

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

ACCUSEARCH TECHNOLOGIES LLC,
Patent Owner.

Case No. IPR2026-00288
Patent No. 11,100,184

DECLARATION OF BENJAMIN B. BEDERSON, PH.D.

Google Exhibit 1003 Google v. AccuSearch

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1. Claim 1	72

- a. [1PRE] In an Internet search system for displaying search results during an Internet search process, the search results being generated based on user-specified search term elements, where at least one search result references a webpage that is missing at least one search term element, a method for providing an interactive graphical user interface for the user to readily discern such search result without opening its referenced webpage, the method comprising:.....72
- b. [1A] receiving, on a server, a first search request submitted via the Internet by a user operating a computing device with a display screen, wherein the first search request is comprised of one or more search term elements;76
- c. [1B] generating a plurality of search results based at least in part on the submitted first search request, wherein the plurality of search results is comprised of:79
- d. [1C] (i) a first type of search result which references a first webpage that contains all submitted search term elements; and80
- e. [1D] (ii) a second type of search result which references a second webpage that is missing at least one submitted search term element;82
- f. [1E] causing the display screen to display the first and second types of search results on a search results webpage;83
- g. [1F] causing the display screen to display the first type of search result as a first search result grouping, wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage, and wherein the first search result grouping does not include any annotation for missing search term elements;84

h.	[1G] causing the display screen to display the second type of search result as a second search result grouping, wherein the second search result grouping is comprised of an annotation showing the at least one search term element missing in the second webpage and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage, and wherein the annotation is comprised of a text representing the at least one search term element; and.....	89
i.	[1H] wherein the annotation enables the user to readily discern, without opening the second webpage and navigating away from the search results webpage, that the second webpage is missing the at least one search term element, and by not opening the second webpage a faster execution is enabled for the Internet search process.....	91
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3.	Claim 6	97
a.	[6A] The method of claim 1, wherein the plurality of search results is further comprised of: (i) a third type of search result which references a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and.....	99
b.	[6B] (ii) a fourth type of search result which references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and	101
c.	[6C] further comprising: causing the display screen to display the fourth type of search result in a same manner as the second search result grouping.....	102
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a.	[7B] wherein the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider;	110
b.	[7E] (ii) a second type of search result which references a second webpage that is, contrary to the search logic guidelines for AND operations published by the search engine provider, missing at least one search term element;	111
c.	[7F] wherein the one or more servers provide the search results webpage via the Internet for displaying the plurality of search results on a display screen of the user-operated computing device;	116
5.	Claim 11	119
a.	[11A] The system of claim 7, wherein the plurality of search results is further comprised of: (i) a third type of search result referencing a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and.....	119
b.	[11B] (ii) a fourth type of search result references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and.....	119
c.	[11C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.	119
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b.	[16B] a fourth type of search result references a fourth webpage that is missing at least one search term element, and all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and.....	122
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	Claim 8[/13]: The system of claim 7[/12], wherein the display screen displays, in combination with the annotation within the second search result grouping, a selectable filtering function that, when selected, automatically causes the second search result grouping to be removed from the search results webpage.	137
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b. [4B]/[9B]/[14B] wherein the automatic removal of the second search result grouping enables the smaller display screen to display an increased number of first type of search results.	144
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a.	[20A] The method of claim 19, wherein the one or more search results further includes: (i) a second search result which references a second webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the second webpage contains the at least one missing search term element; and.....	160
b.	[20B] (ii) a third search result which references a third webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the third webpage are also missing the at least one search term element; and further comprising:	160
c.	[20C] causing the display screen to display the third search result in a same manner as the first search result grouping.	160
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b. [1A] receiving, on a server, a first search request submitted via the Internet by a user operating a computing device with a display screen, wherein the first search request is comprised of one or more search term elements;	190
c. [1B] generating a plurality of search results based at least in part on the submitted first search request, wherein the plurality of search results is comprised of:	191
d. [1C] (i) a first type of search result which references a first webpage that contains all submitted search term elements; and [1D] (ii) a second type of search result which references a second webpage that is missing at least one submitted search term element;	193
e. [1E] causing the display screen to display the first and second types of search results on a search results webpage;	194
f. [1F] causing the display screen to display the first type of search result as a first search result grouping, wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage, and wherein the first search result grouping does not include any annotation for missing search term elements;	195

g.	[1G] causing the display screen to display the second type of search result as a second search result grouping, wherein the second search result grouping is comprised of an annotation showing the at least one search term element missing in the second webpage and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage, and wherein the annotation is comprised of a text representing the at least one search term element; and.....	196
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c.	[6C] further comprising: causing the display screen to display the fourth type of search result in a same manner as the second search result grouping.....	203
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a.	[7B] wherein the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider;	208
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c.	[7F] wherein the one or more servers provide the search results webpage via the Internet for displaying the plurality of search results on a display screen of the user-operated computing device;	210
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b.	[11B] (ii) a fourth type of search result references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and.....	212
c.	[11C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.	212
6.	Claim 12	213
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b. [16B] a fourth type of search result references a fourth webpage that is missing at least one search term element, and all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and.....	215
c. [16C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.	215
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4. Claim 19	229
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a.	[20A] The method of claim 19, wherein the one or more search results further includes: (i) a second search result which references a second webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the second webpage contains the at least one missing search term element; and.....	232
b.	[20B] (ii) a third search result which references a third webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the third webpage are also missing the at least one search term element; and further comprising:	233
c.	[20C] causing the display screen to display the third search result in a same manner as the first search result grouping.	233
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a.	[22A] The method of claim 21, wherein the user-operated computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and	235
b.	[22B] wherein the automatic removal of the first search result grouping enables the smaller display screen to display an increased number of first type of search results.	236
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TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 11,100,184
1002	Prosecution History of U.S. Patent No. 11,100,184
1005	U.S. Patent Application Publication No. 20100145923A1 (“Wang”)
1006	U.S. Patent No. 8,880,547 (“Mills”)
1007	U.S. Patent Application Publication No. 20070168344A1 (“Brinson”)
1008	U.S. Patent Application Publication No. 20090248511A1 (“Mehta”)
1009	U.S. Patent Application Publication No. 20060059126A1 (“Naick”)
1010	U.S. Patent Application Publication No. 20020174118A1 (“Bates”)
1011	U.S. Patent No. 9,098,569 (“Bhagat”)
1012	U.S. Patent Application Publication No. 20090287676A1
1013	U.S. Patent Application Publication No. 20080091834A1 (“Norton”)
1014	U.S. Patent Application Publication No. 20160012050A1 (“Bursey”)
1015	U.S. Patent Application Publication No. 20120191531A1
1016	U.S. Patent Application Publication No. 20090292595A1
1017	U.S. Patent Application Publication No. 20110054998A1
1018	U.S. Patent No. 8,473,492
1019	U.S. Patent Application Publication No. 20070273708A1
1020	U.S. Patent Application Publication No. 20100138293A1
1021	U.S. Patent Application Publication No. 20080150901A1
1022	U.S. Patent Application Publication No. 20110246921A1
1023	U.S. Patent Application Publication No. 20080147638A1
1024	U.S. Patent Application Publication No. 20020057298A1
1025	U.S. Patent No. 7,152,064
1026	U.S. Patent No. 8,095,876
1027	U.S. Patent Application Publication No. 20080071738A1
1028	U.S. Patent No. 5,826,260
1029	U.S. Patent No. 7,200,820
1030	U.S. Patent No. 8,407,217
1031	U.S. Patent Application Publication No. 20080208819A1
1032	U.S. Patent Application Publication No. 20060253431A1
1033	U.S. Patent Application Publication No. 20030105744A1
1034	U.S. Patent No. 7,296,021
1035	U.S. Patent Application Publication No. 20030055810A1
1036	U.S. Patent Application Publication No. 20040162814A1
1037	U.S. Patent No. 7,555,476
1038	U.S. Patent No. 7,693,833

1039	U.S. Patent No. 8,402,032
1040	U.S. Patent No. 8,938,463
1041	U.S. Patent No. 6,718,363
1042	International Application Publication No. WO2011035426A1
1043	U.S. Patent No. 6,012,053
1044	U.S. Patent Application Publication No. 20070112761A1
1045	U.S. Patent Application Publication No. 20080071739A1
1046	U.S. Patent Application Publication No. 20040177064A1
1047	U.S. Patent Application Publication No. 20090187554A1
1048	U.S. Patent No. 5,946,678
1049	U.S. Patent Application Publication No. 20060004734A1
1050	U.S. Patent Application Publication No. 20090276418A1
1051	U.S. Patent Application Publication No. 20080155411A1
1052	U.S. Patent Application Publication No. 20050021512A1
1053	U.S. Patent Application Publication No. 20050120016A1
1054	U.S. Patent Application Publication No. 20080010269A1
1055	U.S. Patent Application Publication No. 20070239662A1
1056	U.S. Patent Application Publication No. 20050177555A1
1057	U.S. Patent Application Publication No. 20080140712A1
1058	U.S. Patent Application Publication No. 20060136400A1
1059	U.S. Patent Application Publication No. 20080208835A1
1060	U.S. Patent Application Publication No. 20080155399A1
1061	U.S. Patent Application Publication No. 20170060856A1
1062	U.S. Patent Application Publication No. 20100262568A1
1063	U.S. Patent No. 5,659,732
1064	Plaintiff's Disclosure of Initial Infringement Contentions, in <i>AccuSearch Techs. LLC v. Google LLC</i> , 25-514-GBW (D. Del. Dec. 17, 2025)
1065	U.S. Patent Application Publication No. 2007/0100804A1
1066	Shneiderman, <i>Designing the User Interface: Strategies for Effective Human-Computer Interaction</i> (3d ed. 1998)
1067	U.S. Patent Application Publication No. 20080221887A1
1068	U.S. Patent Application Publication No. 20040111467A1
1069	U.S. Patent Application Publication No. 20040162814A1
1070	Declaration of Robert Osann, Jr., in <i>AccuSearch Techs. LLC v. Google LLC</i> , 25-514-GBW (D. Del. July 11, 2025)
1071	U.S. Patent Application Publication No. 20020156917A1
1072	U.S. Patent Application Publication No. 20110119243A1
1073	U.S. Patent Application Publication No. 20100198821A1
1074	U.S. Patent No. 8,515,731

1075	U.S. Patent Application Publication No. 20090210404A1
1076	U.S. Patent Application Publication No. 20110035401A1
1077	U.S. Patent No. 8,165,972
1078	U.S. Patent No. 8,055,669
1079	U.S. Patent No. 6,999,959
1080	Chang, et al., “Search Engines’ Help Systems,” Fifth International Conference on Information Technology: New Generations (IEEE 2008)
1081	U.S. Patent Application Publication No. 20020194166A1 (“Fowler”)
1082	U.S. Patent Application Publication No. 20070239676A1
1083	Chi, Ed H., et al. “Using information scent to model user information needs and actions and the Web,” Proceedings of the SIGCHI conference on Human factors in computing systems (2001)

I, Benjamin B. Bederson, declare:

1. I have been retained by Wolf, Greenfield & Sacks, P.C., counsel for Petitioner Google LLC to assess claims 1-22 (the “challenged claims”) of U.S. Patent No. 11,100,184 (“the ’184 patent”). I am being compensated for my time at my standard rate of \$750.00 per hour, plus actual expenses. My compensation is not dependent in any way upon the outcome of the *inter partes* review of the ’184 patent.

2. For the reasons explained below (§§VIII-XV), it is my opinion that each of claims 1-22 would have been obvious to a person of ordinary skill in the art (“POSA”) (*see* §V.C below) in light of the prior-art references that I discuss below.

I. PERSONAL AND PROFESSIONAL BACKGROUND

3. My curriculum vitae, which includes a more detailed summary of my background, experience, and publications, is attached as Exhibit 1004.

4. I received a Bachelor of Science degree in Computer Science with a minor in Electrical Engineering from Rensselaer Polytechnic Institute (“RPI”) in 1986. I received a Master of Science degree and a Ph.D. in Computer Science from New York University (“NYU”) in 1989 and 1992, respectively.

5. Since 1998, I have been a Professor of Computer Science at the University of Maryland (“UMD”), where I have had joint appointments at the

Institute for Advanced Computer Studies and the College of Information Studies (Maryland's "iSchool") and am currently Professor Emeritus. I was also Associate Provost of Learning Initiatives and Executive Director of the Teaching and Learning Transformation Center from 2014 to 2018. I am a member and previous director of the Human-Computer Interaction Lab ("HCIL"), the oldest and one of the best known Human-Computer Interaction ("HCI") research groups in the country. As its name suggests, HCI is the study of how humans interact with computers through, for example, user interfaces (UIs), like the graphical user interfaces (GUIs) presented by Internet search engines and other information-retrieval systems.

6. I am also co-founder and co-director of the International Children's Digital Library ("ICDL"), a web site launched in 2002 that provides the world's largest collection of freely available online children's books from around the world with an interface aimed to make it easy for children and adults to search and read children's books online. I was also co-founder and Chief Scientist of Zumobi, Inc. from 2006 to 2014, a Seattle-based startup that is a publisher of content applications and advertising platforms for smartphones. I was also co-founder and prior Chief Technology Officer of Hazel Analytics from 2014 to 2023, a data analytics company. In addition, I have for more than 25 years consulted for numerous companies in the area of user interfaces, including EPAM, Lockheed

Martin, Logitech, Microsoft, NASA Goddard Space Flight Center, the Palo Alto Research Center, and Sony.

7. For more than 30 years, I have studied, designed, and worked in the field of computer science and human-computer interaction. My experience includes 30 years of teaching and research, with research interests in human-computer interaction and the software and technology underlying today's interactive computing systems. This includes the design and implementation of user interfaces and software applications using a wide range of technologies including web servers and websites, databases, embedded systems, and mobile devices, including smart phones and PDAs.

8. At UMD, my research has been in the area of HCI, a field that relates to the development and understanding of computing systems to serve users' needs. Researchers in this field are focused on making universally usable, useful, efficient, and appealing systems to support people in their wide range of activities. My approach is to balance the development of innovative technology that serves people's practical needs. I have combined my hardware and software skills throughout my career in HCI research, building various interactive electrical and mechanical systems that couple with software to provide an innovative user experience. Example systems that I have built include Pad++ (1994 software for zoomable user interfaces), KidPad (1997 software to support children

collaboratively writing stories), PadPrints (1998 software to graphically show interactive web browsing histories), PhotoMesa (2001 software for end users to browse personal photos), Pocket PhotoMesa (2004 software for browsing of personal photos on a mobile device), DateLens (2002 software for end users to use their mobile devices to efficiently access their calendar information), LaunchTile (2005 “home screen” software for mobile devices to allow users to navigate apps in a zoomable environment), SpaceTree (2001 software for end users to efficiently browse very large hierarchies), ICDL (as described above), and StoryKit (a 2009 iPhone app for children to create stories).

9. Pad++ included a custom web browser that I built from scratch and distributed as open source software at the Pad++ web site. That web browser was described in numerous publications including “Pad++: A Zoomable Graphical Interface for Exploring Alternate Interface Physics.”¹ I implemented a rendering engine from scratch for that web browser which supported the version of HTML available at the time (HTML 1.0) as well as an embedded scripting language. That web browser included the ability to display embedded web pages that could be

¹ Bederson, B. B. & Hollan, J. D. (1994). Pad++: A Zooming Graphical Interface for Exploring Alternate Interface Physics, ACM Conference on User Interface Software and Technology, 17-26.

zoomed along with the rest of the pages. The following images are from that custom web browser that I built, which used a “zoomable user interface” so one page could be shown larger while other recently visited pages would be displayed smaller.²

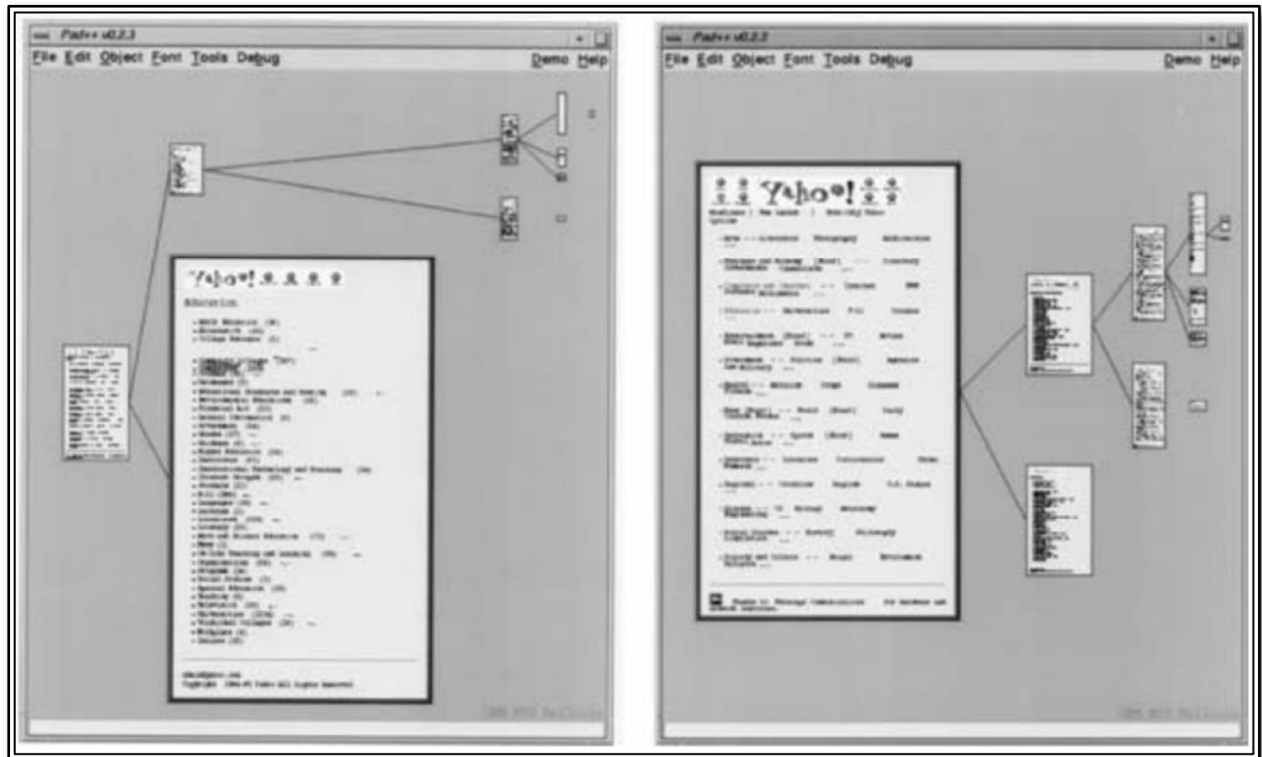


Figure 5 from “Pad++: A Zoomable Graphical Sketchpad for Exploring Alternate Interface Physics”

² Bederson, B. B. et al. (1996). Pad++: A Zoomable Graphical Sketchpad for Exploring Alternate Interface Physics, 7, Journal of Visual Languages & Computing.

10. By 1998, my team had combined Pad++ with Netscape Navigator (a standard web browser of the time) to offer a graphical web history, visually showing what pages a user had visited with an application we called “PadPrints.”³ We did this by implementing a web “proxy,” which was a standard way at the time to modify the built-in behavior of web browsers. Some proxies work by intercepting all web traffic coming from and going to a web browser. Once intercepted, the proxy can do whatever it wants with the traffic, caching it for better performance, simply passing the traffic through and monitoring it, modifying the data itself, or holding that connection and opening new connections. PadPrints’ proxy worked by monitoring the traffic and letting PadPrints know what the user was doing so PadPrints could display the web history.

³ Bederson, B. B. et al. (1998). PadPrints: Graphical Multiscale Web Histories. In Proceedings of the 11th Annual ACM Symposium on User Interface Software and Technology (UIST ‘98). Association for Computing Machinery, New York, NY, USA, 121–122. <https://doi.org/10.1145/288392.288582>.

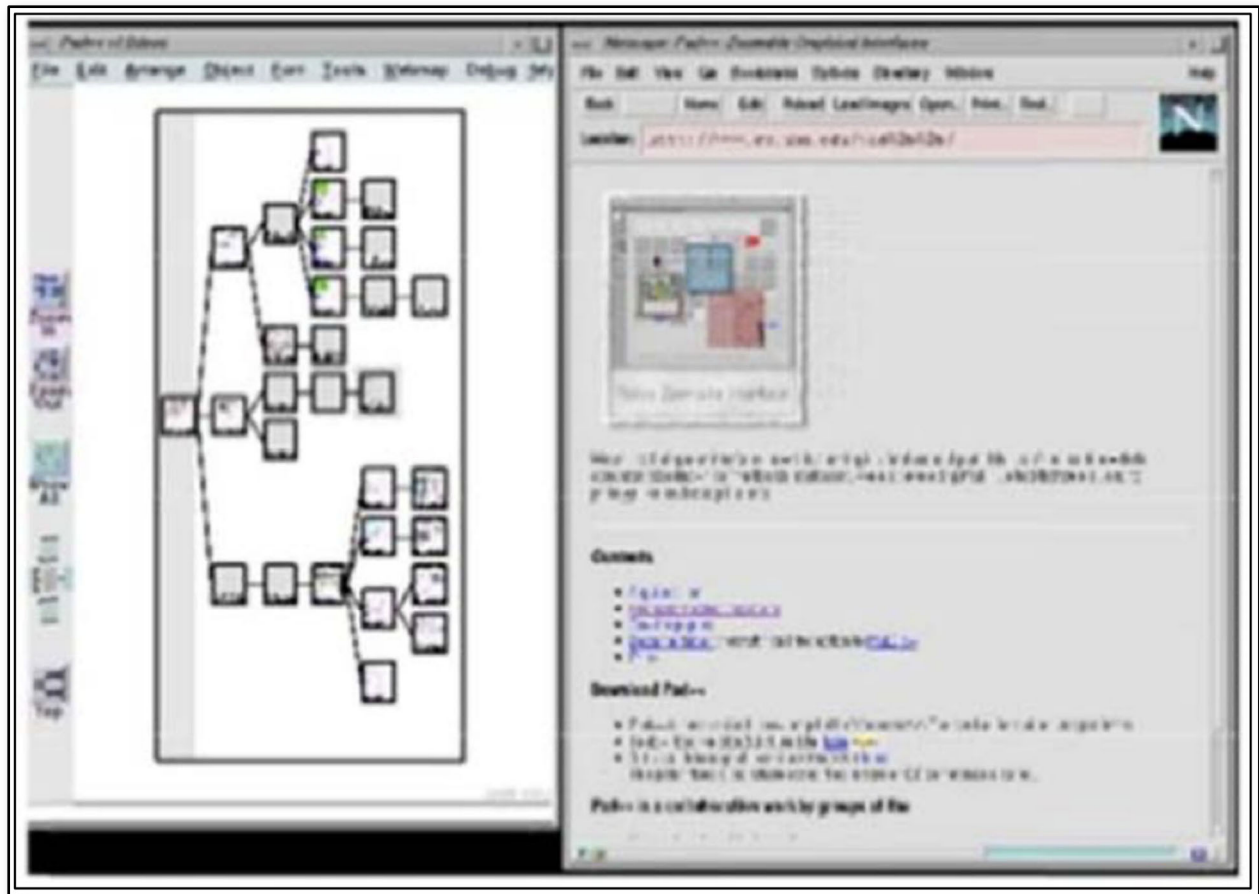


Figure 1 from PadPrints paper

11. In 2000, my team and I published a paper⁴ describing follow-on work to what we had done with PadPrints where we added the ability to search one's web history. "There is a search bar on the top where the user can specify any

⁴ R. Gandhi, G. Kumar, B. Bederson, and B. Shneiderman. 2000. Domain Name Based Visualization of Web Histories in a Zoomable User Interface. In Proceedings of the 11th International Workshop on Database and Expert Systems Applications (DEXA '00). IEEE Computer Society, USA, 591.

string, and DTB then displays all the domain names in the domain panel that contain the query string. For example, if the user types ‘cs’, then all the domain names containing ‘cs’ will be displayed.” (p. 3).

