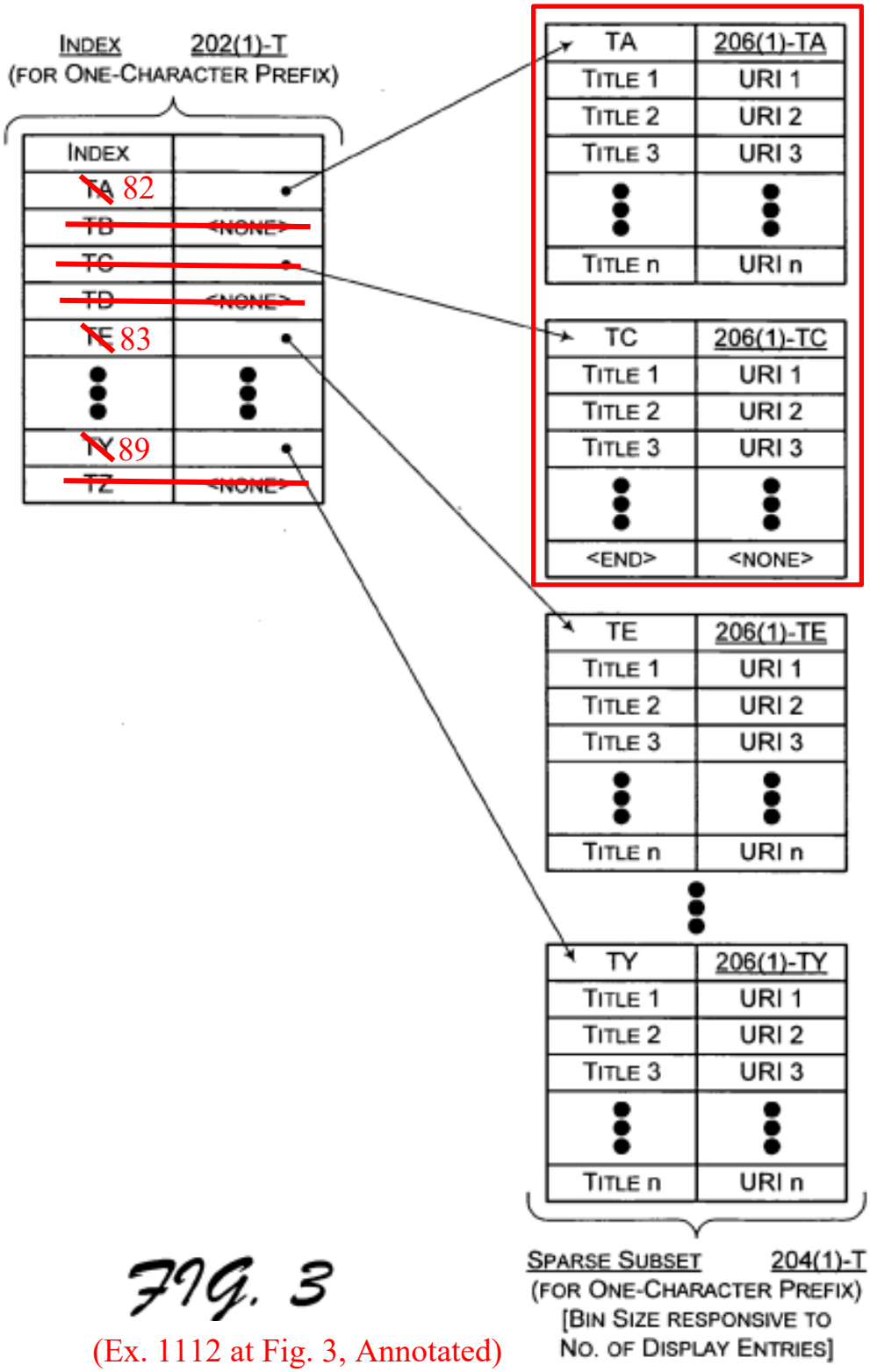


FIG. 3

(Ex. 1112 at Fig. 3, Annotated)

Ex. 1114, ¶ 157.

By generating the numeric indexes, Zigmond in view of Smith teaches "providing access to an index of the items, the index having an association between subsets of the items " (*e.g.*, a subset of items associated with the letters "TA," "TB," or "TC") "and corresponding strings of one or more unresolved keystrokes for overloaded keys" (*e.g.*, "82") "so that the subsets of items are directly mapped to the corresponding strings of unresolved keystrokes for various search query prefix substrings" (*e.g.*, items associated with the characters "TA," "TB," and "TC" are directly mapped to the corresponding number "82," which is the unresolved keystrokes of a search query prefix substring) as illustrated above. Ex. 1114, ¶¶ 158-160.

Furthermore, the index of Zigmond and Smith meets the proposed construction of "directly mapped" because "each alphanumeric character of a search query prefix substring associated with an item" (*e.g.*, the characters "TA," "TB," or "TC" which are associated with items in a subset) "is matched with its corresponding numeric key equivalent on an overloaded keypad" (*e.g.*, the index maps "82" to the items associated with "TA," "TB," or "TC"). Ex. 1114, ¶ 161. Similarly, the index meets the ITC's broader adopted construction because the search query prefix substrings are "prefix substring[s]." *Id.*, ¶ 162. And the index meets Patent Owner's proposed construction from the ITC investigation because the prefix substrings are "for at least one word in the information associated with

an item" (the characters such as "TA" are characters of a title of the item). *Id*.; Ex. 1112, ¶¶ [0034], [0039]-[0048].

iii. 1[b]

> *for at least one subset of items, determining which letters and numbers present in the information associated with and describing the indexed items of the subset caused the items to be associated with the strings of one or more unresolved keystrokes that directly mapped to the subset;*