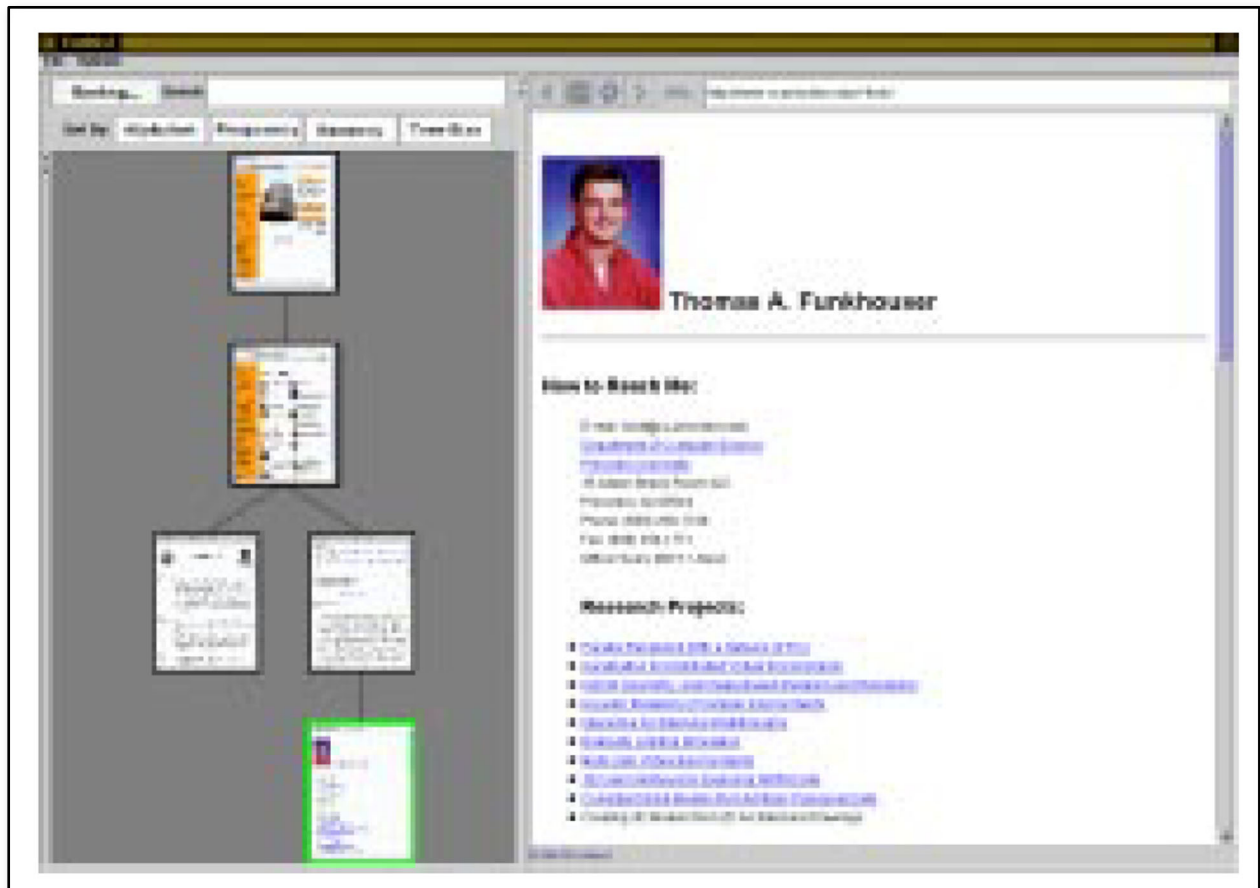


Figure 2 from Domain Name Based Visualization Paper

12. At the International Children’s Digital Library (ICDL), I have since 2002 been the technical director responsible for the design and implementation of the web site, www.childrenslibrary.org (originally at www.icdlbooks.org), which included an Internet Search Engine for searching the content of children’s books. In particular, I have been closely involved in designing the user interface as well as the software architecture for the web site since its inception in 2002.

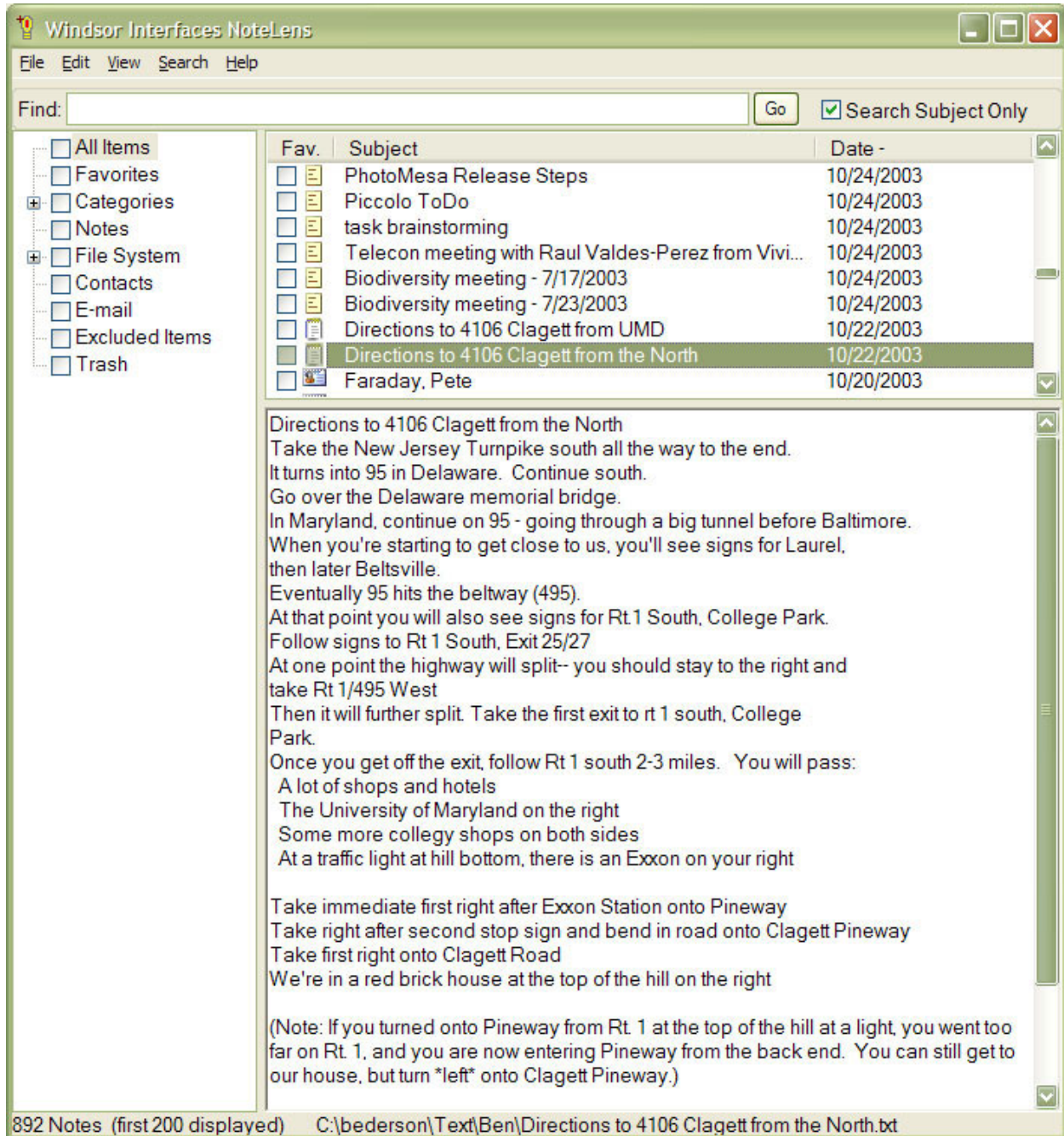


Screenshot taken February 19, 2017 by Benjamin B. Bederson from <http://www.childrenslibrary.org/icdl/SimpleSearchCategory?ids=25&langid=&pnum=1&cnum=1&text=&lang=English&ilang=English>

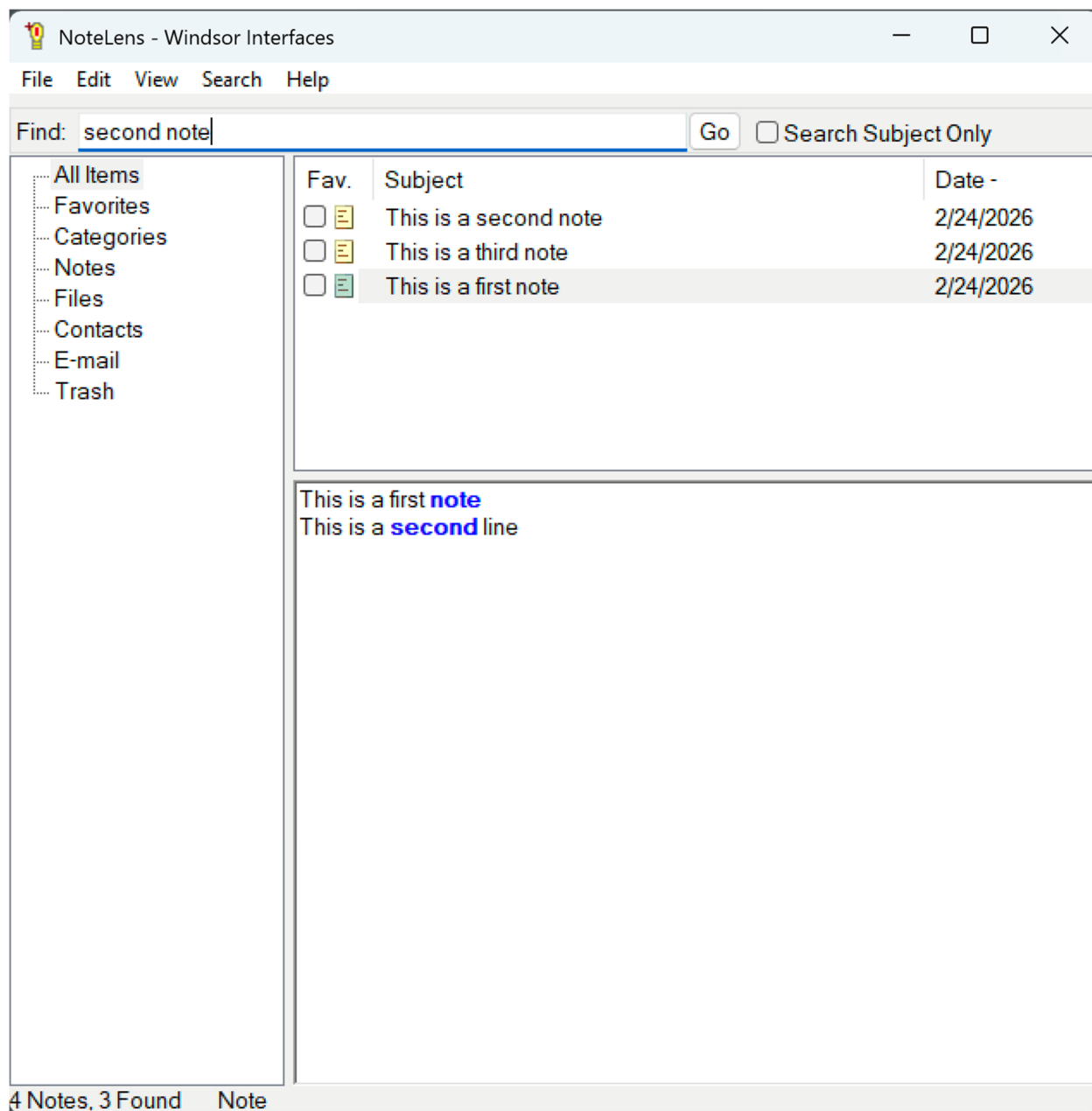
13. In 2004, I designed and wrote NoteLens, an application that supported people to write and quickly search for notes. NoteLens has been available for download at <http://windsorinterfaces.com/notelens.shtml> since 2004, and was described in a New York Times article at that time as well.⁵ NoteLens allows a

⁵ <https://www.nytimes.com/2004/01/22/technology/what-s-next-now-where-was-i-new-ways-to-revisit-web-sites.html>.

user to enter multiple search terms, and it shows search results matching those terms as a user enters each character. It highlights the matching search terms within the found notes.



Screenshot from <http://windsorinterfaces.com/images/notelens.jpg> taken in 2004



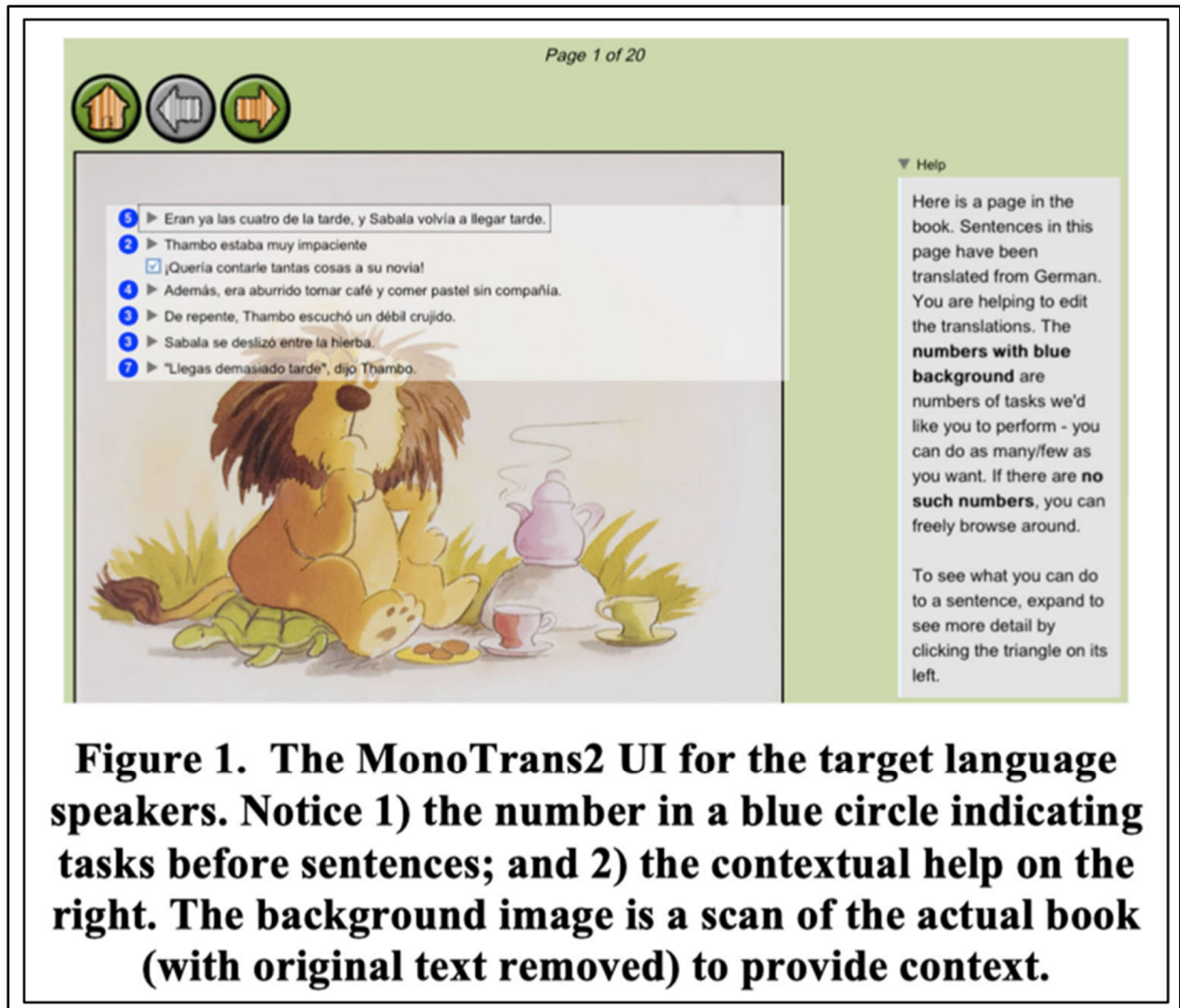
Screenshot taken from running 2003 version 1.07 version of NoteLens on February 24, 2026

14. Beginning in the mid-1990s, I have been responsible for the design and implementation of numerous other web sites in addition to the ICDL. For example, I designed and built my own professional web site when I was an Assistant Professor of Computer Science at the University of New Mexico in 1995

and have continued to design, write the code for, and update both that site (which I moved to the University of Maryland in 1998, currently at <http://www.cs.umd.edu/~bederson/>) as well as numerous project web sites, such as Pad++, <http://www.cs.umd.edu/hcil/pad++/>.

15. I started a new web-based project in 2009 to bring people together on a website to collaboratively translate text for children's books from one language to another. This resulted in numerous publications, including a 2011 paper⁶ that described a second generation of this work. In the numerous versions of this project, we used several web-based collaboration techniques, including by synchronous and asynchronous collaboration – allowing people to see the work of others on their own views of our website either immediately as others were doing the work (synchronously) or later after they had completed the work (asynchronously).

⁶ Bederson, B. B. et al. (2011). MonoTrans2: a new Human Computation System to Support Monolingual Translation. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11). Association for Computing Machinery, New York, NY, USA, 1133–1136.
<https://doi.org/10.1145/1978942.1979111>.



16. My work has been published extensively in more than 160 technical publications, and I have given about 100 invited talks, including 9 keynote lectures. I have won a number of awards including the Brian Shackel Award for “outstanding contribution with international impact in the field of HCI” in 2007, and the Social Impact Award in 2010 from Association for Computing Machinery’s (“ACM”) Special Interest Group on Computer Human Interaction (“SIGCHI”). ACM is the primary international professional community of

computer scientists, and SIGCHI is the primary international professional HCI community. I have been honored by both professional organizations. I am an “ACM Distinguished Scientist,” which “recognizes those ACM members with at least 15 years of professional experience and 5 years of continuous Professional Membership who have achieved significant accomplishments or have made a significant impact on the computing field.” I am a member of the “CHI Academy,” which is described as follows: “The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. These are the principal leaders of the field, whose efforts have shaped the disciplines and/or industry, and led the research and/or innovation in human-computer interaction.” The criteria for election to the CHI Academy are: (1) cumulative contributions to the field; (2) impact on the field through development of new research directions and/or innovations; and (3) influence on the work of others. I have received two “Test of Time” awards from IEEE InfoVis for my 2001 and 2002 work on visualizing hierarchies, including those containing digital photos.⁷ I received the Janet Fabri Memorial Award for

⁷ <https://ieevis.org/year/2021/info/awards/test-of-time-awards;>

[https://ieevis.org/year/2022/info/awards/test-of-time-awards.](https://ieevis.org/year/2022/info/awards/test-of-time-awards)

Outstanding Doctoral Dissertation for my Ph.D. work in robotics and computer vision.

17. I have appeared on radio shows numerous times to discuss issues relating to user interface design and people's use and frustration with common technologies, web sites, and mobile devices. My work has been discussed and I have been quoted by mainstream media around the world over 120 times, including by the New York Times, the Wall Street Journal, the Washington Post, Newsweek, the Seattle Post-Intelligencer, the Independent, Le Monde, NPR's All Things Considered, New Scientist Magazine, and MIT's Technology Review.

18. I have designed, programmed, and publicly deployed dozens of user-facing software products that have cumulatively had millions of users. I am the co-inventor of 14 U.S. patents and 20 U.S. patent applications.

II. MATERIALS REVIEWED AND CONSIDERED

19. My findings, as explained below, are based on my years of education, research, experience, and background in the field of Internet search, as well as my investigation and study of relevant materials for this declaration. When developing the opinions set forth in this declaration, I assumed the perspective of a person having ordinary skill in the art, as set forth in Section IV below. In forming my opinions, I have studied and considered the materials identified in the **Table of Exhibits** listed above.

III. MY UNDERSTANDING OF PATENT LAW

20. In developing my opinions, I discussed various relevant legal principles with Petitioner's attorneys. Though I do not purport to have prior knowledge of such principles, I understood them when they were explained to me and have relied upon such legal principles, as explained to me, in the course of forming the opinions set forth in this declaration. My understanding in this respect is as follows.

21. I understand that "*inter partes* review" (IPR) is a proceeding before the United States Patent & Trademark Office for evaluating the patentability of an issued patent's claims based on prior-art patents and printed publications.

22. I understand that, in this proceeding, Petitioner has the burden of proving that the challenged claims of the '184 patent are unpatentable by a preponderance of the evidence. I understand that "preponderance of the evidence" means that a fact or conclusion is more likely true than not true.

23. I understand that, in IPR proceedings, claim terms in a patent are given their ordinary and customary meaning as understood by a POSA in the context of the entire patent and the prosecution history pertaining to the patent. If the specification provides a special definition for a claim term that differs from the meaning the term would otherwise possess, the specification's special definition controls. If a claim element is expressed as a "means" for performing a specified

function, I understand that it covers the corresponding structure described in the specification and equivalents of the described structure. I have applied these standards in preparing the opinions in this declaration.

24. I understand that determining whether a particular patent or printed publication constitutes prior art to a challenged patent claim can require determining the effective filing date (also known as the priority date) to which the challenged claim is entitled. I understand that for a patent claim to be entitled to the benefit of the filing date of an earlier application to which the patent claims priority, the earlier application must have described the claimed invention in sufficient detail to convey with reasonable clarity to the POSA that the inventor had possession of the claimed invention as of the earlier application's filing date. I understand that a disclosure that merely renders the claimed invention obvious is not sufficient written description for the claim to be entitled to the benefit of the filing date of the application containing that disclosure.

25. I understand that for an invention claimed in a patent to be patentable, it must be, among other things, new (novel—*i.e.*, not anticipated) and not obvious from the prior art. My understanding of these two legal standards is set forth below.

A. Anticipation

26. I understand that, for a patent claim to be “anticipated” by the prior art (and therefore not novel), each and every limitation of the claim must be found, expressly or inherently, in a single prior-art reference. I understand that a claim limitation is disclosed for the purpose of anticipation if a POSA would have understood the reference to disclose the limitation based on inferences that a POSA would reasonably be expected to draw from the explicit teachings in the reference when read in light of the POSA’s knowledge and experience.

27. I understand that a claim limitation is inherent in a prior art reference if that limitation is necessarily present when practicing the teachings of the reference, regardless of whether a person of ordinary skill recognized the presence of that limitation in the prior art.

B. Obviousness

28. I understand that a patent claim may be unpatentable if it would have been obvious in view of a single prior-art reference or a combination of prior-art references.

29. I understand that a patent claim is obvious if the differences between the subject matter of the claim and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the relevant field at

the time the invention was made. Specifically, I understand that the obviousness question involves a consideration of:

- the scope and content of the prior art;
- the differences between the prior art and the claims at issue;
- the knowledge of a person of ordinary skill in the pertinent art; and
- if present, objective factors indicative of non-obviousness, sometimes referred to as “secondary considerations.” To my knowledge, the Patent Owner has not asserted any such secondary considerations with respect to the ’184 patent.

30. I understand that in order for a claimed invention to be considered obvious, a POSA must have had a reason for combining teachings from multiple prior-art references (or for altering a single prior-art reference, in the case of obviousness in view of a single reference) in the fashion proposed.

31. I further understand that in determining whether a prior-art reference would have been combined with other prior art or with other information within the knowledge of a POSA, the following are examples of approaches and rationales that may be considered:

- combining prior-art elements according to known methods to yield predictable results;

- simple substitution of one known element for another to obtain predictable results;
- use of a known technique to improve similar devices in the same way;
- applying a known technique to a known device ready for improvement to yield predictable results;
- applying a technique or approach that would have been “obvious to try,” *i.e.*, choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;
- some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior-art reference or to combine prior-art reference teachings to arrive at the claimed invention. I understand that this teaching, suggestion or motivation may come from a prior-art reference or from the knowledge or common sense of one of ordinary skill in the art.

32. I understand that for a single reference or a combination of references to render the claimed invention obvious, a POSA must have been able to arrive at the claimed invention by altering or combining the applied references.

IV. PERSON OF ORDINARY SKILL IN THE ART (“POSA”)

33. I have been informed and understand that for purposes of assessing whether prior-art references disclose every element of a patent claim (thus “anticipating” the claim) and/or would have rendered the claim obvious, the patent and the prior-art references must be assessed from the perspective of a POSA to which the patent is related, based on the understanding of that person at the time of the patent claim’s priority date. I have been informed and understand that a POSA is presumed to be aware of all pertinent prior art and the conventional wisdom in the art, and is a person of ordinary creativity. I have applied this standard throughout my declaration.

34. The ’184 patent involves technology in the field of Internet Search. I have been asked to provide my opinions as to the state of the art in this field by mid-2011. I use this timeframe because the face of the ’184 patent indicates an earliest claimed priority date of June 17, 2011. Whenever I offer an opinion in this declaration about the knowledge of a POSA, the manner in which a POSA would have understood the claims of the ’184 patent or its description, the manner in which a POSA would have understood the prior art, or what a POSA would have

been led to do based on the prior art, I am referencing the mid-2011 timeframe, even if I do not say so specifically in each case.

35. I understand that the Patent Owner may attempt to prove that the alleged invention recited in the challenged claims was conceived at some time prior to the earliest claimed priority date on the face of the patent. At the time of this declaration, I am unaware of the Patent Owner having alleged any earlier conception date or produced any evidence to establish any earlier conception date.

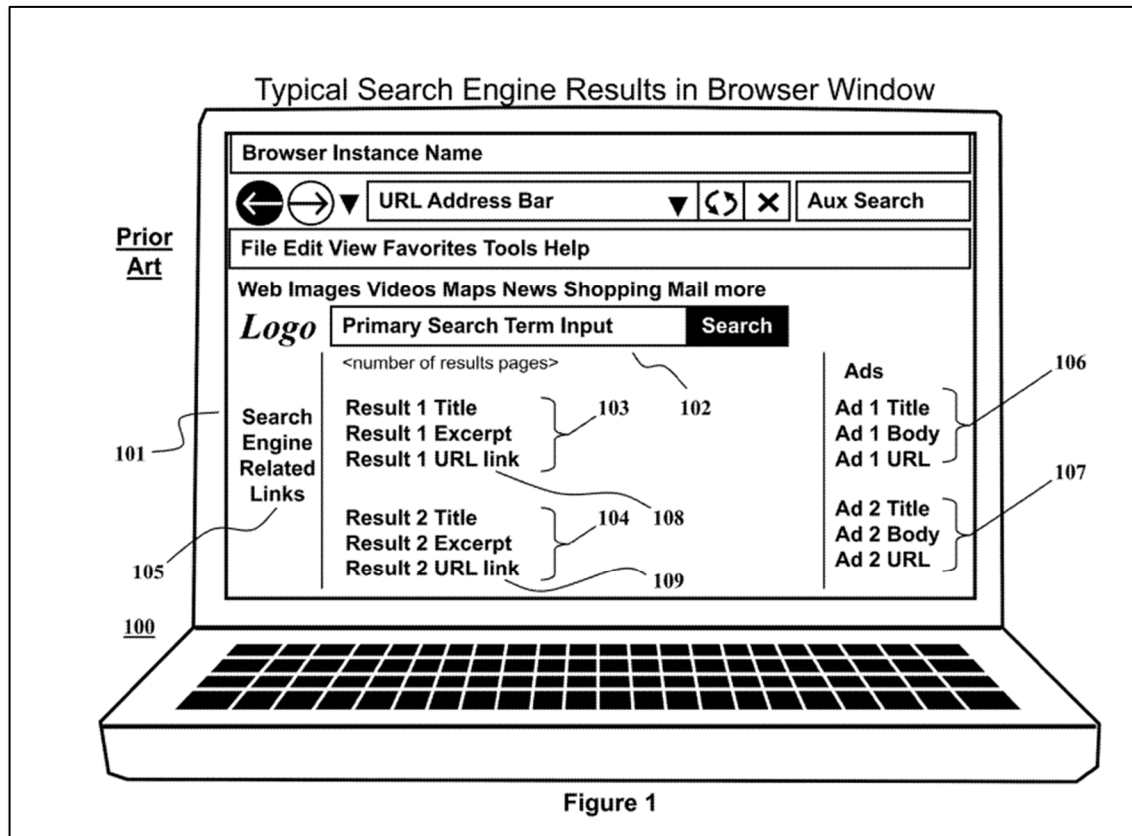
36. In my opinion, a person of ordinary skill in the art in the mid-2011 timeframe (“POSA”) would have had a bachelor’s degree in computer science or a related field, plus at least two years of industry or graduate-level experience with designing user interfaces for Internet search engines. More education could substitute for experience, and vice versa. This person would have been capable of understanding and applying the teachings of the ’184 patent and the prior-art references discussed in this declaration.

37. By 2011, I held a Ph.D. in Computer Science, and I had over 15 years of experience with Internet Search (including my own Internet search engine from 2002 that I discussed above, §I). To-date, I have had over 30 years of experience with Internet Search, including research, design, and implementation of user interfaces for web browsers and Internet search engines and the search algorithms used in those search engines and related information-retrieval systems. Therefore,

I was a person of more than ordinary skill in the art during the relevant timeframe. However, I worked with many people who fit the characteristics of the POSA, and I am familiar with their level of skill. When developing the opinions set forth in this declaration, I assumed the perspective of a person having ordinary skill in the art, as set forth above.

V. THE '184 PATENT (EX1001)

38. As I discuss further below (§V.A), the '184 patent is directed to displaying search-engine results to a user. An interface for a prior-art search-engine webpage is shown in the patent's Figure 1 (reproduced below). As the figure depicts, the prior-art interface includes a search bar into which a user enters search terms, and executing the search identifies a list of search-result webpages that relate to the user-entered search terms.



39. The '184 patent purports to improve this prior-art interface by adding annotations to the list of search results that indicate whether a search-result webpage does or does not include each of the user's search terms. That is, if the user conducts a search using, say, the three-word search query "MANHATTAN CLAM CHOWDER," annotations will be added for each returned search result to indicate whether, for example, the word "MANHATTAN" is missing or included in a particular search-result webpage.

40. Despite the '184 patent's assertion to the contrary, the concept of annotating search-result listings to indicate the presence or absence of search terms was known before 2011, the earliest alleged priority date. For example, Internet

search providers have long **bolded** search terms that are present in a search-result listing, *e.g.*, in a result's title, URL, or summary. As I described above in the section on my qualifications, in 2004, I built a search application that highlighted search terms that were present in a search-result listing.

41. My opinion that it was long known in the prior art to bold search terms that are present in a search-result listing is corroborated by EX1025, which is a U.S. Patent that was filed in 2001 (cover code (22)) and issued in 2006 (cover code (45)). EX1025 “relates to the field of information retrieval, and more specifically to displaying results to a search query,” in particular “searches on the Internet.” EX1025, 1:12-15. EX1025's FIG. 1 “is a display of a searching tool.” EX1025, 5:25. As shown at the top of FIG. 1A, the user entered a two-term search query – “greenhouse effect” – and each of those terms is shown in bold whenever they appear in the title or summary a search result displayed to a user. *See also* EX1025, FIG. 4 (for two-word query “greenhouse effect” bolding either term if it appears in a search-result grouping).

42. My opinion that it was long known in the prior art to bold search terms that are present in a search-result listing is also corroborated by EX1026. EX1026 is U.S. Patent that was filed in 2005 (cover code (22)) and issued in 2012 (cover code (45)). EX1026 “relates generally to information retrieval systems.” EX2026, 1:14-15. EX1026's FIG. 3 “is a screenshot of a user interface for an

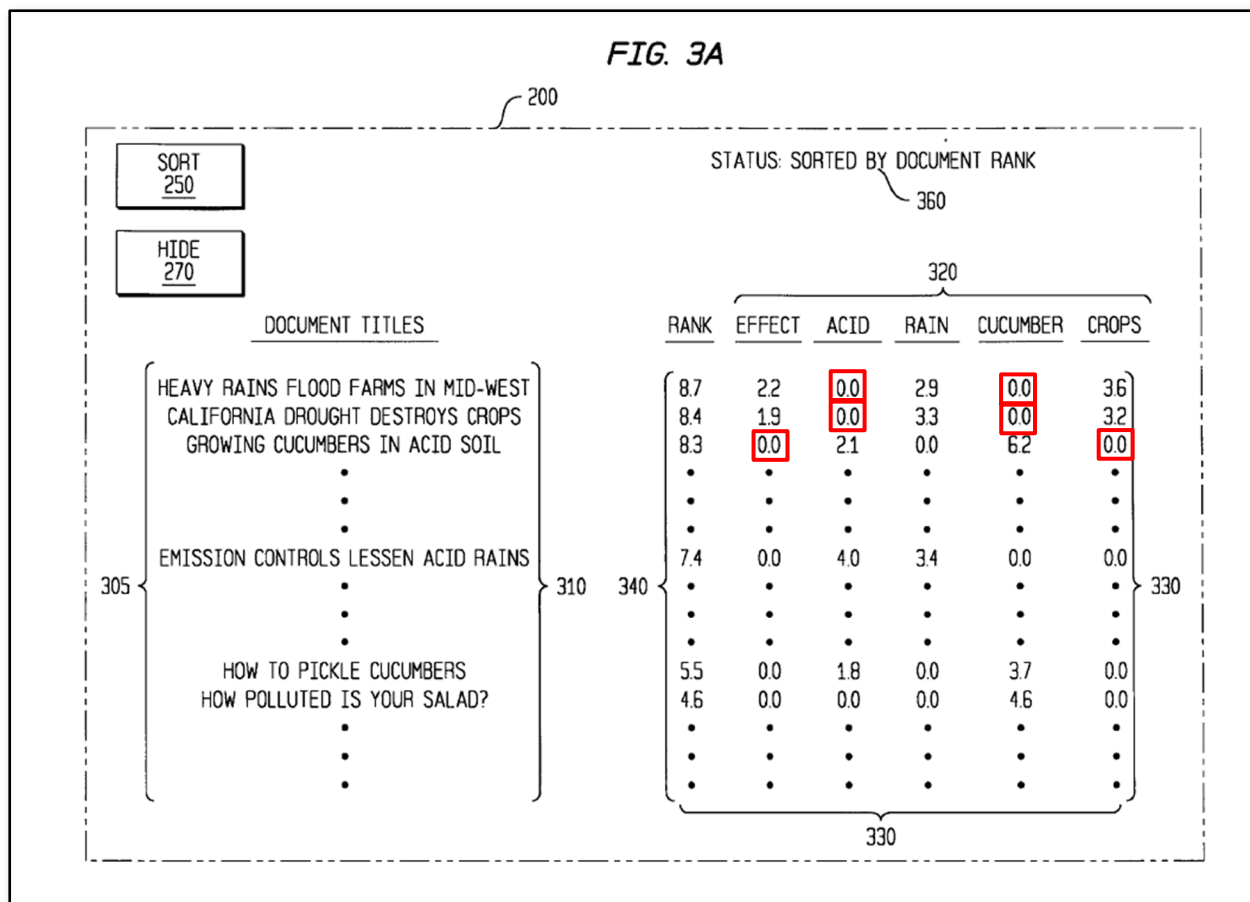
application (e.g., a browser) displaying a set of search results provided by a search engine system 100 in response to a search query.” EX1026, 6:32-34. As shown in FIG. 3, each search result includes a “document title 330[, which] is displayed as a hyperlink, associated with the network address of the primary version of the document” (EX1026, 6:55-58) and “[a] snippet 350 of the primary version of the document” (EX1026, 6:66-67). “The search terms used in the search query are **highlighted in bold font** in the document title 330 and the snippet 350.” EX1026, 7:1-3.

43. Other prior-art references disclose similar annotations used for the purpose of indicating the presence / frequency of search terms in search results. For example, EX1027 is a US patent application publication that published in 2008 (cover code (43)) from an application filed in 2006 (cover code (22)). EX1027 “is in the field of search technologies used by search engines and more specifically methods and systems for displaying the results of searches.” EX1027, [0001]. EX1027 discloses “a method of visually coding search results,” where “for each returned document [e.g., webpage] in the list, determining an occurrence frequency of” each search term and displays an “occurrence indicator” for each search term. EX1027, [0009]. “FIG. 7 illustrates a screen shot of an exemplary interface 500.” EX1027, [0051]. “[E]ach search term of a search query is displayed as a column title 570 and the column located below the column title 570 holds the occurrence

indicators 415 corresponding to that search term.” EX1027, [0057]. “A color shade is assigned to each occurrence indicator 514 based on the occurrence frequency determined for the specific search term in the returned document.” EX1027, [0059]. “[S]earch terms that occur more frequently in a return document (and therefore have a higher occurrence frequency than other search terms) are assigned a color shade that is more intense or rich.” EX1027, [0059]. Conversely, search terms that are **missing** are shown with the lowest intensity (*e.g.*, a faded grey- or white-shaded occurrence indicator 415). EX1027, [0059].

44. As another example, EX1028 is a US patent that issued in 1998 (cover code (45)) from an application filed in 1995 (code (22)). EX1028 “relates to the field of information retrieval,” specifically “using ranking algorithms.” EX1028, 1:8-10. EX1028 says as background information that it was known to rank search results “based on some similarity measure,” such as “whether a particular query element appears in a document or not.” EX1028, 1:63-67. EX1028 also says as background information that there were existing systems that “include[] information about the occurrence of words and the relevance ranking score as a display option with each document.” EX1028, 2:21-25. For example, one known information retrieval system would “show[] which of the ranked documents contain the query terms, in a table format, with individual terms as rows” and “[i]f a term appears in a document, the corresponding position on the table shows an

asterisk,” and “[o]therwise, the position is empty” (thereby indicating that the document is missing that search term). EX1028, 2:26-36. EX1028 says that it was beneficial to help users “understand the relationship among the contributions of various query elements to the overall rank or to change the rank displayed.” EX1028, 3:18-25. EX1028’s Figure 3B “shows the mechanism by which the user selects a new reorder criteria on the display.” EX1028, 4:8-9. As shown in Figure 3A (annotated below), “each of the rows 305” shows the “document titles 210” and “the contribution components 330 (230) of their respective query elements 320 (126).” EX1028, 5:39-44. EX1028 says that the contribution component includes as a factor the “Term Frequency” (EX1028, 5:39-44), and thus users and POSAs would understand that search terms that have a 0.0 contribution component (*e.g.*, some of which I’ve highlighted with red boxes) are terms that have a zero term frequency (*i.e.*, they are terms not found in the corresponding search result).



45. As another example, EX1048 is a US patent that issued in 1999 (cover code (45)) from an application filed in 1995 (code (22)). EX1048 “relates to an improved user interface for a relevance-ranking, abstract or document retrieval computerized system.” EX1048, 1:5-7. EX1048 says it was a “disadvantage” in prior art information-retrieval systems that did not “give the user sufficient information as to how the query words individually contribute or relate to the documents ranked in the results window”:

For instance, if the query words are, for example, A and B, the user cannot see from the display whether a document listed in the results

window is relevant because only A occurs in it, or because only B occurs in it, or because both A and B occur in it.

EX1048, 1:48-57.

46. To address that disadvantage, EX1048 discloses “a user interface” for a “document retrieval computerized system” that “comprises a display with a words window in which each query word is displayed in conjunction with a distinctive representation uniquely associated with each displayed word.”

EX1048, 1:66-2:4. “For the preferred use of color as the distinctive representation, for the example given above of A and B query words, next to each document listed in the results window would be a multi-colored bar of which one color represents the A word and a different color the B word.” EX1048, 2:41-45. EX1048’s Figure 4 shows an example where the user searched for “car sales europe” and “the user can tell at a glance which of the documents s/he may desire to peruse.” EX1048, 5:55-56. For example, “the word ‘car’ is displayed on a lightly shaded background 41.” EX1048, 5:39-40. Figure 4 indicates that “[t]he first document contains the word ‘car’ only,” because the first indicator 49 only contains the lightly shaded background 41 (EX1048, 5:56-58), and thus that first indicator 49 also indicates that the other search terms – “sales” and “europe” – are **not** present in that search result.

47. As another example, EX1049 is a US patent application publication that published in 2006 (cover code (43)) from an application filed in 2004 (cover code (22)). EX1049 relates “to a method and system to search a database for relevant items of information.” EX1049, [0001]. EX1049’s Figure 1 is a “graphical user interface” (GUI) that “provides comparative results of queries in visual form.” EX1049, [0026]. “As terms are added to the query, documents are retrieved and listed in pane 16 alongside the color-segmented bar 52 (respective colors corresponding with the color of subfields 32, 34, and 36) whose length indicates the strength of the term in that document (i.e., extent of relevancy).” EX1049, [0031]. For the example three-term query, “the first item on the list includes all three of the search terms,” as indicated by “all three colored segments [being] shown in bar 52 next to the title 50” and “remaining matches in pane 16 are ordered in such a way that produces an overall pattern (a+b+c, a+b, b+c, c+a), which puts like documents next to each other.” EX1049, [0031]. Thus, the visualization in EX1049 allows the user to see which terms are and are not present in each search result.

48. Thus, it was well-known in the prior art to indicate to a user which of the user’s search terms were and were not present in each search result presented in response to the user’s search query. In my opinion, the only plausible distinction that a person of ordinary skill would see between the annotation system recited in

the '184 patent's challenged claims and those disclosed years earlier in Bates (and others) is the limitation reciting that the annotation itself "*is comprised of a text representing the at least one search term element.*"⁸ That is, for missing search terms, the claims require the warning (annotation) to include the search term's text itself, whereas Bates's example in its figures displays color-coded bars, without text, to indicate missing (and present) search terms.