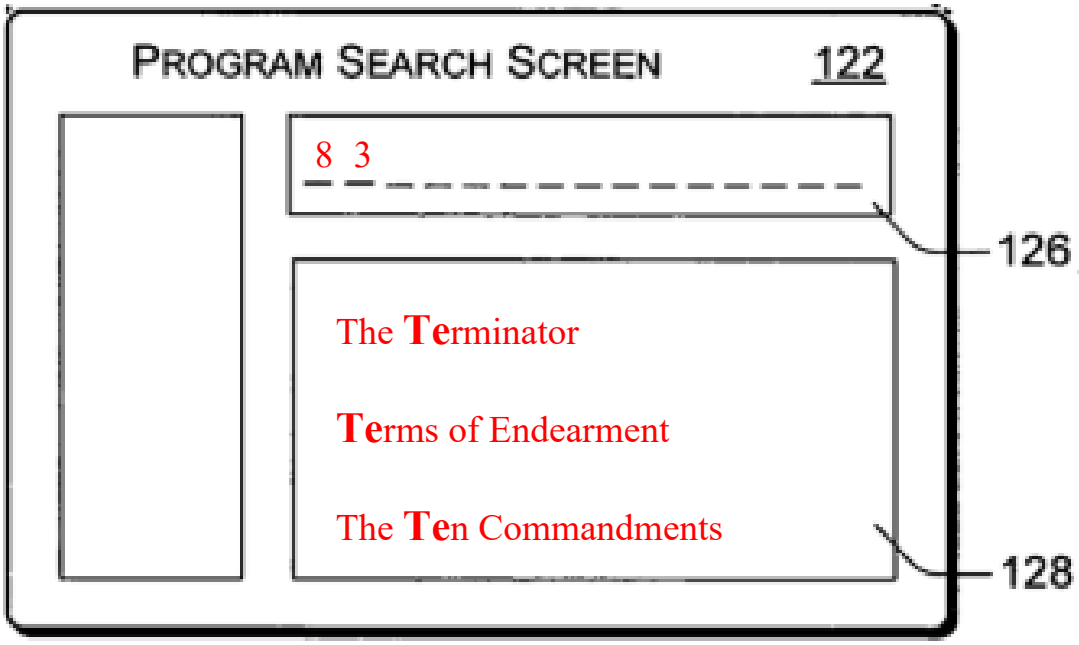
This feature is met by Payne's highlighting feature as combined with Zigmond and Smith. Ex. 1114, ¶¶ 175-186. Additionally, Patent Owner's interpretation of this step is met by the generation of the numeric indexes described at limitation 1[a]. Ex. 1114, ¶¶ 164-174.

Payne teaches highlighting characters corresponding to unresolved keystroke entries during an incremental search. Ex. 1114, ¶¶ 116-118; Ex. 1109 at 7:13-15, 7:55-58, 13:22-25, Figs. 3B, 3D, 3E, 3G. For example, if a user enters unresolved keystrokes corresponding to "22" on an overloaded keypad, the system may display search results with matching characters such as "AB," "BA," and "CA" highlighted. *See* Ex. 1109, Figs. 3D, 3E, 7:36-57. Payne's system thus highlights each character of the search results that matches the search query. *Id*., at 13:22-25; Ex. 1114, ¶ 117.

Under Patent Owner's interpretation of limitation 1[b], merely determining "the letters and numbers themselves," which are what caused the direct mapping (*i.e.*, determining characters without reference to any direct mapping) (*i.e.*, without reference to any direct mapping) meets limitation 1[b]. Ex. 1115, ¶ 196; Ex. 1114, ¶¶ 166-167. Under this interpretation, this step would be met by Payne's highlighting because Payne highlights the "letters and numbers themselves" that match the search query (*i.e.*, the characters that caused the direct mapping under Patent Owner's interpretation). Ex. 1114, ¶¶ 176-178; Ex. 1109 at 7:35-58, 13:22-25.

Further, even setting aside that Payne teaches the claimed determination of characters under Patent Owner's interpretation, a POSA would have found it obvious to perform this step in accordance with Zigmond's feature that allows a search query to match any word of a title. Ex. 1114, ¶¶ 179-185. Zigmond teaches that a user search query may match characters from the first or subsequent words of the title. Ex. 1112, ¶ [0081]. A POSA having ordinary creativity would recognize that applying Payne's highlighting technique to the system of Zigmond and Smith would require a determination of which characters to highlight based on whether the search query matches characters of the first word, the second word, or some other subsequent word. Ex. 1114, ¶¶ 179-185. Dr. Fox illustrates an

example of how a POSA would combine Payne's highlighting feature with Zigmond and Smith:



Ex. 1112 at Fig. 1 (as modified by Smith and Payne) FIG. 1

Ex. 1114, ¶ 182.

As Zigmond's modified Figure 1 shows, a POSA would recognize that Zigmond's teaching of matching on first as well as subsequent words of a title would lead a POSA to highlight the matching characters of whichever word matches the query. Ex. 1114, ¶¶ 179-180, 184-185; Ex. 1112, ¶ [0081]. A POSA would combine the references in this way so that "each of [the] highlighted

characters represent[s] one of the symbols that has been entered," as taught by Payne. Ex. 1109 at 13:22-25; Ex. 1114, ¶¶ 180-181. A POSA would recognize that highlighting any other characters (instead of the matching characters) would undesirably confuse the user, which would lead away from Payne's stated goal of providing visual feedback "so that the effectiveness of the retrieval or search process can be easily understood." Ex. 1109 at 10:47-48; Ex. 1114, ¶ 180.