49. For example, EX1012 discloses "a word index map 640" that uses "one or more visual aspects corresponding to a metric value, such as frequency or count." EX1012, [0051]; *see also* EX1012, [0043] (disclosing that "word indexes may be provided for each search result"). EX1012 discloses that the "[v]isual aspects that correspond to a metric scale" in a word index "may include color, font type, font size, a shape with a particular size that is associated with each word ..., etc." EX1012, [0051]. In the example word index in FIG. 6D, "a word that has a higher frequency metric may have a larger font than another word that has a lower frequency." EX1012, [0051]. Thus, when the word index is used to indicate "a term frequency (tf) metric" (EX1012, [0038]), the texts of each search term would

⁸ In my declaration, unless noted otherwise, I have italicized the claim language and added any emphasis that appears in quotes.

be included and written in a particular font size (or font color or font type) to indicate its frequency in each search result.

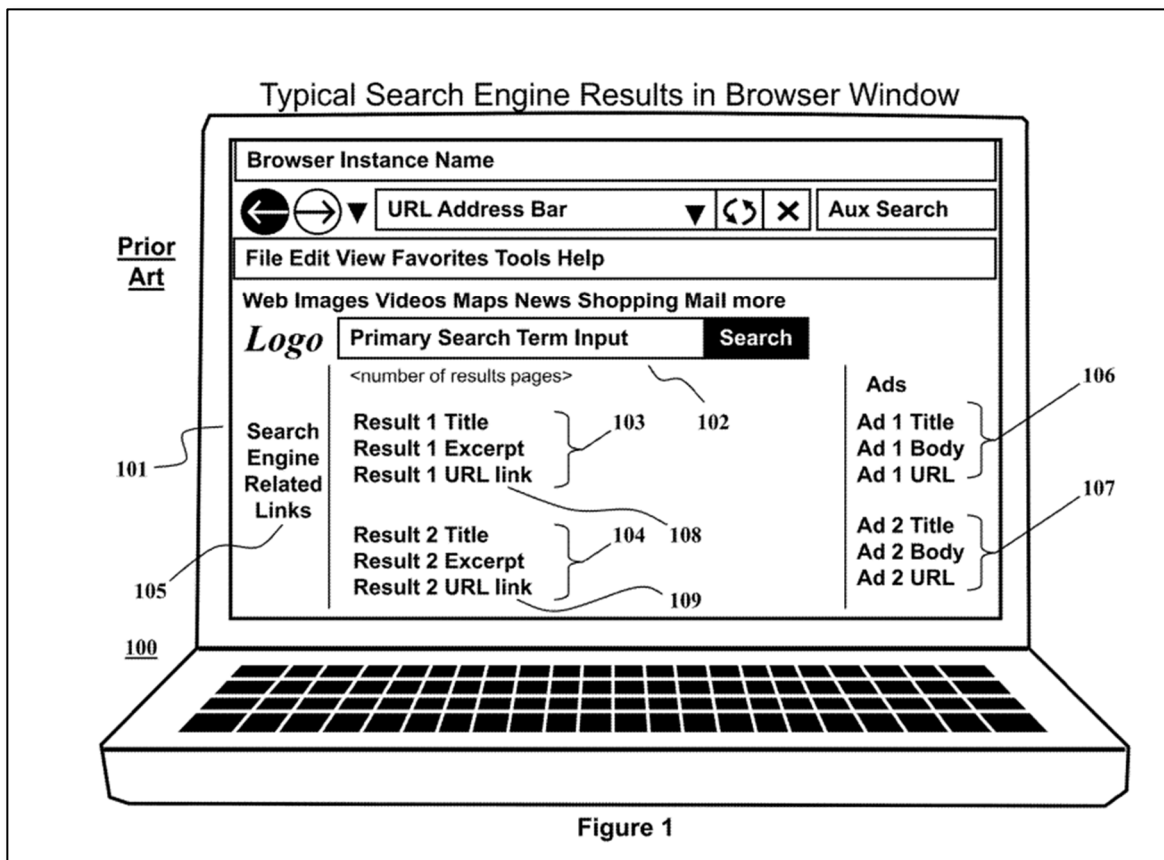
50. Another example of a text-based annotation to indicate the absence of search terms is disclosed in EX1045, which is a US patent application publication that published in 2008 (cover code (43)) from an application filed in 2006 (cover code (22)). In EX1045, “pages that either have no text, or whose text does not contain the search terms, may have been selected and presented as search results because they are referred to by other pages in a manner that uses one or more of the search terms.” EX1045, [0021]. “In such cases, the user can be presented with the referencing information, including the anchor text, in order to relate the user’s query to the result.” EX1045, [0021]. For example, “FIG. 3 illustrates a series of search results 230, 240, 250, 260 and 270, each representing one or more pages deemed relevant to the search string.” EX1045, [0037]. For search result 250, “none of the search terms were found in the page presented as search result 250” but “referencing information 252 is still provided to the user,” where the referencing information is the user’s search term “foobar.” EX1045, [0040], FIG. 3. Thus, a user of this search system would understand that the webpage at search result 250 does not include the search term “foobar,” but is displayed because it is “referred to by other pages in a manner that uses” that search term (EX1045, [0021]).

51. Given the state of the art, in my opinion, a person of ordinary skill would have found the challenged claims to recite nothing more than a predictable combination of known types and uses of text-based search-result annotations to indicate the presence or absence of a search term in a given search result (*e.g.*, as in Bhagat and Mills) with known interface configurations for displaying search results (*e.g.*, as in Bates and Wang). As I discuss further below (§§VIII-XV), it is my opinion that the challenged claims would have been obvious to a person of ordinary skill.

A. Overview of the Specification

52. The '184 patent claims priority to a June 2011 application. The patent alleges that then-existing search engines provided search-result webpages that caused users to waste their time clicking on websites that were “irrelevant or of little inherent use with regard to what the user seeks.” EX1001, 1:57-60. For example, the patent alleges then-existing search engines sometimes returned to users search-result webpages that did not “contain the search terms that [the user] had specified.” EX1001, 2:20-23. The patent says it would be beneficial if users knew “in advance which [search-result] webpages contain which search term elements.” EX1001, 2:38-41. The '184 patent is directed toward that idea.

53. The patent introduces its alleged invention by providing an overview of the prior-art “search engine browser” (EX1001, 2:42-44) depicted in Figure 1 below:



54. As seen above, the browser includes a “search term input bar 102” into which a user enters search terms. EX1001, 2:44-49. A listing of search-result groups 103 and 104 are returned in response to the user’s search terms and each group includes “the title of a search result webpage, some form of excerpt from the webpage, and the URL link at which the webpage is located.” EX1001, 2:44-49.

55. According to the patent, “[i]t would be advantageous if additional information appeared on” the interface that “provides insight to the user on what is contained in the webpage located at each search result URL.” EX1001, 2:59-64. “This foreknowledge of the contents of these webpages could prevent the user from wasting their time reviewing pages that are not relevant to their search.” EX1001, 2:64-66.

56. To provide that “foreknowledge” of what the search-result webpages contain, the patent describes adding annotations that “convey to the user...specific characteristics of the webpage located at the URL corresponding to the search result.” EX1001, 6:24-30. These “characteristics” can include the “presence or lack of presence of the search term elements...in the search results.” EX1001, 6:44-46.

57. Figure 5 (below) shows an example of an “annotated search engine results webpage according to the present invention” with “annotations adjacent each search result grouping to indicate which search term elements are present in the webpage referenced by the search result URL link.” EX1001, 4:33-38.

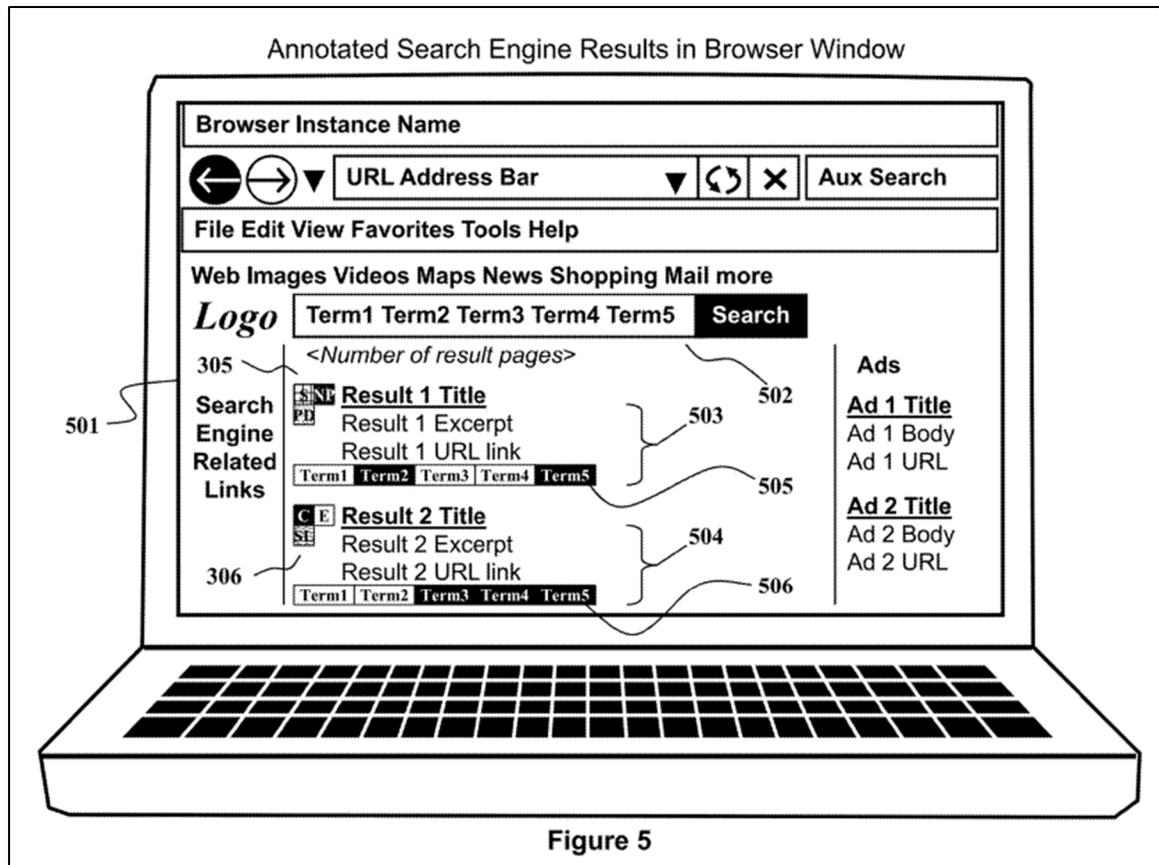


Figure 5

58. As shown above, the prior-art browser has been modified to include “search term elements annotations 505 and 506 indicating for example which search term elements actually appear on the webpage located at the search result URL link.” EX1001, 10:15-19. In Figure 5’s embodiment, “search term elements which are present [are] shown as black text on a white background, with those search term elements that are not present shown with white text on a black background.” EX1001, 10:19-22. The specific “[c]olors and shadings,” however, “are arbitrary and exemplary.” EX1001, 10:23.

B. The Challenged Claims

59. In the Claim Listing Appendix (§XVI below), I have reproduced the challenged claims with labels added for convenience. Independent claim 1 recites a system that aligns with Figure 5’s embodiment. Independent claims 7, 12, 17, and 19 largely mirror claim 1. Among other limitations of the independent claims, each independent claim requires a search result with an “*annotation*” comprising “*a text representing the at least one search term element*” that is “*missing*.”

C. Prosecution History of the ‘184 Patent

60. After an initial amendment, the as-filed application contained claims 1-25. EX1002, 74-86. Of those initially filed claims, claims 1-11 and 15-25 were rejected only for obviousness-type double-patenting, while claims 12-14 were rejected on that basis as well as rejected as obvious over certain prior art references that are not used herein. EX1002, 94-101. The applicant canceled claims 12-14, filed a terminal disclaimer, and originally filed claims 1-11 and 15-25 were allowed. EX1002, 148-171.

VI. CLAIM INTERPRETATION

61. In accordance with the standards for interpreting patent claim terms that I discussed above in Section III, I have interpreted the terms in the claims in accordance with their ordinary and customary meaning as understood by a POSA in the context of the patent (including the descriptions in the specification) and its prosecution history.

VII. SUMMARY OF GROUNDS FOR UNPATENTABILITY

62. I understand that Google requests cancellation of claims 1-22 as follows:

Ground	Reference(s)	Claim(s)	Basis
1A	Bates, Bhagat	1-2, 6-7, 11-12, 16	Obviousness
1B	Bates, Bhagat, Brinson	3-4, 8-9, 13-14	
1C	Bates, Bhagat, Mehta	5, 10, 15, 17-20	
1D	Bates, Bhagat, Mehta, Brinson	21-22	
2A	Wang, Mills	1-2, 6-7, 11-12, 16	
2B	Wang, Mills, Brinson	3-4, 8-9, 13-14	
2C	Wang, Mills, Mehta	5, 10, 15, 17-20	
2D	Wang, Mills, Mehta, Brinson	21-22	

63. I understand that each of the references listed above is prior art to the '184 patent based on its filing date (or filing date of a related application) and/or its publication date. None of these references were cited or discussed during prosecution of the challenged patent. *See generally* EX1002.

VIII. GROUND 1A: BATES, BY ITSELF OR COMBINED WITH BHAGAT, RENDERS OBVIOUS CLAIMS 1-2, 6-7, 11-12, AND 16

A. Bates (EX1010)

64. Bates is a US patent application publication that published in 2002 (cover code (43)) from an application filed in 2001 (cover code (22)).

65. Bates discloses an example of a search-engine interface that uses color to indicate the “occurrence of each keyword” (*i.e.*, a search term) in each search result that the search engine returns and displays in response to a user’s search.

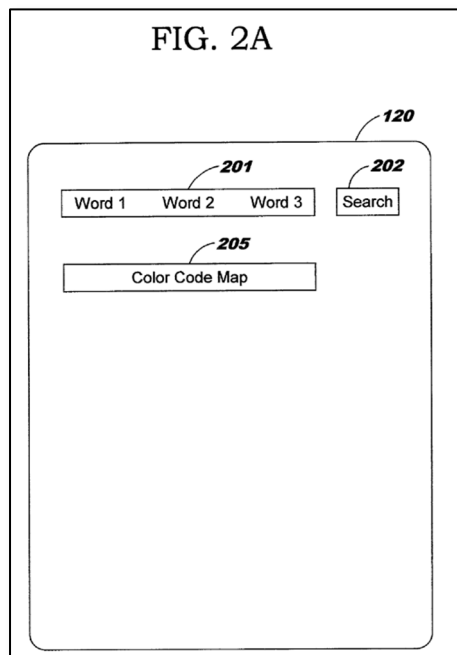
Bates, Abstract. Bates teaches that “color coding search results” allows users to conveniently “interpret[] search output.” Bates, [0001].

66. Bates explains that keyword-based searches are “often interpret[ed]” by search engines “as requests to find web pages that contain any one or more of the keywords,” which may “return[] an unusably large number of sources.” Bates, [0004]. POSAs would understand that Bates is discussing prior art searches that used as their default a so-called Boolean “OR” logical operation, which is satisfied when a search result contains any of the search terms joined by the “OR.” As Bates says, “[f]or example, a searcher might enter three keywords,” but instead of displaying only results that include all three keywords, the “search engine would [] find sources that include” just one keyword “in isolation,” sources that include any two of the keywords, and sources that include “all three keywords.” Bates, [0006]. That is, the Boolean OR operator broadens the search results compared to the Boolean AND operator, which narrows the search results. Bates says that the searcher (*i.e.*, user), however, may only “judge[]” a source to be “relevant to the search” if it matches “at least two of the keywords,” *i.e.*, the searcher does not want results that match only one of the three keywords, but instead wants results that contain at least two (*i.e.*, two or three) of the three keywords. Bates, [0006].

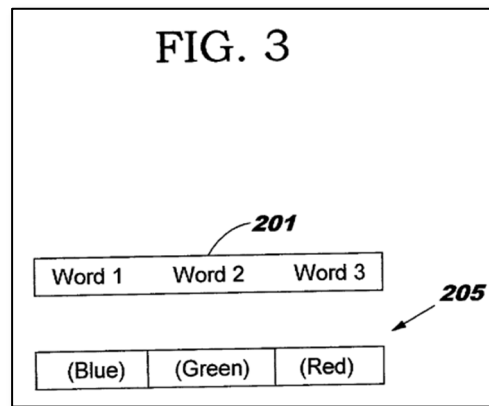
67. Bates therefore identifies “a need for...presenting the results of a search so that the searcher may form an effective picture of the relevance of the

sources found by the search engine” without having to “examine sources that lack relevant information” but are nevertheless displayed “in the list of sources.” Bates, [0009]. Bates addresses this need by collecting “occurrence data that report, for example, whether each keyword is present or absent in each web page,” and displaying within each search result “a correlation indicator” that “includes a visual area that is colored according to [a] color code and the occurrence data.” Bates, [0011]-[0012].

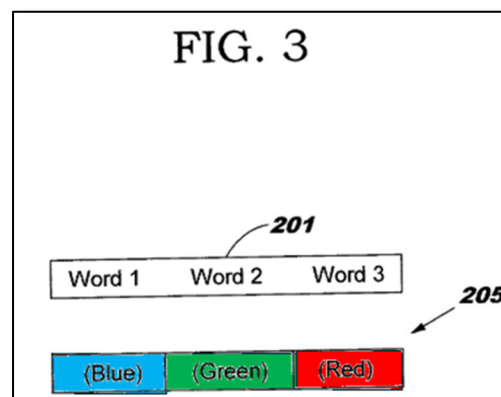
68. Bates’s Figure 2A (below) depicts an interface displayed to a searcher, *e.g.*, on a computer screen (*e.g.*, via a web browser). Bates, [0018], [0026]. As seen below, the interface presents a searcher with “an input line 201, wherein keywords may appear as they are entered.” Bates, [0026]. In Figure 2A, three keywords are shown: “word1, word2, and word3.” Bates, [0026].



69. As seen above, the interface includes “a color code map 205” located beneath the input line, where the map “provide[s] the searcher [] with a visual association between colors and keywords.” Bates, [0026]. Bates’s Figure 3 (below) “shows an exemplary configuration of the color code map” below the input line. Bates, [0029].



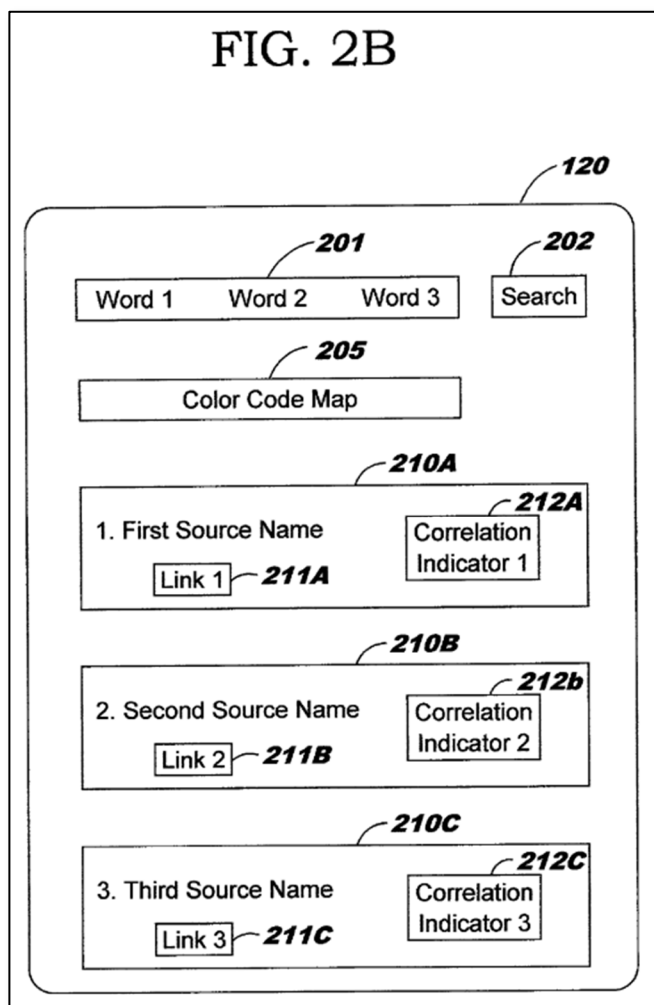
70. The color-code map “visually associate[s] colors with the keywords that appear on the input line 201. For example, keywords word1, word2, and word3 might appear on the input line 201 as shown in FIG. 3, and be associated with the colors blue, green, and red, respectively.” Bates, [0029]. This is seen in the colored version of Figure 3 below:



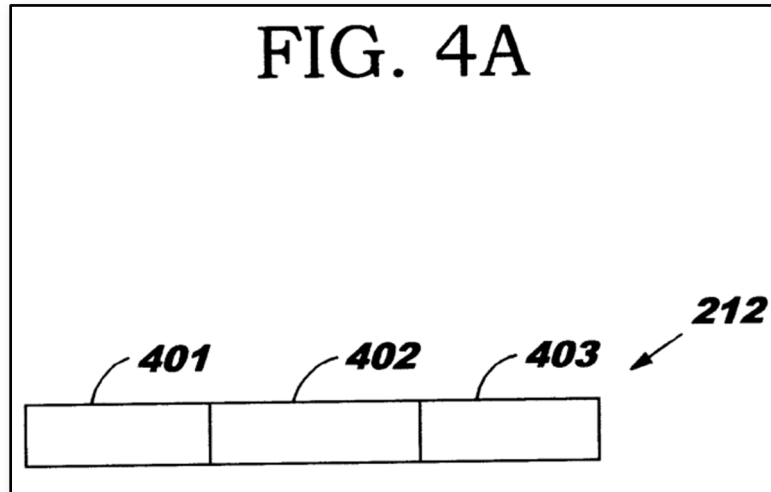
71. In one embodiment, Bates does not use a separate color-code map (like color bar 205 depicted in Figures 2A-2B and 3) but instead changes the font color of each search term as it is typed into input line 201. For example, “word1 might appear in blue characters in the input line 201, word2 might appear in green characters, and word3 in red.” Bates, [0031]. Bates refers to using different color font for each search term as an “implicit” color-code map. Bates, [0031]. I have illustrated an example of an implicit color-code map below, where each keyword that is entered into input line 201 are automatically written in a different font color:

Word 1	Word 2	Word 3
--------	--------	--------

72. Similar to Figure 2A, Bates’s Figure 2B (below) depicts an interface for Bates’s system. Bates, [0018]. As seen below, the input line 201 and color code map 205 are displayed with an “exemplary presentation of search results,” which includes information about webpages 210A-210C that were “found by the search.” Bates, [0027].



73. As seen above, each search result 210 includes a correlation indicator 212. “The correlation indicator 212 may have the form of a horizontal bar as shown in FIG. 2B, divided into a number of segments according to the number of keywords on the display line 201. For example, if there are three keywords, the horizontal bar correlation indicator may have three segments 401, 402, and 403 as shown in FIG. 4A, associated respectively with the keywords and their colors.” Bates, [0033]. Figure 4A’s correlation indicator is shown below:



74. Bates explains how this embodiment of its system works as follows:

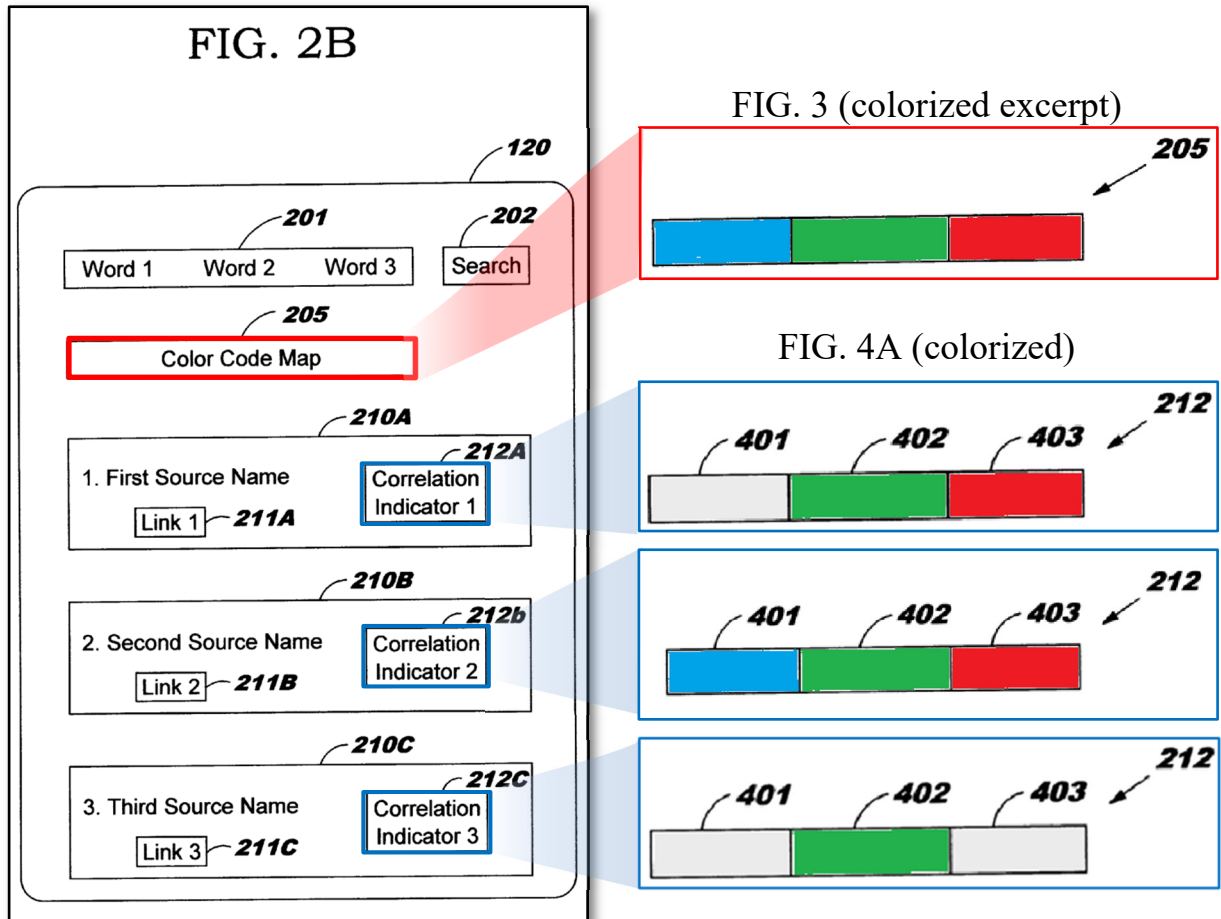
When a URL returned by the search engine 180 contains keyword word1, for example, the first segment 401 of the horizontal bar correlation indicator may be colored blue. If the web page that is identified by the URL returned by the search engine does not contain keyword word1, then the first segment 401 of the horizontal bar may be left uncolored, or colored according to a background color not associated with any keyword by the color code map 205. When the web page contains keyword word2, the second segment 402 of the bar may be colored green, or left uncolored if the web page does not contain keyword word2, and likewise in kind for keyword word3.

Bates, [0033].

75. The demonstrative below is based on Bates's Figures 2B, 3, and 4A, and illustrates an example of Bates's system where webpage 210B contains all

three of the user's keywords, but webpage 210A is missing word1 (as indicated by its correlation indicator having its first segment shaded gray) and webpage 210C is missing word1 and word3 (as indicated by its correlation indicator having its first and third segments shaded gray), where gray is "a background color not associated with any keyword by the color code map 205." Bates, [0033].⁹ "Thus, by glancing at the colors of the correlation indicator 212, the searcher 100 may readily grasp the relevance of the URL to the search." Bates, [0033].

⁹ Bates's specification is a little ambiguous whether the 210 reference labels are intended to be Bates's reference for a "web page" itself or "information about a web page." *See, e.g.*, Bates, [0027] ("The exemplary presentation includes information about a first web page 210A...."). Whether the 210 reference labels (or, alternatively, the 211 reference labels) are the reference to a "web page" or a reference to information associated with a "web page," it is clear from Bates's disclosure that Bates's search engine is searching for and displaying a search results interface for Internet web pages.



76. Bates’s above-depicted embodiment utilizes a correlation indicator that takes the form of a segmented horizontal bar of colors (Bates, [0033]), but Bates teaches that an indicator “may be **any** visual presentation that uses a color code to convey the presence or absence...of keywords in a web page” (Bates, [0036]). Bates thus encourages POSAs to consider alternative designs for its correlation indicators 212.

77. Moreover, as the annotated Figures 2-4 above illustrate, Bates designs its correlation indicators 212 for the search results 210 to mirror the color code

map 205 for the input field 201. POSAs would thus have recognized that in the embodiment in which an “implicit” color map is utilized—*i.e.*, each search term entered into field 201 is coded using a different color font rather than a colored bar (Bates, [0031])—a straightforward matching implementation of the correlation indicator for each search result would have been to use the color-coded search terms themselves as correlation indicators. I discuss this obvious implementation of Bates in more detail below in Section VIII.C.1.

B. Bhagat (EX1011)

78. Bhagat is a US patent that issued August 2015 (cover code (45)) from an application filed in December 2010 (cover code (22)).

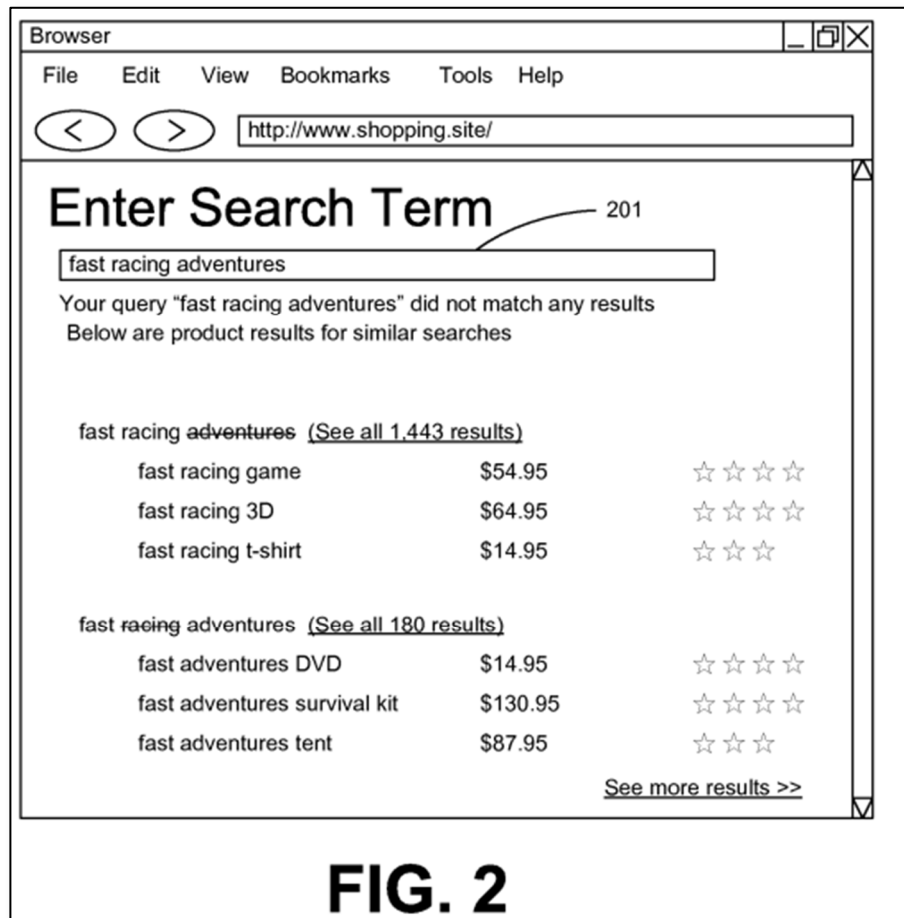
79. While Bates describes a color-based approach to indicating the presence or absence of search terms in search results, POSAs would have known that there were other beneficial ways to visually indicate information about the presence and absence of search terms. As I discuss further below, Bhagat provides one such example in the prior art.

80. Like Bates, Bhagat discloses a user interface for a search engine that is based on, *e.g.*, “keyword matching.” Bhagat, 1:6-10; *see* Bhagat, FIGS. 2-4. Though Bhagat’s examples are in the context of searching an electronic commerce system, Bhagat makes clear (and a POSA would understand) that Bhagat’s search and annotation methodology (that I discuss further below) are also applicable more

generally for a “general purpose search engine.” Bhagat, 1:54-58, 2:50-67. For example, Bhagat discloses an application 110 that “is executed to provide for interaction between the applications on the computing device 103 and clients 106 and/or mobile devices 107.” Bhagat, 4:6-12. Bhagat teaches that “the application server 110 may also include, for example, a web server application” and that the “search application 111” executing on the application server can be “in the context of...a general purpose search engine.” Bhagat, 4:12-25.

81. Bhagat explains that some “search queries submitted by a user to a search engine may yield few and/or no search results.” Bhagat, 1:58-62. Rather than leave the user to believe that there are few or no search results available, Bhagat says it would be beneficial to generate “suggested queries” for the user. Bhagat, 1:62-2:4. The suggested queries can be generated, in part, “by removing one or more search term[s] from [a] search query” to determine if a revised search query matches a “historical search query” that Bhagat’s system knows yielded relevant results. Bhagat, 6:4-22. For example, in response to a “four term search query that yields no products” in a data store, “the search application 111 can determine whether there are three term historical search queries 113 using any three of the four terms that are associated with at least one search result.” Bhagat, 6:23-37.

82. In Figure 2's example (below), the three-word search query "fast racing adventures" typed into a search input line "yields no search results." Bhagat, 8:16-22. In response, Bhagat's system identifies two historical queries related to the initial query by "remov[ing] a search term from the user supplied search query." Bhagat, 8:29-34.



83. POSAs understood that the strikethrough for the text "~~adventures~~" and "~~racing~~" in the first and second sets of search results above indicates that those search results are missing the search term that has been stricken, but include the search term(s) that are not stricken. A user of Bhagat's system would understand

that a term with a strikethrough means the term is missing from the corresponding search results. This because Bhagat's Figure 2 says (under box 201) that the original search "did not match any results." That means that no results (including the ones shown in Figure 2) matched all three of the user's search terms, and, therefore, each group of search results matched a subset of the user's search terms – *i.e.*, the term(s) without a strikethrough – but the group is missing the term with the strikethrough (if they were not missing the stricken term, the original search **would** have matched those results rather than none).

84. Thus, Bhagat taught POSAs that one way to visually indicate to a user that a search term is missing in a particular search result is to display the text of the search term next to the search result in a strikethrough text.

C. Obvious Implementations of Bates and Bates-Bhagat

85. As I discussed above (§VIII.A), the example embodiment illustrated in Bates's figures utilizes a correlation indicator that has a segmented horizontal bar of colors to indicate the presence or absence of search terms within each search result. Bates, [0033]. Bates expressly teaches, however, that its indicator "may be **any visual presentation** that uses a color code to convey the presence or absence...of keywords in a web page." Bates, [0036]. Bates thus encourages POSAs to consider alternative techniques for visually indicating to a user that search terms are present or absent in search results. Bates itself plainly suggests

one alternative technique to POSAs (*i.e.*, combining color-coding and text, *see* §VIII.C.1 below); Bhagat discloses another alternative technique (*i.e.*, strikethrough text of missing terms, *see* §VIII.C.2 below). POSAs would have found that implementing Bates’s system using either technique (or both) would have been obvious for the reasons I discuss further below.

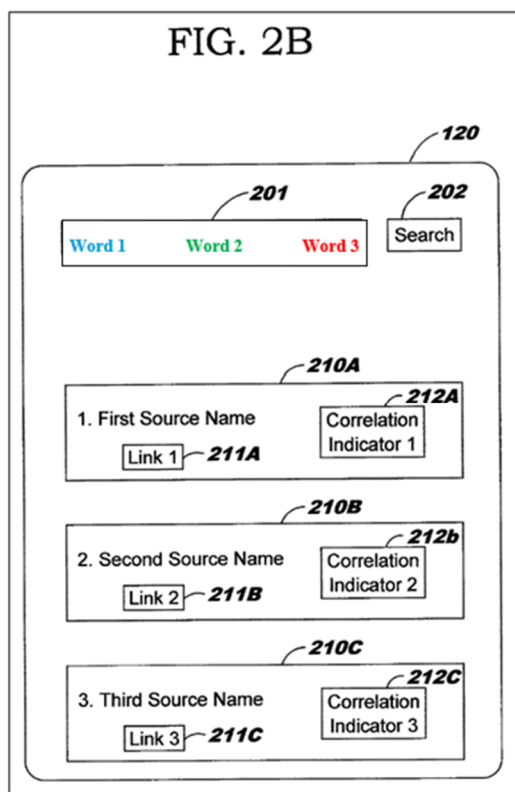
1. Bates Alone

86. In my opinion, POSAs would have had reason to maintain Bates’s preference for “a color code to convey the presence or absence...of keywords” (Bates, [0036]), while nonetheless **also** using a text-based annotation. Bates says “**any visual presentation** that uses a color code to convey the presence or absence...of keywords in a web page” could be used (Bates, [0036]), which suggests to POSAs to consider (and that there exist) other visualizations to convey the present or absence of search terms using color. Indeed, Bates’s disclosure **already suggests** using the text of the search terms as the correlation indicator with different colored font for each term.

87. Specifically, as I discussed above in §VIII.A, Bates discloses an embodiment in which its color-code map is not displayed as a bar of colors, but rather is displayed in an “implicit” manner using font color. Bates, [0031]. In this embodiment, each individual search term typed into the search input line is displayed using different colored text corresponding to an “implicit” color code

map. Bates, [0031]. For example, “word1 might appear in blue characters in the input line 201, word2 might appear in green characters, and word3 in red.” Bates, [0031]; FIG. 2.

88. The demonstrative below uses Bates’s FIG. 2B to illustrate an implementation of Bates’s “implicit”-color-code embodiment:



Bates FIG. 2B (modified)

89. As seen above, each search term entered into input line 201 is assigned a color and the explicit color code map 205 is not displayed. Bates, [0031] (“It is not necessary, however, that the color code map 205 be a horizontal bar...[instead] the color code map 205 may be implicit rather than explicit.”). And while the corresponding correlation indicator for search results in the “implicit”-

color-code embodiment **could** still take the form of segmented horizontal bars of color, a POSA would have recognized that another obvious implementation of Bates that maintains a color-coded correlation indicator would have been to simply use the color-coded search terms themselves as correlation indicators. Indeed, POSAs would have recognized that Bates's Figures 3 and 4 depict an exemplary correlation indicator that uses essentially the same format as the color-code map that is explicitly displayed to the user, and therefore when an "implicit" color-code map is used it would have also made sense for POSAs to use the format of that implicit mapping—*i.e.*, different colored fonts—as the correlation indicators. Beyond a POSA knowing that that would have been a logical implementation of Bates's own explicit teachings, in my opinion, POSAs would have had several additional reasons to make this change.

90. First, POSAs would have recognized that remembering what search term corresponds to each color in Bates's horizontal bar could be unnecessarily cumbersome, and that this added mental burden would be beneficially avoided by simply displaying the colored search terms themselves in the correlation indicators. For example, while a user **could** memorize Bates's color-code map, that could be challenging for long queries and/or when a user is rapidly revising queries by adding, subtracting, or substituting search terms. Alternatively, while a user **could** repeatedly look up at (or scroll to) the top of Bates's search-results webpage to re-

review the color-code map, that could be time-consuming, needlessly annoying, and/or could potentially cause users to lose their place in a long list of search results.

91. POSAs would thus have recognized that using the text of the search terms directly as correlation indicators would convey the same information but beneficially avoid the need to memorize or repeatedly reference the color-code map. POSAs would have wanted to avoid having a user memorize or repeatedly look back to the color-code map because POSAs knew that in user interface design generally there are benefits to reducing users' mental processing load, including by eliminating even small incremental mental tasks elicited by the interface design.

92. My opinion in that regard is corroborated by EX1066, which is a prior art textbook on designing user interfaces. EX1066 (at 74-76) notes that one of the "Golden Rules of Interface Design" (at 74) is to "**Reduce short-term memory load**" (at 75; emphasis original). As Ex1066 notes, there is a "limitation [for] human information processing in short-term memory," which "requires that displays be kept simple" and "window-motion frequency be reduced." EX1066, 75. EX1066 similarly notes that one "objective[] for data display that remain[s] vital" is to have "*Minimal memory load on user.*" EX1066, 80 (italics original). For example, "[u]sers should not be required to remember information from one

screen for use on another screen” and “[t]asks should be arranged such that completion occurs with **few actions**.” EX1066, 80.

93. Second, POSAs would have recognized that using color-coded font rather than merely color-coded horizontal bars as the correlation indicators would have beneficially conveyed the presence or absence of search terms using two compatible forms of visual information: text **and** color. My opinion in this regard is corroborated by EX1023, which discloses, as POSAs knew, that “using **multiple visual features to represent the same data attribute**” beneficially “provides redundant coding and results in an increase in the ease, speed, and accuracy in which the users are able to perceive and interpret the information.” EX1023, [0063]. Including search-term text **and** color-coding of search terms in the correlation indicators would have been the use of two, complementary visual indicators for the same attribute (the presence or absence of search terms) that, when used together, would have increased the ease, speed, and accuracy of a user’s understanding of the information being conveyed by each correlation indicator. That Bates’s “implicit”-color-code embodiment already uses a combination of text and color (*i.e.*, different font colors for the text of different search terms) would have further encouraged POSAs to use both of forms of visual communication as a correlation indicator too.

94. Third, POSAs would have recognized that using color-coded text as Bates's correlation indicator would have been an obvious combination of prior-art search-result annotations (color- and text-based annotations) with Bates's known annotation method to yield the predictable result of using color-coding **and** search-term text to indicate the presence/absence of search terms in Internet search results.

95. POSAs would have recognized that a straightforward implementation of Bates's "implicit"-color-code embodiment would have been to change Bates's correlation indicator from a color-coded segmented horizontal bar to color-coded text of the search terms themselves. Doing so would have made the format of each search result's correlation indicator match the format Bates expressly describes as an alternative for the search input field (analogous to how the original color-bar correlation indicator 212 matched the color-bar map 205 in the explicit-code embodiment). Similar to Bates' horizontal bar correlation indicator, in this obvious alternative the text of each search term would have been displayed using its assigned color when the term is present in the search result, and would have been displayed using an un-assigned color (*e.g.*, a muted-gray font) when the term is not present in the search result. Bates, [0028].