Accordingly, before highlighting the characters, the system of Zigmond, Smith, and Payne would determine which characters caused the search result to match the unresolved keystrokes. Ex. 1114, ¶ 180. A POSA would have needed only ordinary creativity to implement highlighting while preserving Zigmond's ability to search on any word of the title. Ex. 1114, ¶¶ 184-185; *see also KSR*, 550 U.S. at 402 ("a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle").

Additionally, although limitation 1[b] appears in the claim before limitation 1[c], which recites receiving a search query, the claims do not explicitly require performance of limitation 1[b] before performance of limitation 1[c]. Ex. 1114, ¶¶ 99-107.

A POSA would have found it obvious to determine which characters match the unresolved keystrokes using the direct mapping in the index. Ex. 1114, ¶ 184. The direct mapping indicates matches between alphanumeric characters and their

corresponding numeric key equivalents. *See* Section IV.B.1.i, *supra*; Ex. 1114, ¶ 184. Using the direct mapping would have been an obvious and convenient way to determine which characters to highlight based on the numeric search query. Ex. 1114, ¶ 184.

The system of Zigmond, Smith, and Payne, as combined above, would therefore determine alphanumeric characters of information associated with an item (*e.g.*, determining the characters "TE" to highlight) that "match a string of unresolved keystrokes directly mapped to the subset" (*i.e.*, the characters "TE" match the input string "83" in the index), thus meeting Petitioner's construction of the "caused" limitation. Ex. 1114, ¶ 184.

The system of the combination would also, "for at least one subset of items" (*e.g.*, for the subset of items directly mapped to numeric input "83"), "determin[e] which letters and numbers present in the information associated with and describing the indexed items of said subset" (*e.g.*, determine the characters "TE" of a particular word of a title to highlight) "caused said items to be associated with the strings of one or more unresolved keystrokes that are directly mapped to said subset" (*e.g.*, the characters "TE" caused the direct mapping with the numeric input "83" in the index). Ex. 1114, ¶¶ 184-185.

It would have been obvious to modify the system of Zigmond/Smith to include Payne's incremental highlighting to provide visual feedback indicating

how the characters of search results match the overloaded input, and because the combination was nothing more than the application of a known technique to a piece of prior art ready for the improvement, or a combination of prior art elements according to known methods to yield predictable results. Ex. 1114, ¶¶ 129-133; Ex. 1109 at 7:13-15, 7:55-58, 13:22-25; Section VII.A.2, *supra*. The combination would predictably yield an incremental search system with incremental highlighting of characters that match overloaded input. Ex. 1114, ¶¶ 129-132; Ex. 1112, ¶¶ [0018]-[0020]; Ex. 1109 at 7:13-15, 7:55-58, 13:22-25. A POSA combining Payne with the system of Zigmond and Smith would have had an expectation of success because of the predictability of the art, because highlighting characters associated with search results was a well-known technique in searching, and because the systems of Zigmond/Smith and Payne are both directed to incrementally searching based on inputs from overloaded keypads. Ex. 1114, ¶ 133; Ex. 1112, ¶¶ [0018]-[0020], [0025], [0037], [0039]-[0048]; Ex. 1113 at 1:36-65, 5:33-62; Ex. 1109, Figs. 1, 3B, 3D, 3E, 3G, 1:28-61, 2:38-65, 6:50-8:57.

Additionally, Patent Owner's expert, in a related ITC proceeding using the narrower *Phillips* standard, argued that this step is performed when the claimed index is generated. Specifically, Patent Owner's expert stated that:

> the fact that [an item] is grouped with the subset of items associated with the string of unresolved overloaded keystrokes . . . **is the determination** that such letters caused [the item] to be associated

with the string of unresolved overloaded keys . . . and **that determination is always present in the index**.

Ex. 1116, ¶ 241, (emphasis added).

Under Patent Owner's interpretation, the generation of the claimed index in limitation 1[a] meets the "determining" step. Ex. 1114, ¶¶ 166-169; *see also* Ex. 1115, ¶¶ 187, 196.

Under Patent Owner's interpretation, limitation 1[b] is met by the numeric indexes of Zigmond combined with Smith because items of the index (*e.g.*, items with the letters "TE" in the title) are grouped with items associated with strings of unresolved keystrokes (*e.g.*, the items in the bin corresponding to "83"). Ex. 1114, ¶¶ 170-174. According to Patent Owner's interpretation, this grouping "is the determination" that the letters "TE" caused the corresponding items to be associated with the string "83," and "that determination is always present in the index". Ex. 1114, ¶¶ 173-174; Ex. 1116, ¶ 241. Therefore, under Patent Owner's interpretation of the claim, generating the numeric index (*i.e.*, by combining Smith and Zigmond as described for limitation 1[a]) meets this step of the claim. *See* Sections VII.A.1, VII.A.3.ii, *supra*.

iv.1[c]

receiving from a user a search query for desired items composed of unresolved keystrokes, the search query

comprising a prefix substring for at least one word in information associated with the desired item;

The combination of Zigmond and Smith teaches this feature. Ex. 1114, ¶¶ 187-192.

Zigmond teaches "receiving from a user a search query for desired items." Ex. 1114, ¶ 188. Zigmond teaches receiving a search request and subsequently displaying subsets of programs prefetched from a server. Ex. 1112, ¶¶ [0031], [0034]-[0036]. The search requests are received incrementally at the client and forwarded to the server, which obtains subsets of programs using indexes 202. *Id*., ¶¶ [0053]-[0056].

Zigmond further teaches the "search query comprising a prefix substring for at least one word in information associated with the desired item." Ex. 1114, ¶ 189. For example, Zigmond teaches receiving an alphanumeric search query such as "TE," which may be a prefix substring of the titles (or other information) of several items for which the user is searching. Ex. 1112 at Fig. 1, ¶¶ [0039], [0056], [0062], [0081], [0082].

Smith further teaches a search query "composed of unresolved keystrokes." Ex. 1113 at 5:33-42. A POSA would have been motivated to modify Zigmond's search system to use Smith's numeric index to search using fewer keystrokes when receiving overloaded input, and because the combination was nothing more than the application of a known technique to a piece of prior art ready for the

improvement, or a combination of prior art elements according to known methods to yield predictable results. Ex. 1114, ¶¶ 124-128, 190; Ex. 1113 at 1:36-65, 5:20-62; Section VII.A.1, *supra*. This combination would predictably yield a system that incrementally searches (as taught by Zigmond) using numeric indexes when receiving overloaded input (as taught by Smith). Ex. 1114, ¶¶ 126-128; Ex. 1112, ¶¶ [0018]-[0020]; Ex. 1113 at 1:36-65, 5:1-62. Furthermore, a POSA combining Zigmond and Smith would have had an expectation of success because of the predictability of the art, because indexing was a well-known technique in searching, and because the systems of Zigmond and Smith are both directed to searching based on overloaded inputs. Ex. 1114, ¶ 128, 190; Ex. 1112, ¶¶ [0025], [0037]; Ex. 1113 at 1:27-30, 5:1-32, 6:6-22.

In the system of the combination, the prefix substring would therefore be a query including numeric unresolved keystrokes. *See* Ex. 1113 at Fig. 5A, 5:33-42; Ex. 1114, ¶¶ 191-192; Section VII.A.3.ii, *supra*.

v. 1[d]

in response to each unresolved keystroke, identifying and displaying the subsets of items, and information associated therewith, that are associated with the strings of one or more unresolved keystrokes received from the user based on the direct mapping of strings of unresolved keystrokes to subsets of items

Zigmond and Smith in combination teach this feature. Ex. 1114, ¶¶ 193-199.

Zigmond teaches an incremental search that identifies and displays subsets of items "in response to each . . . keystroke," as recited in the claim. Ex. 1112, ¶ [0027]. Furthermore, Zigmond teaches identifying and displaying the items and "information associated" with each item, such as titles or other information associated with each item. Ex. 1112, ¶ [0081]; Ex. 1114, ¶ 197. A POSA would understand from Zigmond's figures and disclosure that, when searching for title information, the system of the combination would identify and display the title information, which is "information associated therewith," and allows for selection of the item itself. Ex. 1112 at Fig. 4, ¶ [0064]-[0066]; Ex. 1114, ¶ 198.

Smith teaches displaying search results in response to unresolved keystrokes. Ex. 1113 at 5:33-42. A POSA would have been motivated to modify Zigmond's search system to use Smith's numeric index to search using fewer keystrokes when receiving overloaded input, and because the combination was nothing more than the application of a known technique to a piece of prior art ready for the improvement, or a combination of prior art elements according to known methods to yield predictable results. Ex. 1114, ¶¶ 124-128, 194; Ex. 1113 at 1:36-65, 5:20-62; Section VII.A.1, *supra*. This combination would predictably yield a system that incrementally searches (as taught by Zigmond) using numeric

indexes when receiving overloaded input (as taught by Smith). Ex. 1114, ¶¶ 126-128; Ex. 1112 ¶¶ [0018]-[0020]; Ex. 1113 at 1:36-65, 5:1-62. Furthermore, a POSA combining Zigmond and Smith would have had an expectation of success because of the predictability of the art, because indexing was a well-known technique in searching, and because the systems of Zigmond and Smith are both directed to searching based on overloaded inputs. Ex. 1114, ¶¶ 128, 194; Ex. 1112, ¶¶ [0025], [0037]; Ex. 1113 at 1:27-30, 5:1-32, 6:6-22.

The system of the combination would therefore identify and display subsets of items and associated information "in response to each unresolved keystroke." Ex. 1114, ¶ 196; Section IX.A.1.1[a], *supra*. As a result, the combination of Zigmond and Smith teaches an incremental search using unresolved keystrokes. Ex. 1114, ¶¶ 195-196.

Zigmond, as combined with Smith, further teaches that the search is "based on the direct mapping of strings of unresolved keystrokes to subsets of items." Ex. 1114, ¶¶ 198-199. The search process uses the indexes, which provide the "direct mapping of strings of unresolved keystrokes to subsets of items." Ex. 1114, ¶ 199; Section VII.A.3.iv, *supra*; Ex. 1112, ¶¶ [0035]-[0048], [0051]-[0053], [0059], [0060], [0066].

vi. 1[e]

in response to each unresolved keystroke, as the identified items are displayed, highlighting the letters and numbers present in the one or more words in the information describing the identified items that were determined to have caused the displayed items to be associated with the strings of unresolved keystrokes that are directly mapped to the items so as to illustrate to the user how the unresolved keystrokes entered match the information associated with the displayed items.

The combination of Zigmond, Smith, and Payne teaches this feature. Ex. 1114, ¶¶ 200-206.

Payne teaches an incremental search where characters are highlighted "in response to each unresolved keystroke," as recited in the claim. Ex. 1109 at 2:52-65, 6:45-7:65; *see also* Ex. 1114, ¶¶ 201-202. For example, when a user inputs a first unresolved keystroke (e.g., "2"), the characters that were mapped to the unresolved keystroke are highlighted. Ex. 1109 at Fig. 3B, 7:1-15. Continuing the example, when a user then inputs a second unresolved keystroke, the characters that were mapped to the first and second unresolved keystrokes are highlighted. Ex. 1109 at Fig. 3D, 7:47-57.