96. POSAs would have found that using a gray / muted-gray font to indicate the absence of search terms in search results would have been a known, beneficial, and easily understood way to indicate the absence of search terms in

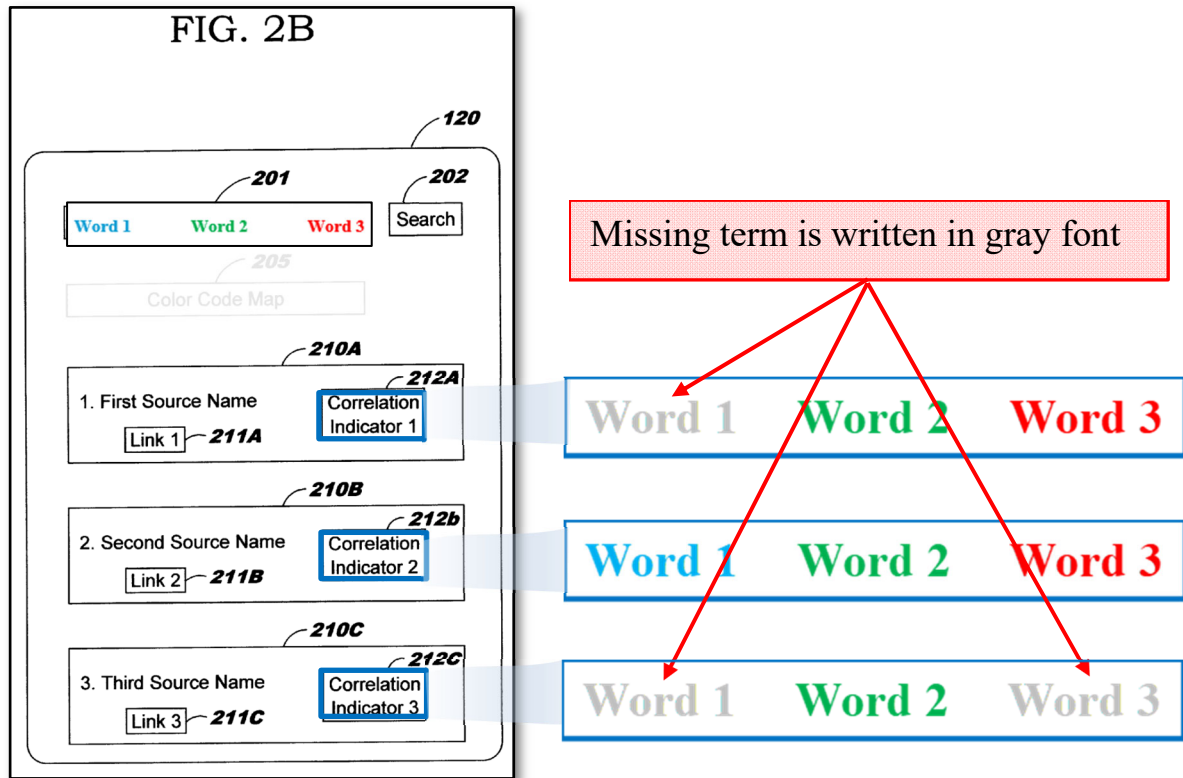
search results. My opinion in this regard is corroborated by EX1046, which “relates to an input interface for selecting keywords that are effective for use in database searches.” EX1046, [0001]. Figure 6 “show[s] an example of a color mapping table.” EX1046, [0017]. The color mapping table displays information, like a “hit ratio,” which represents “the number of hits [of a user’s search term in the returned search results] divided by the number of all the documents stored in the document database.” EX1046, [0046]. EX1046 discloses that “the color gray is allocated to a keyword that has a hit ratio of 0.0000” (*i.e.*, a gray-colored keyword has no hits – it is missing in the search results). EX1046, [0047].

97. My opinion is further corroborated by EX1024, which “relates to customized user interfaces, for example, a graphical user interface (GUI).” EX1024, [0001]. EX1024 discloses using “a muted gray-scale” color to indicate functionality that “is presently unavailable” (EX1024, [0005]), which a POSA would have recognized is similar to a search term being missing in a search result (in the sense that the missing term is unavailable from the search result).

98. Thus, EX1046 and EX1024 corroborate my opinion that it would have been obvious to use color gray / muted-gray to indicate missing keywords in Bates.

99. The following demonstrative depicts the obvious implementation of Bates that I described above, where each correlation indicator includes each search-term’s text in its assigned color (when the search term is present in the

search result) or a gray / muted-gray font (when the search term is missing in the search result):



100. In the above obvious implementation of Bates's correlation indicators, each search term is written in its assigned color when present in a search result and in gray / muted gray when the search term is missing in the search result. Another obvious implementation of Bates's correlation indicators would have maintained Bates's bars of color (*e.g.*, a blue horizontal bar for the first search term; a green horizontal bar for the second search term; and a red horizontal bar for the third search term; etc.) but with the search terms written within those bars in a contrasting color font (*e.g.*, in white font or some other contrasting font color,

based on the background color of the bar). Consistent with Bates's teaching to use an unassigned or white color for missing search terms (Bates, [0033]), the bar for missing search terms would be colored with an unassigned color (*e.g.*, gray / muted gray / white) with the text of the missing search term written in a contrasting color font (*e.g.*, black font).

2. The Bates-Bhagat Combination

101. In view of Bhagat, an alternative obvious implementation of Bates's system to a POSA would have been to change Bates's correlation indicator from a segmented horizontal bar of colors to a text-based indication of whether search terms are present or missing. For example, POSAs would have used the text of the search terms themselves as the correlation indicator with any term missing from a search result being formatted with a strikethrough, as Bhagat teaches (*see* §VIII.B above). In my opinion, POSAs would have had several reasons to make this change.

102. First, as I explained above for "Bates-alone" (§VIII.C.1), POSAs had several motivations to use (or at least add) text-based annotations. As I explained with corroboration, POSAs would have recognized that using (or at least adding) text-based annotations would make Bates's system more user-friendly as a user would not need to memorize a color-code map or constantly scroll up to remind themselves as to what color corresponds to what search term.

103. Second and relatedly, POSAs would have recognized that colorblind users could have difficulty interpreting Bates's color coding because as the number of search terms increased it would become harder to display easy-to-distinguish colors (*i.e.*, to find enough colors that would have appeared sufficiently different from each other for colorblind users). My opinion in this regard is corroborated by EX1019. EX1019 discloses that "[c]olor blindness" "is the inability to perceive differences between some or all colors that other people can distinguish." EX1019, [0002]; *id.*, [0003] (explaining that "different kinds of color blindness result from one or more of the different cone systems [in the human eye] either not functioning at all, or functioning in an unusual way"). EX1019 further states that "[t]he most frequent forms of human color blindness" are "collectively referred to as 'red-green color blindness,'" where a person "ha[s] a harder time differentiating between these colors" (*e.g.*, trouble distinguishing a dark red color from a dark green color). EX1019, [0004]. EX1019 further says that there is "evidence that people with red-green color-blindness see reds and greens as yellows, oranges, and beiges," which "means that yellow, oranges, and beiges **can be confused** with greens and reds." EX1019, [0005]. Though EX1019 says its "much rarer than red-green color blindness," some people also have "complete color blindness or monochromacy, where one **cannot distinguish any color from grey**, as in a black-and-white movie or photograph." EX1019, [0010].

104. My opinion that POSAs had motivation to use (or at least add) non-color-based visual indicators for colorblind users is further corroborated by EX1022. EX1022 discloses “[a] sentiment visualization system” “that provides a method for identifying content sentiment visually, and does so in a way that is also relevant to individuals who are colorblind” by “provid[ing] multiple visual cues that identify sentiment.” EX1022, [0012]. “For example, the system may include a displayed indicator that follows a scale of 0 to 1 and **represents sentiment in several ways**, such as a user-defined color scheme, **hover text that provides a text description of the sentiment**, and a notched bar.” EX1022, [0012].

105. My opinion that POSAs had motivation to use (or at least add) non-color-based visual indicators is further corroborated by EX1051. EX1051 discusses aspects of various “World Wide Web Consortium (W3C)” standards that “relate[] to the accessibility, technical validity or other attributes of web content.” EX1051, [0017]. EX1051 includes “excerpt[s] from the W3C’s WAI’s Web Content Accessibility Guidelines,” which advises web content designers to “1. **Provide equivalent alternatives to auditory and visual content**” and “2. **Don’t rely on color alone.**” EX1051, [0028]. POSAs would have recognized that including the text of the search terms as part of Bates’s correlation indicators would satisfy both of those recommendations. EX1051 (at [0026]) further notes that another technical “standard[] for web content accessibility” taught that “(a) A

text equivalent for every non-text element **shall be provided**” and “(c) Web pages shall be designed so that **all information conveyed with color is also available without color.**”

106. Therefore, POSAs would have recognized that using (or at least adding) search-term text in each of Bates’s correlation indicators would have made the indicator easier to understand for colorblind / visually impaired users.

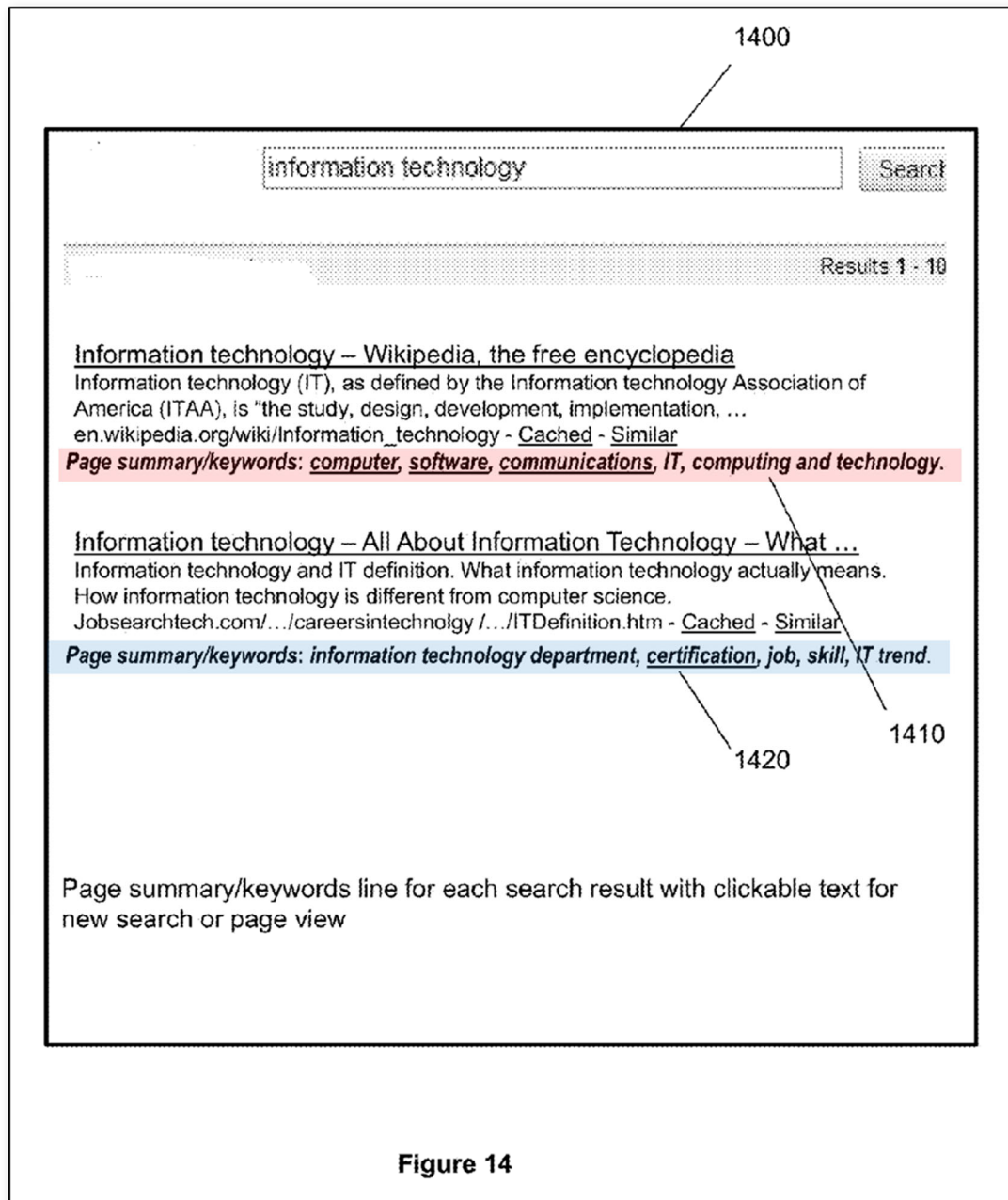
107. Third, POSAs would have known that some devices had black-and-white-only displays, which would have made differentiating between more than two colors difficult (and would have been increasingly difficult as the number of search terms increased). My opinion in that regard is corroborated by EX1020, which “relates to the field of mobile communications and more particularly to improved mobile advertisement syndication for mobile communication facilities.” EX1020, [0005]. EX1020 considers its invention in the context of conventional “wireless communication” devices, such as “a mobile phone, cell phone,..., handheld device, personal digital assistant (PDA)” (EX1020, [0044]), some of which were known to have “a black and white LCD” or a “grayscale LCD” (EX1020, [0048]). My opinion is further corroborated by EX1021, which discloses “a handheld electronic device” with a conventional “liquid crystal display” (EX1021, [0030]), which could be “a black and white display (i.e., a monochrome display rather than a colour display)” (EX1021, [0042]).

108. POSAs would have recognized that for devices with black-and-white-only displays, using search-term text as the correlation indicator would have made it easier to display and easier for the user to understand the indicator.

109. Fourth, using text rather than color (or just color) to convey information regarding a search result would have been the simple substitution of one known element (color-boxes-based annotations) for another (text-based annotations) to obtain predictable results (using search-term text to indicate the presence / absence of search terms in individual search results). This is because, as I demonstrate below, using text to convey information about the contents of a search result would have been well known to a POSA.

110. My opinion in this regard is corroborated by EX1030, which “relates to information management technologies, and more particularly, to technologies for automated topic discovery in documents, content highlighting, document search and ranking.” EX1030, 1:22-25. Figure 14 (annotated below) illustrates providing additional “information about the entire content of” “web pages in” “search results.” EX1030, 18:15-21. At the bottom of each search result in Figure 14 are “summary lines 1410 and 1420” (highlighted red and blue, respectively) that “allow users to immediately have a quick idea about the main topics of the page before committing more time and effort to reviewing the whole page.” EX1030, 18:26-29. Each “summary/keyword[] line” discloses text of “summary/keywords”

associated with the search result that the user can review to understand “the main content of the page” “without spending time in opening the page and reading the whole content.” EX1030, 18:34-40.



111. My opinion that POSAs would have been aware of using text-based information to convey information about the contents of a search result is further corroborated by EX1045. EX1045 “relates to providing additional context for search results.” EX1045, [0021]. Figure 3 (annotated below) “is an example of a rendered web page providing search results.” EX1045, [0017]. “FIG. 3 illustrates a series of search results 230, 240, 250, 260, and 270, each representing one or more pages deemed relevant to the search string.” EX1045, [0037]. EX1045 explains that “[s]ome pages” “have no text at all, or no text that contains the search string.” EX1045, [0038]. “Search result 240 illustrates an example of such a page, containing no text in common with the search string.” EX1045, [0038].

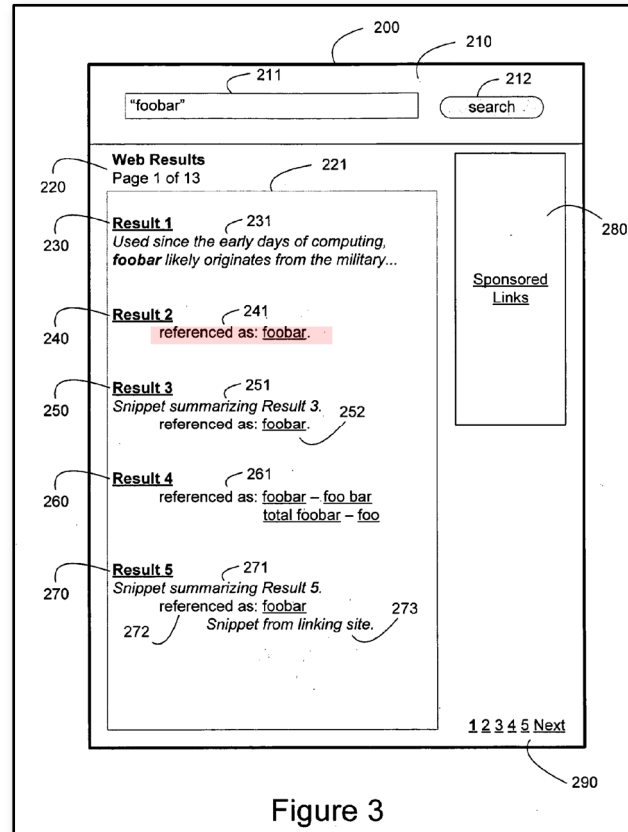


Figure 3

112. “However, as illustrated in FIG. 3, referencing information 241 [red highlight] can be provided in addition to the search result 240, illustrating to the user the connection between their search string and the selection of the page identified by result 240.” EX1045, [0039]. EX1045 elsewhere explains that a page “is determined to be relevant to the user’s search term because of the anchor text in other pages that links to that page, [which] can be presented by including that anchor text.” EX1045, [0008]. In other words, the “referenced as” search term 241 in Figure 3 above is a text-based annotation that identifies a search term (or term related to a search term) that is not in the result’s webpage but is instead text used in another webpage that links to the result’s webpage.

113. Thus, the choice to use text rather than color (or the combination of text and color) to convey information would have been a routine design choice for POSAs as both options accomplish the same predictable result: visually conveying the same information to a user regarding the presence/absence of search terms in search results for an information retrieval system.

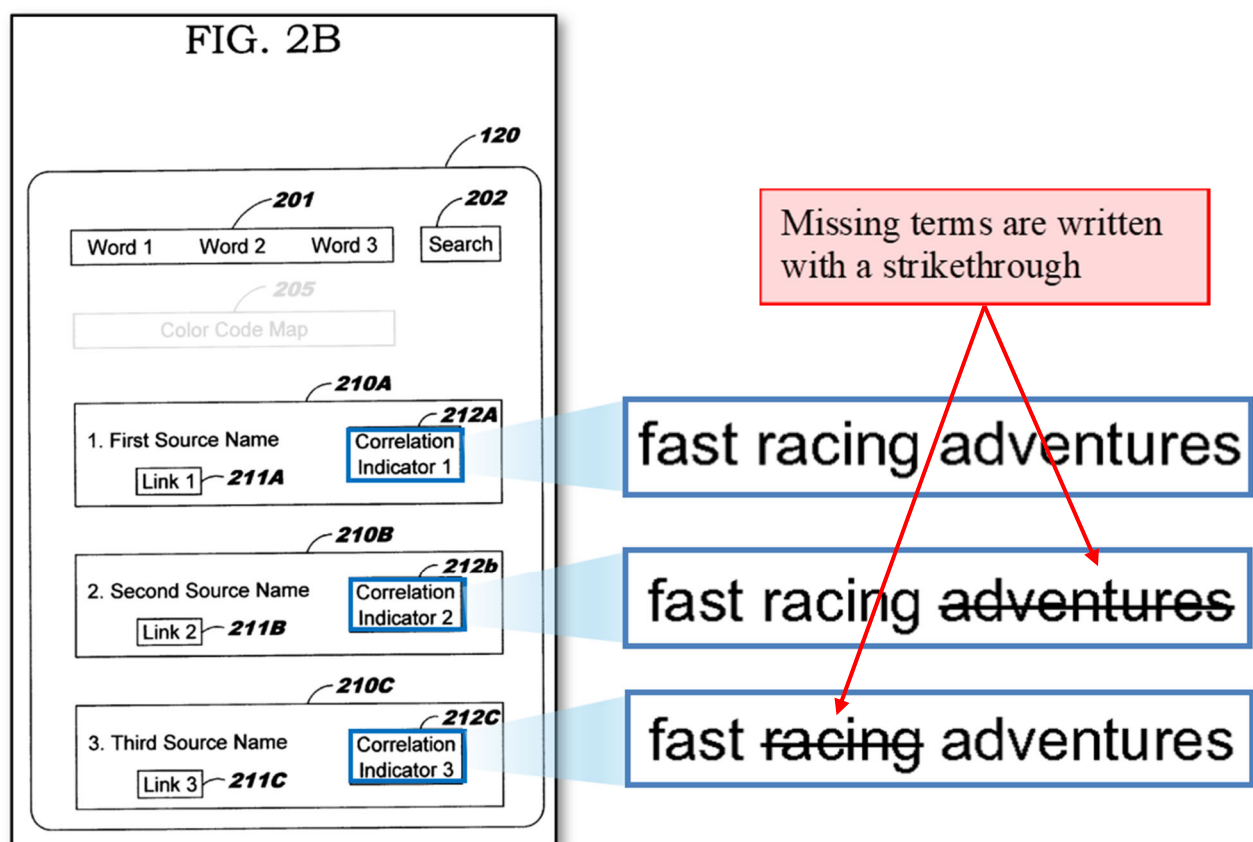
114. Finally, while Bates may express a preference for color-coded correlation indicators to indicate the presence or absence of search terms (Bates, [0036]), POSAs would not have been discouraged from pursuing known alternative techniques for indicating the same information, like Bhagat’s text-based annotations. As I discussed above (§VIII.A), Bates’s correlation indicator uses

different colors in different segments of the correlation indicator to indicate whether each search term is present or missing in each search result (*e.g.*, white or some unassigned color (say gray) to indicate missing terms). As I also discussed above (§VIII.B), Bhagat similarly annotates groups of search results that are responsive to various subsets of the user's search terms by, among other things, writing each search-term element adjacent to its corresponding group of search results, either with or without a strikethrough. Bhagat, FIGS. 2-3, 8:19-34, 8:51-56. And as I discussed above (§VIII.B), like the color-coded boxes in a Bates correlation indicator, POSAs understood that a strikethrough in Bhagat indicates that the term is missing in the corresponding search results and that no strikethrough indicates that the term is present in the corresponding search results. POSAs would have thus recognized that Bhagat's text-based annotations convey the same information as Bates's correlation indicators: the presence or absence of individual search terms in search results. Therefore, POSAs would have known that Bhagat's text annotations could easily be implemented using color font (as Bates suggests [0031]) with added strikethroughs as an alternative to an annotation of black font with added strikethroughs, further confirming that Bates's preference for color would not have discouraged POSAs from pursuing the proposed combination.

115. As I explained above in this section, POSAs would have known that there were several benefits to using text-based correlation indicators and thus would not have been discouraged from using such indicators in a system based on Bates simply because Bates expresses a general preference for color. Indeed, POSAs would have known that Bhagat's text annotations could easily be implemented using color font (as Bates suggests at [0031]) with strikethroughs added to missing terms, as an alternative to Bhagat's black font with added strikethroughs. That alternative modification of Bates in view of Bhagat further confirms that Bates's preference for color would not have discouraged POSAs from pursuing the proposed combination because including the text of the search terms in colored font and strikethroughs for missing terms were complementary annotations. Given the motivations to use text-based annotations and Bhagat's disclosure of text-based annotations that convey the same information as that conveyed by Bates's correlation indicators, POSAs would have had reason to apply Bhagat's text-based annotations to Bates's correlation indicators.

116. In the combination (which I will refer to as "Bates-Bhagat" or the "Bates-Bhagat combination"), rather than color-coded horizontal bars, the correlation indicators would use the text of the user's search terms, where (based on Bhagat) a strikethrough indicates a search term is absent from a search result. Using Bates's Figure 2B (annotated below left) as an example based on the search

query and annotations illustrated in Bhagat's Figure 2 (excerpted below right), the correlation indicators in Bates-Bhagat would display the user's search terms, with a strikethrough format used for a search term that is missing from a search result (and, as discussed above, optionally also in greyed-out or colored font). For example, in response to the user's search for "fast racing adventures," the second and third correlation indicators below indicate that "adventures" is missing from the second search result 210B and "racing" is missing from the third search result 210C.



3. Reasonable expectation of success

117. In my opinion, POSAs would have reasonably expected success in the two combinations discussed above (§§VIII.C.1-2). This is because, for Bates-alone (§VIII.C.1), Bates explicitly teaches how to replace color-bar coding with text-color coding (Bates, [0033]) and, for Bates-Bhagat (§VIII.C.2), Bates says its correlation indicators can use “**any visual presentation** that uses a color code to convey the presence or absence...of keywords in a web page” (Bates, [0036]) and Bates explicitly collects search-term occurrence data like that used to generate Bhagat’s strikethroughs (*see* Bhagat, 2:15-17). Moreover, both references rely on conventional search-computing technologies, like web browsers and search engines. Bates, [0024]; Bhagat, 2:15-17. Thus, it would have required only POSAs’ ordinary programming skill to implement the obvious implementations of Bates-alone and Bates-Bhagat that I discussed above. That Bates and Bhagat are in the same field (search-result interfaces) and address the same problem (how to provide users with helpful information regarding their searches) further underscores the references’ compatibility.

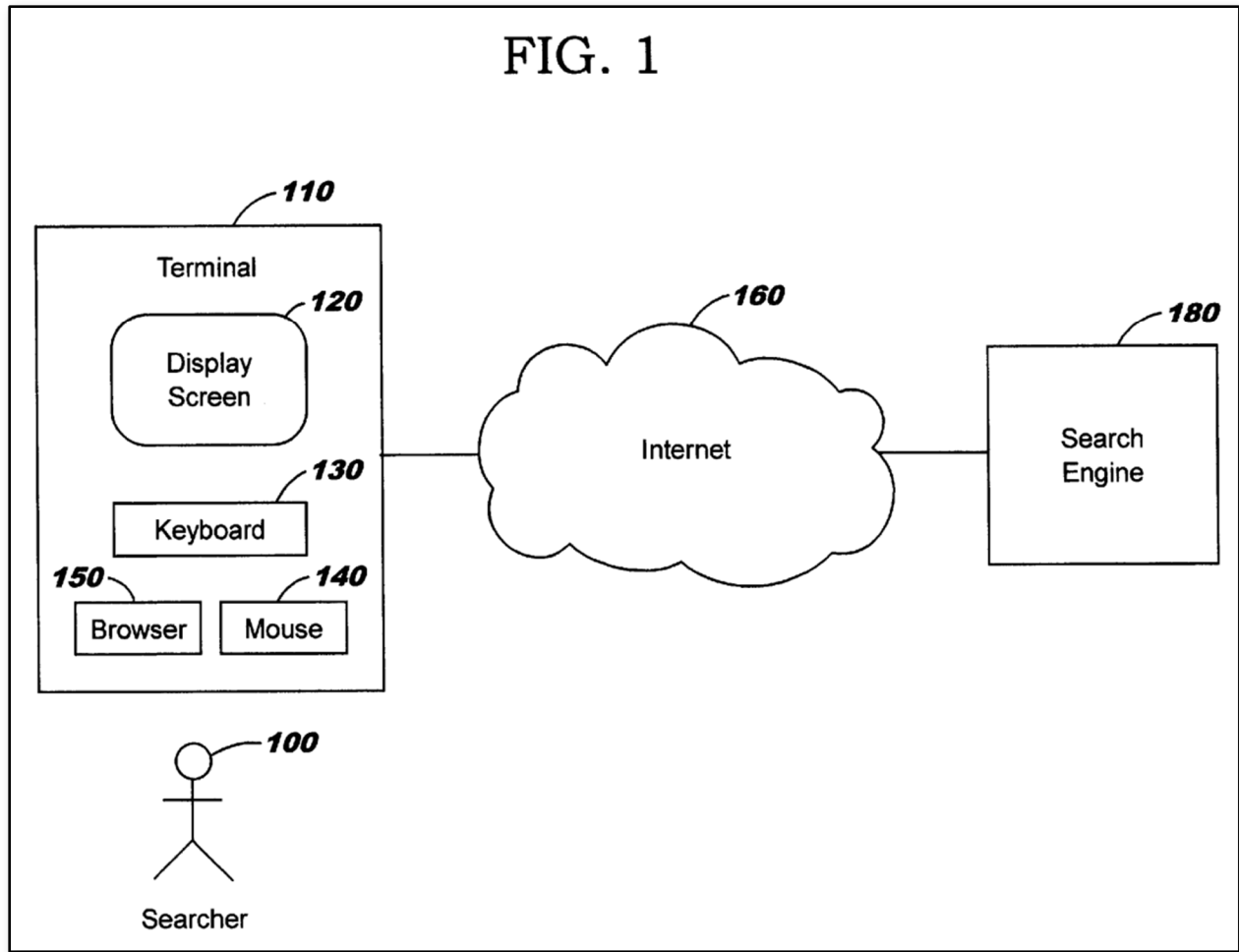
D. Mapping to the Challenged Claims

1. Claim 1

- a. **[1PRE] In an Internet search system for displaying search results during an Internet search process, the search results being generated based on user-specified search term elements, where at least one search result references a webpage that is missing at least one search term element, a method for providing an interactive graphical user interface for the user to readily discern such search result without opening its referenced webpage, the method comprising:**

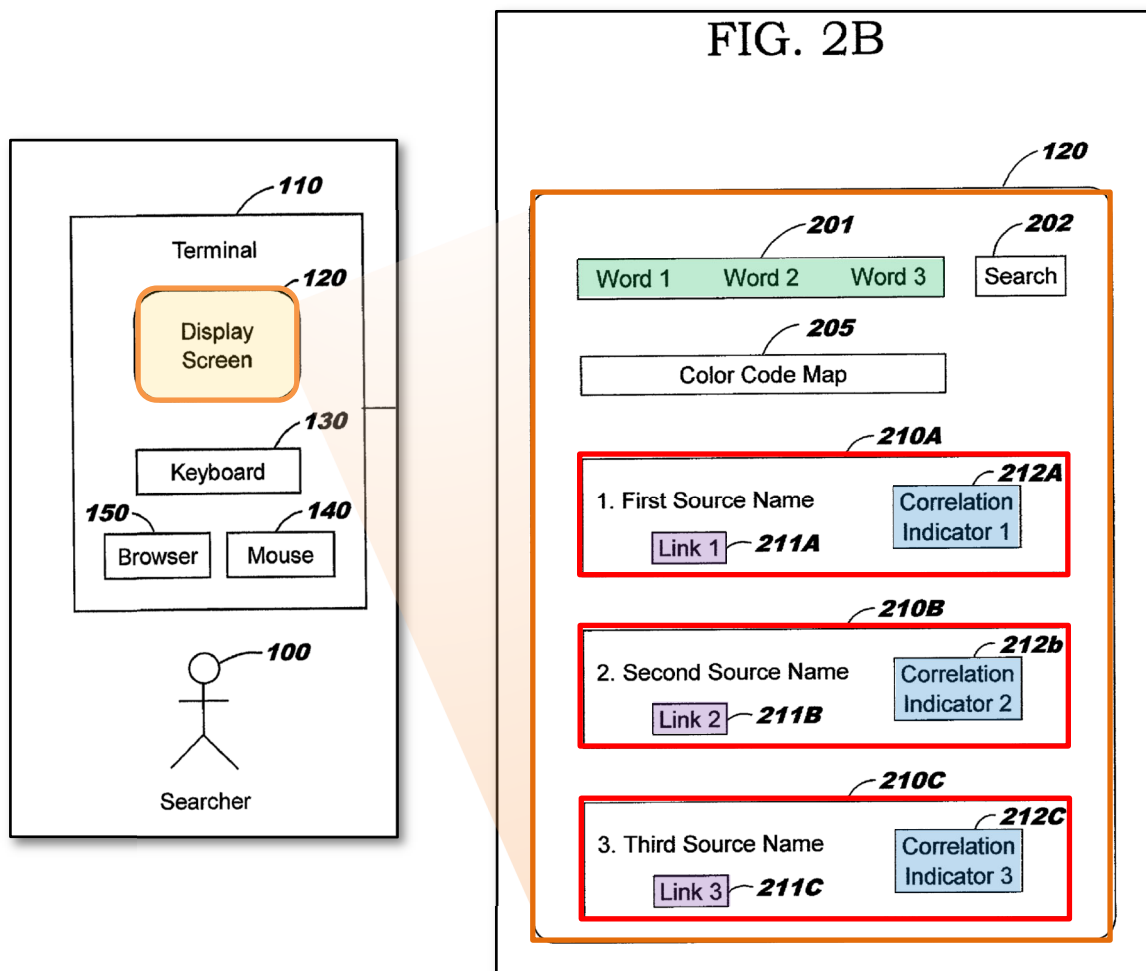
118. Bates discloses a *system* “for color coding search results” when “Internet users conduct searches to find pages on the Word World Web” (*i.e., an Internet search system*). Bates, [0001]-[0002].

119. Bates’s FIG. 1 (below) “shows an exemplary search environment,” *i.e., a system*, where “a searcher [*user*] employs a terminal 110” having a “browser 150 th[at] displays on the display [screen] 120 links to the sources [*e.g., webpages*].” Bates, [0023], [0039]. The sources are provided by “[t]he search engine 180[, which] executes the search, and returns to the browser 150 a list of source locators such as URLs that identify sources found by the search.” Bates, [0039]. *See also* Bates, [0011] (“The search engine executes a search, and sends to the browser a set of uniform resource locators (URLs) that identify web pages purportedly relevant to the search....”).



120. “To conduct a search, the searcher 100 may enter keywords” (*i.e.*, *user-specified search term elements*) “into the [terminal’s] browser.” Bates, [0024]. As illustrated in Figure 1 (which I have highlighted and excerpted below left), the terminal’s “display screen” (orange) displays the search engine’s *interactive graphical user interface* (GUI) illustrated in Figure 2B (which I have highlighted below right). Bates, [0024]; EX1001, 5:15-17 (“The user interface...appears...in a browser window....”). The example search below comprises “keywords word1, word2, and word3,” *i.e.*, three *search term elements*

(green), and the GUI displays “information about” three *search results* (210A-210C; red) that *reference webpages* at links 211A-211C (purple), respectively. Bates, [0026]-[0027].



121. The *search results* are generated based on the user-specified search term elements. For example, if “a searcher” “enter[s] three keywords,” “[t]he search engine would then find sources [webpages] that include the keyword[s].” Bates, [0006]; *see also* Bates, [0024] (“The search engine 180 conducts an **Internet search to locate web pages that contain the keywords**, according to

methods that are well known to those skilled in the art, and returns to the browser
150 the results of the search.”).

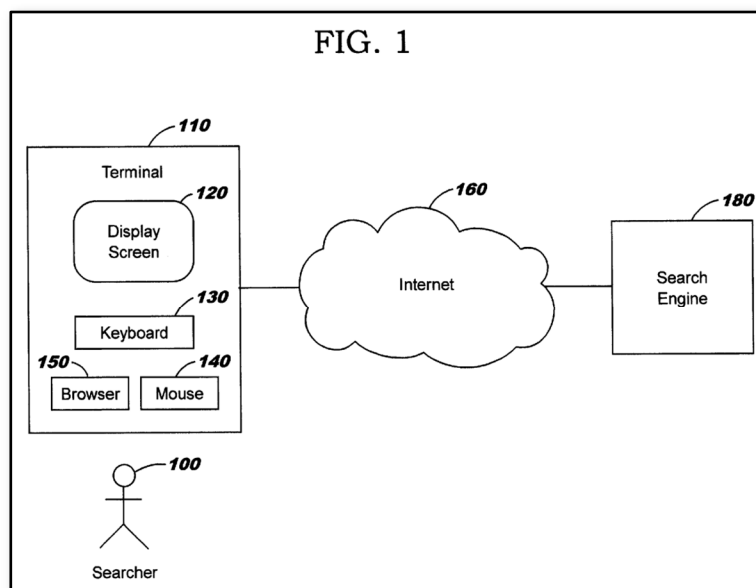
122. As illustrated above, each search result above has a correlation
indicator 212 (blue) that indicates when a *search result references a webpage that
is missing at least one search term*. For example, when “the web page...does not
contain keyword word1, then the first segment 401 of the horizontal bar may be
left uncolored, or colored according to a background color not associated with any
keyword by the color code map.” Bates, [0033]. The correlation indicator,
therefore, allows “the searcher” to “readily grasp the relevance of the URL to the
search.” Bates, [0033]. *See also* Bates, [0015] (“Thus the searcher may readily
grasp the relevance of each source to the search by glancing at the colors of the
correlation indicators, and no longer needs to rely on the positions of the sources in
the list returned by the search engine.”), [0009] (invention addresses “a need for a
way of presenting the results of a search so that the searcher may form an effective
picture of the relevance of the sources found by the search engine, in order that the
searcher need not examine sources that lack relevant information yet appear
nevertheless”), [0040] (“searcher may now readily grasp the relevance of each
source such as a web page from visual presentation of colors by the correlation
indicators, and no longer need waste time and communication bandwidth accessing

and viewing sources that lack relevant information but appear nevertheless”); *see also supra* §VIII.A (Bates overview).

123. Thus, Bates’s *interactive GUI* allows *the user to readily discern a search result* that is a missing search term *without opening its referenced webpage* because the user can see the correlation indicator identifying the missing term without having to open the webpage to ascertain that information. *See also infra* §§VIII.D.1.d-e ([1C]-[1D]; where I discuss the annotation formats of Bates-alone and Bates-Bhagat).

- b. [1A] receiving, on a server, a first search request submitted via the Internet by a user operating a computing device with a display screen, wherein the first search request is comprised of one or more search term elements;

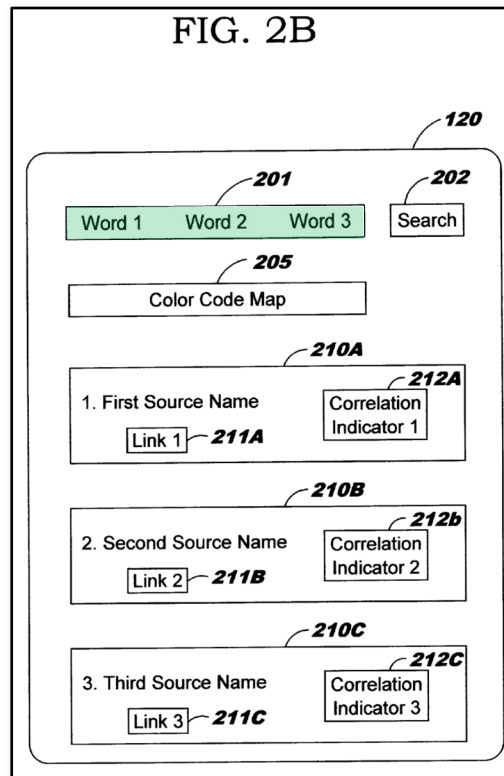
124. Bates’s FIG. 1 (below) shows Bates’s “terminal 110” (a user-operated *computing device*) with a “display screen 120” and “browser 150.” Bates, [0024].



125. “To conduct a search, the searcher 100 may enter keywords into the browser,” which are “sen[t]...over the Internet” “to the search engine.” Bates, [0024], FIG. 1. Thus, Bates discloses *receiving*, by the search engine, a *first search request*. Because Bates’s search engine “executes a search” (Bates, [0011]) using search terms received over the Internet, it would have been conventional, beneficial, and obvious for the search engine to be implemented as *a server*.

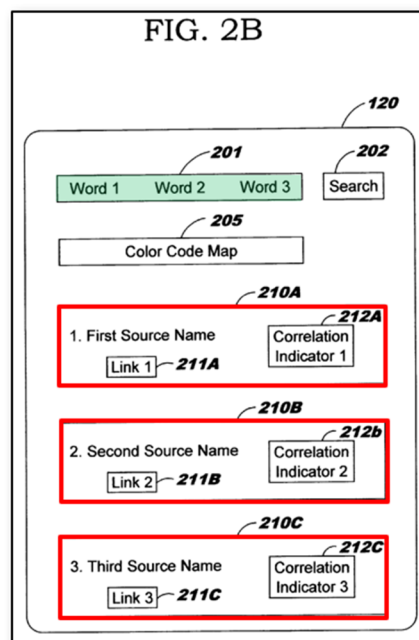
126. My opinion in that regard is corroborated by EX1032, which discloses that “[s]earch engines are server-based software products which use specific, sometimes proprietary means to identify web pages relevant to a user’s query.” EX1032, [0067]. My opinion is further corroborated by EX1037, which discloses that “[c]onventional search engines typically reside on ‘server’ computers.” EX1037, 6:32-40.

127. Bates's Figure 2B (which I have highlighted below) shows an example *first search request* (green) comprising three “keywords word1, word2, and word3,” *i.e.*, three *search term elements submitted via the Internet by a user* for *receiving on* the search engine, which is (or in an obvious, conventional implementation would be) a *server*, as I explained above. Bates, [0026]-[0027].



- c. [1B] generating a plurality of search results based at least in part on the submitted first search request, wherein the plurality of search results is comprised of:

128. Bates's "search engine executes [the] search, and sends to the browser" information for "web pages purportedly relevant to the search." Bates, [0011], FIG. 1. For example, if "a searcher" "enter[s] three keywords" "[t]he search engine would then find sources [webpages] that include the keyword[s]." Bates, [0006]; *see also* Bates, [0024] ("The search engine 180 conducts an Internet search to locate web pages that contain the keywords, according to methods that are well known to those skilled in the art...."). Bates's Figure 2B (which I have highlighted below) shows "information about" three *search results* (210A-210C; red) which are *generated* by the search engine *based at least in part on* ("relevant to"; Bates, [0011]) *the submitted first search request*. Bates, [0026]-[0027].

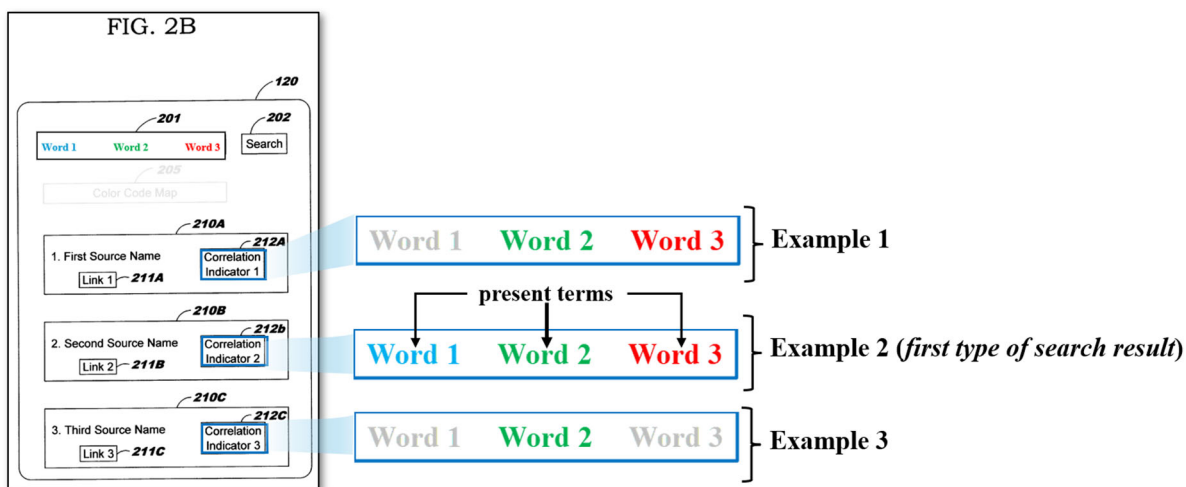


- d. [1C] (i) a first type of search result which references a first webpage that contains all submitted search term elements; and

129. Bates recognizes that with, *e.g.*, three keywords (*search term elements*) some of the search results will include “sources that include **all three keywords**” (Bates, [0006]).

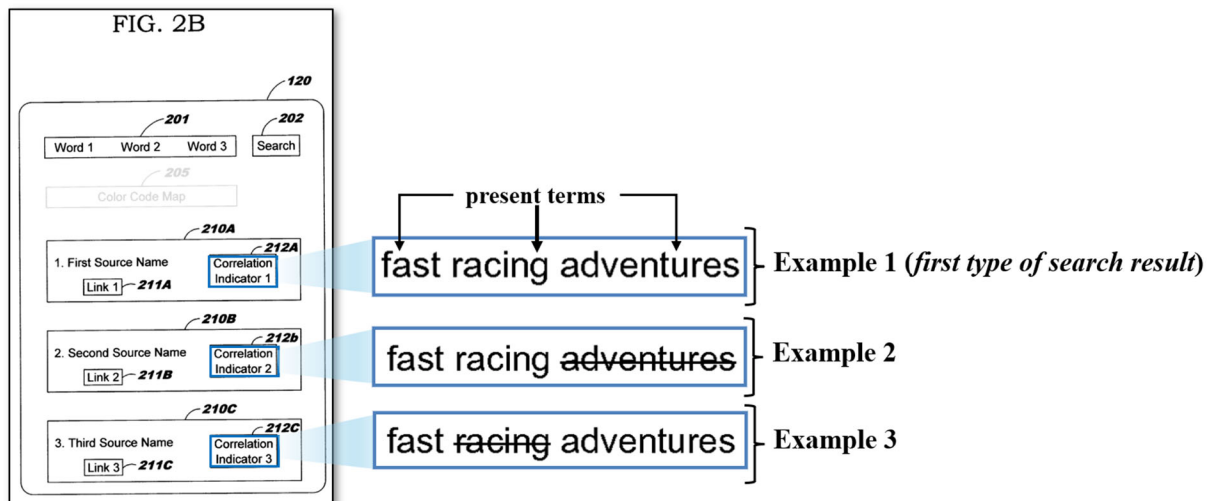
130. The illustration of Bates-alone below shows three search results. The second search result (210B; Example 2) meets *a first type of search result which references a first webpage (at link 211B) that contains all submitted search term elements*, as indicated by its correlation indicator displaying all search terms in their respective colors. *See also supra* §VIII.C.1 (discussing Bates-alone combination).