It would have been obvious to modify the system of Zigmond/Smith to include Payne's incremental highlighting to provide visual feedback indicating which characters of search results caused those results to be associated with the

overloaded input, and because the combination was nothing more than the application of a known technique to a piece of prior art ready for the improvement, or a combination of prior art elements according to known methods to yield predictable results. Ex. 1114, ¶¶ 129-133, 204; Ex. 1109, 7:13-15, 7:55-58, 13:22-25; Section VII.A.2, *supra*. The combination would predictably yield an incremental search system with incremental highlighting of characters that matched overloaded input. Ex. 1114, ¶¶ 129-132, 205 (example display of Zigmond/Smith/Payne system); Ex. 1112, ¶¶ [0018]-[0020]; Ex. 1109 at 7:13-15, 7:55-58, 13:22-25. A POSA combining Payne with the system of Zigmond and Smith would have had an expectation of success because of the predictability of the art, because highlighting characters associated with search results was a well-known technique in searching, and because the systems of Zigmond/Smith and Payne are both directed to incrementally searching based on inputs from overloaded keypads. Ex. 1114, ¶¶ 133, 204; Ex. 1112, ¶¶ [0018]-[0020], [0025], [0037], [0039]-[0048]; Ex. 1113 at 1:36-65, 5:33-62; Ex. 1109 at Figs. 1, 3A-3D, 1:28-61, 2:38-65, 6:45-8:57. Therefore, it would have been obvious and predictable to a POSA that combining Payne with Zigmond and Smith would yield an incremental search that highlighted characters "in response to each unresolved keystroke." Ex. 1114, ¶ 201.

Although Payne's illustrations only show highlighting of letters, Payne discloses that indexes may contain "alphanumeric characters." Ex. 1109 at 3:60-4:20. Zigmond also teaches that search characters may include "alphanumeric characters" as well as other character sets. Ex. 1112, ¶ [0041]. Therefore, a POSA would understand that Payne's highlighting would be applied to "letters and numbers" in the combination as claimed. Ex. 1114, ¶ 202.

Furthermore, a POSA would combine Payne with Zigmond/Smith by highlighting the characters that were determined for limitation 1[b], as described above. *See* Section VII.A.3.iii, *supra*; Ex. 1114, ¶ 206. This would be a predictable and convenient way of determining which characters to highlight, and would beneficially avoid re-determining the same characters. Ex. 1114, ¶ 206.

Furthermore, as described above, the combination would highlight the characters that caused a search result to be associated with the keystrokes input by the user, so the characters would be highlighted "so as to illustrate to the user how the unresolved keystrokes entered match the information associated with the displayed items." Ex. 1109, 7:13-22, 7:55-58, 13:22-25; Ex. 1114, ¶ 203.

4. Dependent Claim 2

The method of claim 1, wherein highlighting the letters and numbers comprises highlighting by coloring, bolding, italicizing, underlining, or changing to a different font, or some combination thereof

Zigmond, Smith, and Payne in combination teach and render obvious the method of claim 1. Ex. 1114, ¶¶ 134-206. Payne teaches the additional limitation of claim 2. Ex. 1114, ¶¶ 207-209. Payne further illustrates the highlighting feature by bolding the characters that are highlighted. Ex. 1114, ¶ 207; Ex. 1109 at 7:13-16, 7:55-58, Figs. 3B, 3D, 3E, 3G.

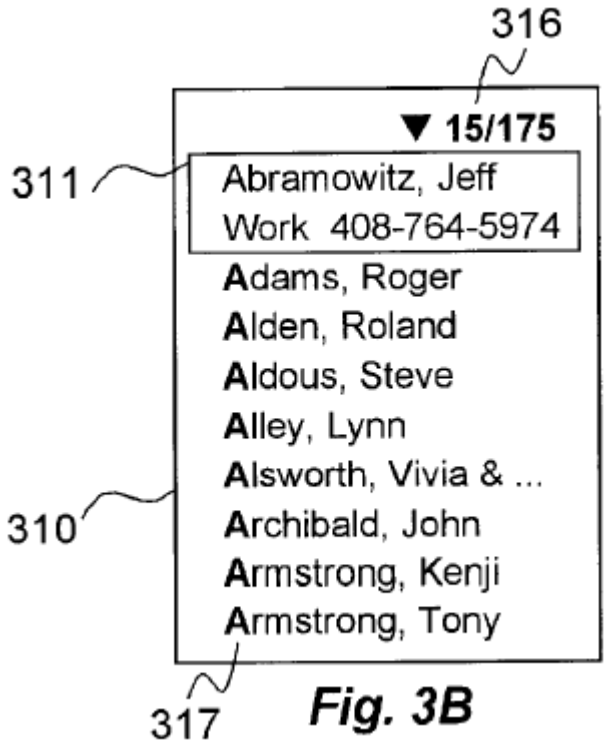


Fig. 3B

Ex. 1109 at Fig. 3B

As also noted by Dr. Fox, bolding is just one obvious method of highlighting characters, and the other claimed highlighting methods (coloring, italicizing, underlining, or changing font) would have been considered obvious variants of Payne's bold highlighting. Ex. 1114, ¶ 209.

It would have been obvious to combine Payne's highlighting feature with the system of Zigmond and Smith as described above. *See* Section VII.A.2, *supra*.

5. Dependent Claim 4

The method of claim 1, wherein the search query is processed by a server system remote from said user

Zigmond, Smith, and Payne in combination teach the method of claim 1. Ex. 1114, ¶¶ 134-206. Zigmond further teaches the limitation of claim 4. Ex. 1114, ¶¶ 210-211.

Zigmond teaches that a server receives prefix information and searches for results using the prefix information and the index. Ex. 1112, ¶¶ [0073]-[0079]. A POSA would consider the prefix information to be a search query that is processed while searching the index. Ex. 1114, ¶ 210.

Zigmond's server is remote from the client device. Ex. 1112, ¶¶ [0033], [0037]. Therefore, Zigmond's server is remote from the user as claimed. Ex. 1114, ¶ 211.

6. Dependent Claim 5

The method of claim 1, wherein the search query is processed by a device operated by said user

Zigmond, Smith, and Payne in combination teach the method of claim 1. Ex. 1114, ¶¶ 134-206. Zigmond further teaches the limitation of claim 5. Ex. 1114, ¶¶ 212-216.

Zigmond teaches that before the search query is sent to a server, it is processed at the user location by a client device 102 and/or an input device that may be in communication with the client device. *Id*. In particular, Zigmond's client device 102 receives the search query and uses it to find prefetched items (already stored at the client device) for display. Ex. 1112, ¶¶ [0023]-[0027], [0035]. A POSA would consider this receiving and searching using the search query to be "processing" as claimed. Ex. 1114, ¶ 213.

Zigmond's input device (*e.g*., a remote, keypad, or other device) may also receive the search query when a user enters the search query via the input device. Ex. 1112, ¶ [0025]; Ex. 1114, ¶ 214. The input device then transmits the search query to the client device 102, which transmits it to the server so that further possible results can be prefetched. Ex. 1114, ¶ 214. A POSA would consider the receipt and transmission of user input to be "processing" of the search query, and therefore this step is also met by Zigmond's input device. *See id*.

7. Dependent Claim 6

The method of claim 5, wherein the device is a cell phone

Zigmond, Smith, and Payne in combination teach the method of claim 5. Ex. 1114, ¶¶ 212-216. Zigmond further teaches the limitation of claim 6. Ex. 1114, ¶ 217.

Zigmond's client device 102 may be a mobile phone, which is a "cell phone." Ex. 1114, ¶ 217; Ex. 1112, ¶ [0037].

8. Dependent Claim 8

The method of claim 5, wherein the device is a remote control device for a television

Zigmond, Smith, and Payne in combination teach the method of claim 5. Ex. 1114, ¶¶ 212-216. Zigmond further teaches the limitation of claim 8. Ex. 1114, ¶ 218.

Zigmond teaches that the input device may be "a remote, a keypad, a touch pad/tablet." Ex. 1112, ¶ [0025]. A POSA would consider "a remote," in the context of television-based systems like Zigmond's, to refer to a remote control device for a television. Ex. 1114, ¶ 218; Ex. 1112, ¶ [0023], [0037], [0082].

9. Dependent Claim 9

The method of claim 1, wherein at least some items of the set of items are television content items

Zigmond, Smith, and Payne in combination teach the method of claim 1. Ex. 1114, ¶¶ 134-206. Zigmond's search system is a "television-based system" for finding television programs and other content items. Ex. 1112, ¶¶ [0023], [0037], [0082]. Zigmond's system may also be implemented using an electronic program guide, which is software for finding and selecting television content. Ex. 1112, ¶¶ [0002]-[0005], [0022]-[0023], [0026], [0028], [0037]; Ex. 1114, ¶ 219. Zigmond

therefore teaches that at least some items are television content items. Ex. 1114, ¶ 219.

10. Dependent Claim 10

The method of claim 1, wherein at least some items of the set of items are product items

Zigmond, Smith, and Payne in combination teach the method of claim 1. Ex. 1114, ¶¶ 134-206. Zigmond's search system is a "television-based system" for finding television programs and other content items. Ex. 1112, ¶¶ [0023], [0037], [0082]; Ex. 1114, ¶ 220. Zigmond's system may also be implemented using an electronic program guide, which is software for finding and selecting television content. Ex. 1112, ¶¶ [0002]-[0005], [0022]-[0023], [0026], [0028], [0037]; Ex. 1114, ¶ 220. A POSA would understand that the plain and ordinary meaning of "product items" at least includes television content items, which would be digital "product items" provided by a television service. Ex. 1114, ¶ 220. Zigmond also teaches searching for other digital product items such as game information, "tips and cheats," as well information such as white pages listings. Ex. 1112, ¶ [0082]; Ex. 1114, ¶ 220. Zigmond more generally states that "any elements of any data collection" could be indexed and found using the search system. Ex. 1112, ¶ [0082].

Smith additionally teaches that an index may contain information about product items such as "wine," "champagne," "bar items," and other such information. Ex. 1113 at 4:18-25.

To any extent Zigmond does not already teach product items, a POSA would have found it obvious to index product items as taught by Smith because Zigmond explicitly contemplates indexing any type of data and because a POSA would recognize that indexing product items would be desirable for users that wish to find product items. Ex. 1112, ¶ [0082]; Ex. 1114, ¶¶ 221-222. Therefore, a POSA would have been motivated to include Smith's product items in the index of the combination. A POSA making such a combination would have an expectation of success because Zigmond explicitly contemplates indexing any type of items. Ex. 1114, ¶ 222.

11. Dependent Claim 11

The method of claim 1, wherein identifying and displaying the subsets of items comprises identifying the subsets of items by reference to the index of the items

The combination of Zigmond, Smith, and Payne teaches the method of claim 1. Ex. 1114, ¶¶ 134-206. Zigmond further teaches the limitations of claim 11. Ex. 1114, ¶ 223.

Zigmond further teaches that the subsets of items are identified using the index and subsequently displayed. Ex. 1112, ¶¶ [0057], [0061], [0063], [0068],

[0075]; Section VII.A.3.iv, *supra*; Ex. 1114, ¶ 223. Therefore, the "identifying and displaying" step identifies the items "by reference to the index of the items." Ex. 1114, ¶ 223.

B. GROUND 2: Claim 3 Is Obvious Over Zigmond in view of Smith and Payne and Further in View of Sanders

Claim 3 is unpatentable as obvious over Zigmond in view of Smith and Payne and further in view of Sanders.

1. Dependent Claim 3

> *The method of claim 1, wherein the items of the subsets of items displayed are ordered when displayed such that items having single-word or multi-word term matches between the information associated with and describing those items and the unresolved keystrokes of the search query received from the user are displayed before items having single-word or multi-word abbreviation matches*

Zigmond, Smith, and Payne in combination teach the method of claim 1. Ex. 1114, ¶¶ 134-206. Sanders further teaches the limitation of claim 3. Ex. 1114, ¶¶ 224-239.

Sanders teaches a stemming process that transforms a search query to allow a search system to display more search results—the claimed term and abbreviated matches. Ex. 1110 at 6:42-47; Ex. 1114, ¶¶ 228-229. Sanders describes an example where a search query of "divine" is stemmed to "divin" so that related terms such as "diviner" or "divinity" may be found. Ex. 1110 at 6:47-49. A POSA

would consider hits achieved via stemming to be the claimed "abbreviation matches" because a stem is an abbreviation of the query term containing the stem. Ex. 1114, ¶¶ 225-229. And a POSA would understand that Sanders's match of a query term prior to or without stemming (*e.g.*, a match that contains the word "divine") is a term match. *Id*. Sanders teaches searching using either single-word (*e.g.*, "The") or multi-word queries (*e.g.*, "The West Wing"). Ex. 1110 at Fig. 5, 15:59-16:29. Sanders thus teaches single-word and multi-word term matches as well as single-word and multi-word abbreviation matches. Ex. 1114, ¶¶ 225-230, 232.

Sanders further teaches displaying items that are term matches before items that are abbreviation matches by reducing the relevance ranking of matches found via stemming or other types of query transformation. Ex. 1114, ¶ 229; Ex. 1110 at 6:54-58, 11:59-62. Sanders also teaches displaying term matches temporally before displaying abbreviation matches, which may be found later in time. Ex. 1114, ¶ 229; Ex. 1110 at 12:50-57.

Due to the alternative language in the claim, Sanders teaches claim 3 because Sanders displays items having single-word term matches before items having single-word abbreviation matches, and displaying items having multi-word term matches before items having multi-word abbreviation matches. Ex. 1114, ¶¶ 230-233, 238.

A POSA would have found it obvious to combine Sanders with Zigmond, Smith, and Payne, incorporating Sanders's stemming and ranking technique into the system of Zigmond/Smith/Payne, for several reasons. Ex. 1114, ¶¶ 234-239.

First, Sanders teaches that "[s]temming has the advantage of generating hits that might have been missed if the search term was queried exactly." *Id*. at 6:51-52. Further, Sanders teaches that stemming "has the disadvantage of often generating irrelevant hits," but "[t]his effect can be decreased by using a relevance ranker." Ex. 1110 at 6:51-54. Therefore, a POSA would have been motivated to use Sanders's ranking technique for ranking matches found via stemming and placing those results below other matches in order to achieve these advantages of stemming while also minimizing disadvantages of irrelevant results. Ex. 1114, ¶ 234; Ex. 1110 at 11:57-62.

Second, a POSA also would have considered the combination nothing more than a combination of prior art elements according to known methods, to yield the predictable result of stemming queries in the system of Zigmond/Smith/Payne to find additional results and ranking the additional results below other results. Ex. 1114, ¶ 235; *see KSR*, 550 U.S. at 416. The prior art elements are Sanders's stemming technique and the system of Zigmond/Smith/Payne with the predictable result of a stem of a query being generated before searching the index. Ex. 1114, ¶ 235; Ex. 1110 at 6:42-61, 11:52-62. Such a stemmed query would have been used

to find items that match both the original query as well as items that match the stemmed query but not the original query. Ex. 1114, ¶ 235. The known method is modifying a stemming algorithm, such as the Porter stemming algorithm described by Sanders, to work with numerical queries, which would have required only "ordinary skill" to fit the references together "like pieces of a puzzle." *See KSR*, 550 U.S. at 402; Ex. 1114, ¶ 239; Ex. 1110 at 6:49-57, 11:52-62.

Third, for the same reasons, a POSA would have recognized the combination as "the mere application of a known technique" (*i.e.*, Sanders's stemming and ranking technique) "to a piece of prior art ready for the improvement." Ex. 1114, ¶ 236; *see KSR*, 550 U.S. at 416. The system of Zigmond/Smith/Payne was ready for the improvement because it does not describe finding results based on stems of matches, and therefore would not generate as many search results absent the use of stemming. *See* Ex. 1114, ¶ 236; Ex. 1110 at 6:51-52.

A POSA combining Sanders with Zigmond, Smith, and Payne would have had a reasonable expectation of success because stemming and incremental searching were well-known search techniques, and because each of Zigmond, Payne, and Sanders are directed to incremental search systems, so adapting techniques from one incremental search system to another would have been easy

for a POSA. Ex. 1114, ¶ 237; Ex. 1112, ¶¶ [0018]-[0020]; Ex. 1109 at 2:52-65; Ex. 1110 at Fig. 5, 2:35-38.

C. GROUND 3: Claim 7 Is Obvious Over Zigmond in view of Smith and Payne and Further in View of Weeren

Claim 7 is unpatentable as obvious over Zigmond in view of Smith and Payne and further in view of Weeren.

1. Dependent Claim 7

The method of claim 5, wherein the device is a desk phone

Zigmond, Smith, and Payne in combination teach the method of claim 5. Ex. 1114, ¶¶ 212-216. Weeren further teaches the limitation of claim 7. Ex. 1114, ¶¶ 240-243.

Weeren teaches an information retrieval system that is usable by a wireless phone or a desk phone. Ex. 1125 at 5:3-22. The information retrieval services allow a user to search for information from a database. *Id*. at 3:7-20; Ex. 1114, ¶ 241. Thus, Weeren teaches that a desk phone is an alternative to a wireless phone for accessing a search system. Ex. 1114, ¶ 242.

Because Weeren teaches that desk phones may be used to access such information and services, including "phone directories, locator services, retail services, or other information services," a POSA would have been motivated to access the search system of Zigmond, Smith, and Payne, which also provides such

information services, to be operable with a desk phone as a client. Ex. 1125 at 5:14-18; Ex. 1114, ¶ 242. This modification would beneficially expand the number of devices from which the information and services provided by the search system would be available. Ex. 1114, ¶ 242. Therefore, a POSA would have been motivated to modify the system of Zigmond, Smith, and Payne to work with desk phones for the purpose of achieving these benefits.

Additionally, a POSA also would have found the combination of the search system of Zigmond, Smith, and Payne with Weeren's desk phone to be nothing more than the "mere application of a known technique" (accessing search services via a desk phone) to the system of Zigmond/Smith/Payne, which was "ready for the improvement" because Zigmond's search services were not accessible via desk phones. Ex. 1114, ¶ 242; *KSR*, 550 U.S. at 417; Ex. 1125 at 5:3-22. Combining the desk phone of Weeren with the search system of Zigmond, Smith, and Payne also would have yielded predictable results because a desk phone was a known alternative to a wireless phone. Ex. 1125 at 5:3-22. A POSA combining Weeren with Zigmond, Smith, and Payne would have a reasonable expectation of success because modifying the search system of Zigmond, Smith, and Payne to work on a desk phone would have been a simple modification involving moving software from one type of phone to another. Ex. 1114, ¶ 242; Ex. 1125 at 5:3-22.

VIII. CONCLUSION

Inter partes review of claims 1-11 of the ’394 Patent should be instituted and claims 1-11 should be canceled.

BANNER AND WITCOFF, LTD.

Dated: November 12, 2018

By: / Frederic M. Meeker /
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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), I certify that this paper includes 12,850 words. In accordance with 37 C.F.R. § 42.24(a)(1), this word count does not include a count of the words in a table of contents, a table of authorities, mandatory notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Furthermore, in accordance with 37 C.F.R. § 42.24(d), this word count is the word count of the word-processing system used to prepare the paper.

BANNER AND WITCOFF, LTD

Dated: November 12, 2018 By: / Frederic M. Meeker /

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.105, I hereby certify that I caused a true and correct copy of the Petition for *Inter Partes* Review in connection with U.S. Patent No. 7,937,394 and supporting evidence to be served via FedEx Priority Overnight on November 12, 2018, on the following:

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Dated: November 12, 2018

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CLAIMS APPENDIX

1[Pre]	A method of processing unresolved keystroke entries by a user from a keypad with overloaded keys in which a given key is in fixed association with a number and at least one alphabetic character, the unresolved keystroke entries being directed at identifying an item from a set of items, each of the items being associated with information describing the item comprising one or more words, the method comprising:
1[a]	providing access to an index of the items, the index having an association between subsets of the items and corresponding strings of one or more unresolved keystrokes for overloaded keys so that the subsets of items are directly mapped to the corresponding strings of unresolved keystrokes for various search query prefix substrings;
1[b]	for at least one subset of items, determining which letters and numbers present in the information associated with and describing the indexed items of the subset caused the items to be associated with the strings of one or more unresolved keystrokes that directly mapped to the subset;
1[c]	receiving from a user a search query for desired items composed of unresolved keystrokes, the search query comprising a prefix substring for at least one word in information associated with the desired item;
1[d]	in response to each unresolved keystroke, identifying and displaying the subsets of items, and information associated therewith, that are associated with the strings of one or more unresolved keystrokes received from the user based on the direct mapping of strings of unresolved keystrokes to subsets of items; and
1[e]	in response to each unresolved keystroke, as the identified items are displayed, highlighting the letters and numbers present in the one or more words in the information describing the identified items that were determined to have caused the displayed items to be associated with the strings of unresolved keystrokes that are directly mapped to the items so as to illustrate to the user how the unresolved keystrokes entered match the information associated with the displayed items.
2	The method of claim 1, wherein highlighting the letters and numbers comprises highlighting by coloring, bolding, italicizing, underlining, or changing to a different font, or some combination thereof
3	The method of claim 1, wherein the items of the subsets of items displayed are ordered when displayed such that items having single-word or multi-word term matches between the information associated with and

	describing those items and the unresolved keystrokes of the search query received from the user are displayed before items having single-word or multi-word abbreviation matches.
4	The method of claim 1, wherein the search query is processed by a server system remote from said user.
5	The method of claim 1, wherein the search query is processed by a device operated by said user.
6	The method of claim 5, wherein the device is a cell phone.
7	The method of claim 5, wherein the device is a desk phone.
8	The method of claim 5, wherein the device is a remote control device for a television.
9	The method of claim 1, wherein at least some items of the set of items are television content items.
10	The method of claim 1, wherein at least some items of the set of items are product items.
11	The method of claim 1, wherein identifying and displaying the subsets of items comprises identifying the subsets of items by reference to the index of the items.