Bates-alone



131. Likewise, the illustration of Bates-Bhagat below shows three search results. The first search result (210A; Example 1) meets *a first type of search result which references a first webpage (at link 211A) that contains all submitted search term elements*, as indicated by its correlation indicator displaying all search terms without strikethrough. See also *supra* §VIII.C.2 (discussing Bates-Bhagat combination).

Bates-Bhagat

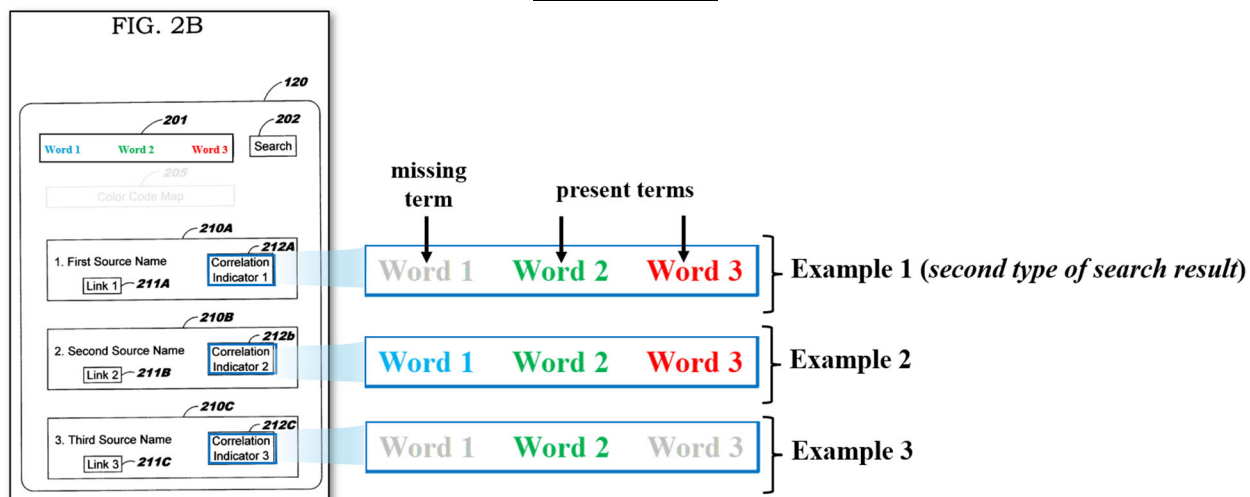


- e. [1D] (ii) a second type of search result which references a second webpage that is missing at least one submitted search term element;

132. Bates's search results will also include webpages that “do[] not contain [a] keyword.” Bates, [0033].

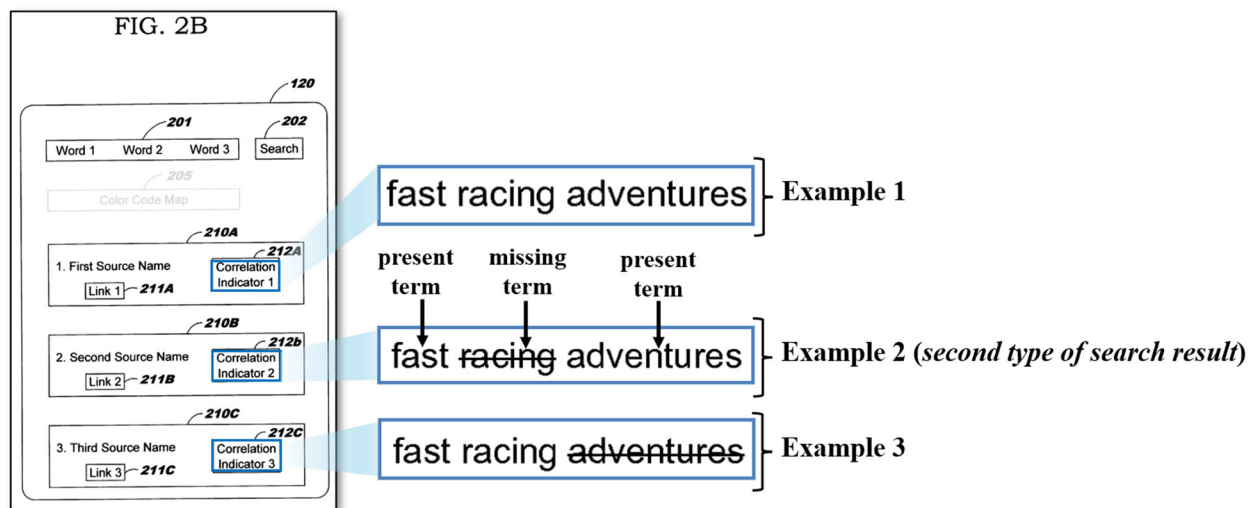
133. In the illustration of Bates-alone below, the first search result (212A; Example 1) meets *a second type of search result which references a second webpage* (at link 211A) *that is missing at least one submitted search term element* (“Word 1”), as indicated by “Word 1” being displayed in a grayed-out font. *See also supra* §VIII.C.1 (discussing Bates-alone combination).

Bates-alone



134. Likewise, in the illustration of Bates-Bhagat below, the second search result (Example 2) meets *a second type of search result which references a second webpage (at link 211A) that is missing at least one submitted search term element* (“racing”), as indicated by “~~racing~~” being displayed in strikethrough format. See *also supra* §VIII.C.2 (discussing Bates-Bhagat combination).

Bates-Bhagat

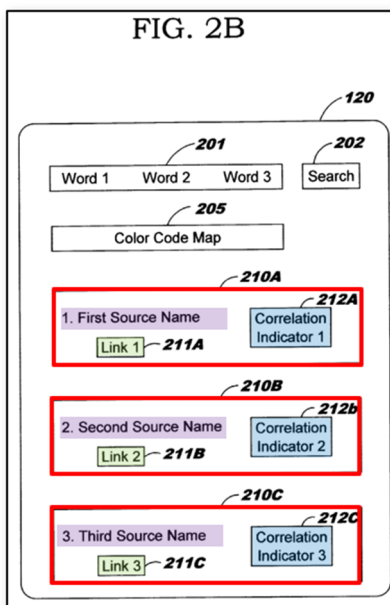


- f. [1E] causing the display screen to display the first and second types of search results on a search results webpage;

135. As I illustrated above (limitations [1C]-[1D], §§VIII.D.1.d-e), in Bates-alone and Bates-Bhagat, *the first and second types of search results* “appear on the display screen” in *a search results webpage* displayed in the terminal’s browser. Bates, [0026]-[0027], FIG. 2B; *see also* Bates, [0023] (“The terminal 110 may also include a browser 150 for accessing and viewing pages of the World Wide Web (web pages).”).

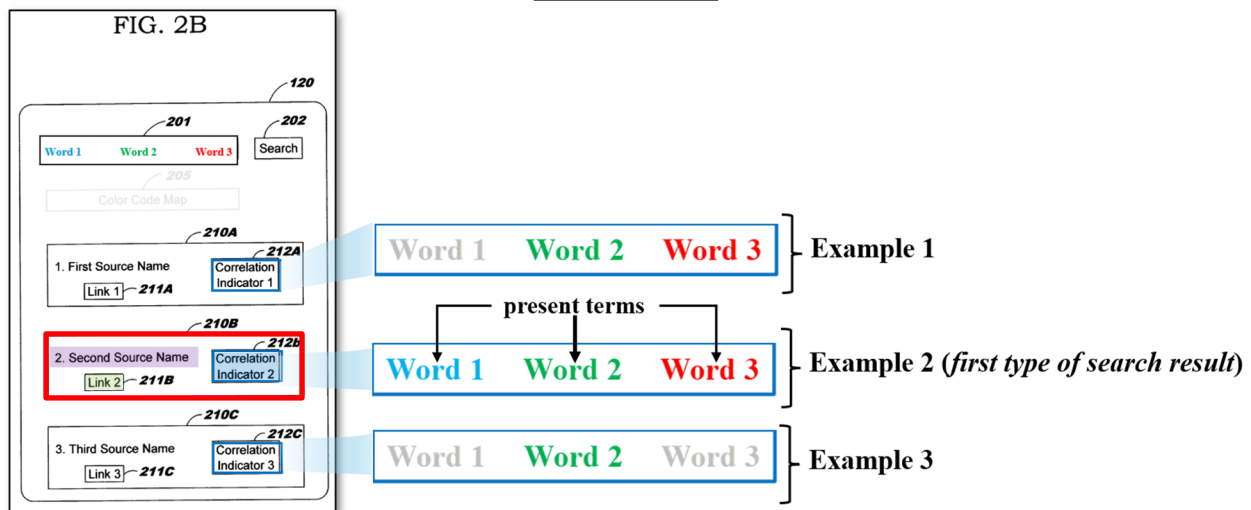
- g. [1F] causing the display screen to display the first type of search result as a first search result grouping, wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage, and wherein the first search result grouping does not include any annotation for missing search term elements;

136. Bates's FIG. 2B (which I have highlighted below) shows “an image...on the *display screen*” for the search-results webpage. Bates, [0027]. The interface presents “information about” each “web page,” which is *organized* as a *search result grouping* (red-boxes) that comprises a Source Name (*i.e.*, a *title* (purple)), a “URL 211[] that identifies the” “*web page*” (green), which is both an *Internet link* (*e.g.*, “**Link 1**” in FIG. 2B) and a *URL*, and a correlation indicator (blue). Bates, [0028] (explaining that the same type of information is provided for every search result).

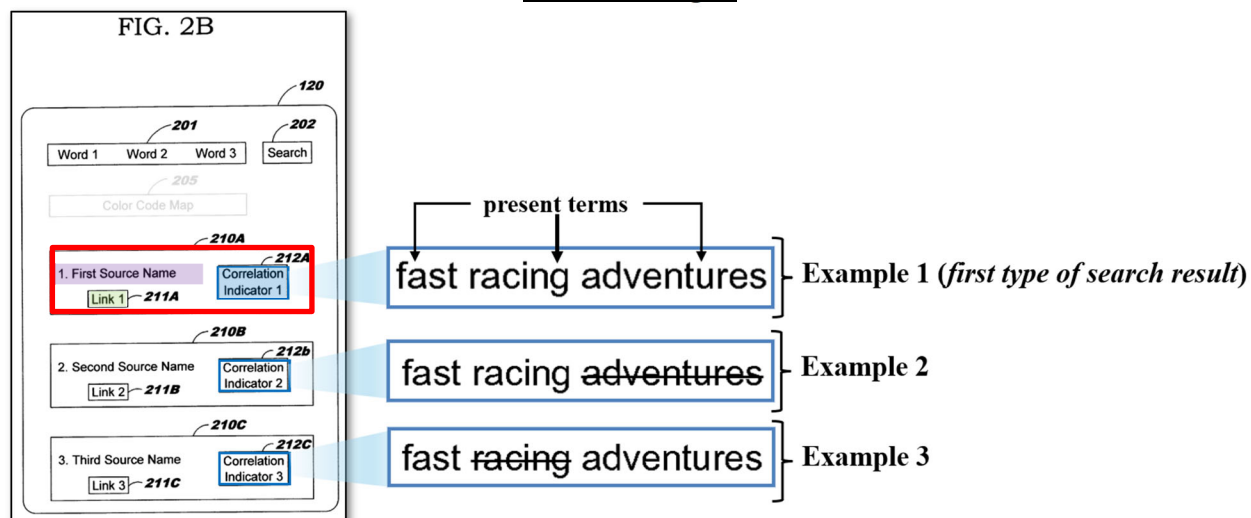


137. Using the illustrations of Bates-alone and Bates-Bhagat that I discussed above ([1C], §VIII.D.1.d), in each *first type of search result* shown below the *grouping* (red box) *does not include any annotation for missing search term elements* because there are no missing search terms in the *first type of search result*. The corresponding correlation indicator for that search result (highlighted blue on the left) displays each search term in its assigned color (Bates-alone) and/or without strikethrough (Bates-Bhagat), and thus is not an annotation *for missing search term elements*; instead, it indicates that all search terms are present.

Bates-alone



Bates-Bhagat



138. If limitation [1F] (and limitation [1G] below) were to require that the correlation indicators themselves must be within the page transmitted to the computing device via the Internet (*e.g.*, html code for generating the correlation indicators is transmitted by search-engine system to the computing device, as opposed to the indicators being generated by the browser based on the occurrence data and search-results webpage generated by the search-engine system), that would have been an obvious alternative implementation of Bates-alone (§VIII.C.1) and Bates-Bhagat (§VIII.C.2) as a matter of a conventional design choice. POSAs would have known that it was common in the prior art for annotations to be generated by a server connected to the user computing devices via the Internet. Having the server generate the annotations, as opposed to each user's individual computing device, would have beneficially reduced the processing load on user computing devices (which would have been especially advantageous for user using

less-powerful devices and/or “dumb” terminals) and would have also made updating easier (because the updating would have primarily occurred at a small number of centralized servers as opposed to numerous end-user devices).

139. My opinion in this regard is corroborated by EX1012, which relates “to providing search results and associated information in response to a search term query.” EX1012, [0001]. EX1012 discloses “a word or phrase index [that] is determined for a set of search results and this index is provided along with the search results.” EX1012, [0021]. The “word index may also be displayed with one or more metrics,” which “can be displayed as numbers or by some form of visual representation or map.” EX1012, [0042]; EX1012, [0051] (disclosing that “visual aspects corresponding to a metric value, such as frequency or count” “may include color, font type, font size,..., etc.”). EX1012 further discloses that the “word indexes may be determined by [a] search and index server” that is part of or separate from a “search server” accessible over the Internet. EX1012, [0029].

140. My opinion in this regard is further corroborated by EX1034, which “provid[es] a visual indication of [search] results that include both an identification of matching data objects and an extent to which the objects match respective ones of the search parameters.” EX1034, 4:11-14. Figure 1 “shows a graphical user interface that may be used in accordance with one aspect of the present invention.” EX1034, 4:42-43. Figure 3 “illustrates modules of the server” used in EX1034’s

system and Figure 4 “illustrates logical operations of the server.” EX1034, 4:47-50. EX1034 discloses that the server includes “a User Interface Display Handler,” which “is invoked to calculated and return the results display user interface (previously described with reference to FIG. 1).” EX1034, 6:52-7:21.

141. My opinion is also corroborated by EX1049, which discloses in its Figure 1 a “graphical user interface” (EX1049, [0021]) that includes “color coded segmented bar[s]...whose length indicates the strength of the [search] term in that document” (EX1049, [0031]), which are similar to Bates’s correlation indicators. As shown in EX1049’s FIGS. 3-4, EX1049 discloses a “User Interface Display Handler” in the search engine server that “is invoked to calculate and return the results display user interface (previously described with reference to FIG. 1) to provide an abstract graphic representation of the data and its relevance to the query.” EX1049, [0040].

- h. **[1G] causing the display screen to display the second type of search result as a second search result grouping, wherein the second search result grouping is comprised of an annotation showing the at least one search term element missing in the second webpage and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage, and wherein the annotation is comprised of a text representing the at least one search term element; and**

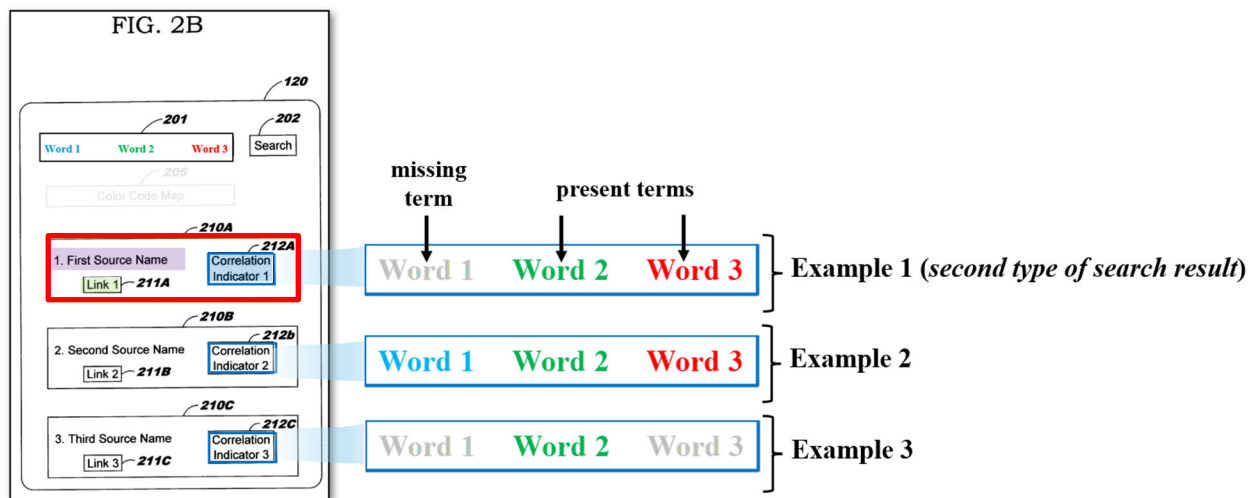
142. Like each first type of search result that I discussed above ([1F]), Bates's method causes the display screen to display each *second type of search result* ([1D]) *as a second search result grouping that comprises a Source Name (title), an Internet "link to a [] URL 211B that identifies the [second] web page,"* and a correlation indicator. Bates, [0027]-[0028]. As I illustrated above ([1D]) and as I discuss further below, those correlation indicators meet [1G]'s *annotation*.

143. Bates's search engine transmits "occurrence data that report...whether each keyword is present **or absent in each source** [webpage]." Bates, [0024]; *see also* Bates, [0011 ("The search engine executes a search, and sends to the browser a set of uniform resource locators (URLs) that identify web pages purportedly relevant to the search, along with occurrence data that report, for example, whether each keyword is present or absent in each web page...."). Using that data, Bates's correlation indicator will visually indicate which terms are present or absent in each search result, as I explained above in §VIII.A. *See* Bates, [0032]-[0033].

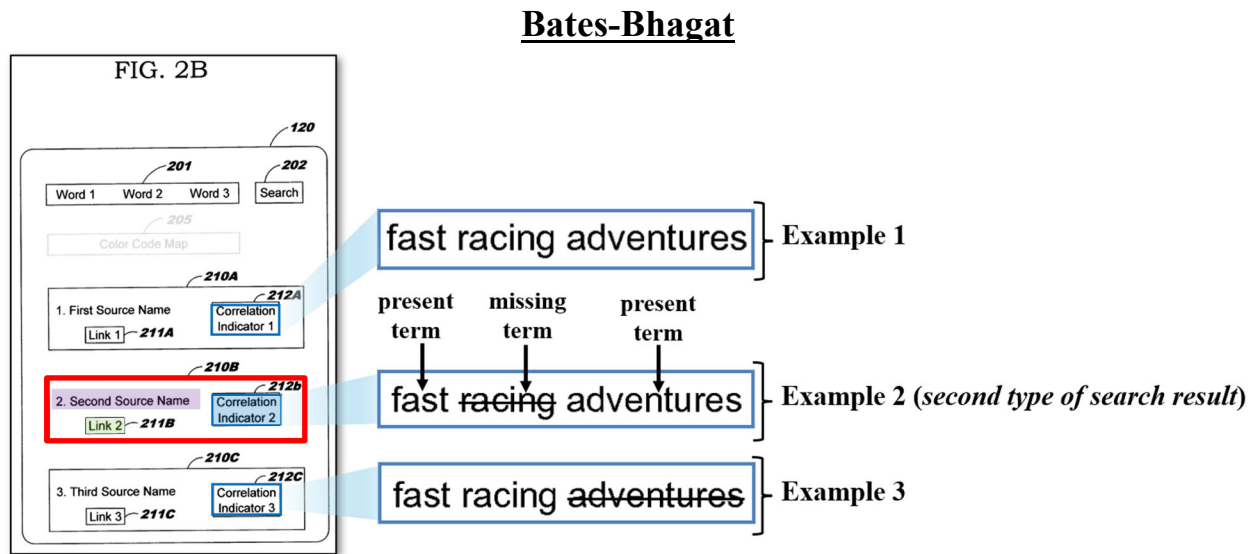
144. Thus, the correlation indicator will *show* (using the example formats discussed below) when *the at least one search term element is missing in a webpage*.

145. In Bates-alone, as illustrated below, *the annotation for the example second type of search result (210A; Example 1) comprises text representing the missing search term element (“Word 1”) written in a font “color not associated with any keyword by the color code map 205” (Bates, [0033]) (e.g., muted-gray)*.

Bates-alone



146. In Bates-Bhagat, as illustrated below, *the annotation* for the example *second type* of search result (210B; Example 2) *comprises text representing the missing search term element* (“~~racing~~”) in a strikethrough format (and as I discussed above (§VIII.C.2) colored font can also be used in Bates-Bhagat’s correlation indicators).



- i. [1H] wherein the annotation enables the user to readily discern, without opening the second webpage and navigating away from the search results webpage, that the second webpage is missing the at least one search term element, and by not opening the second webpage a faster execution is enabled for the Internet search process.

147. As Bates says, the correlation indicator (*annotation*) allows “the searcher” (*the user*) to “**readily grasp the relevance** of the URL to the search” (Bates, [0033]), so the user “**no longer need waste time...accessing and viewing** sources that lack relevant information” (Bates, [0040]). *See also* Bates, [0015],

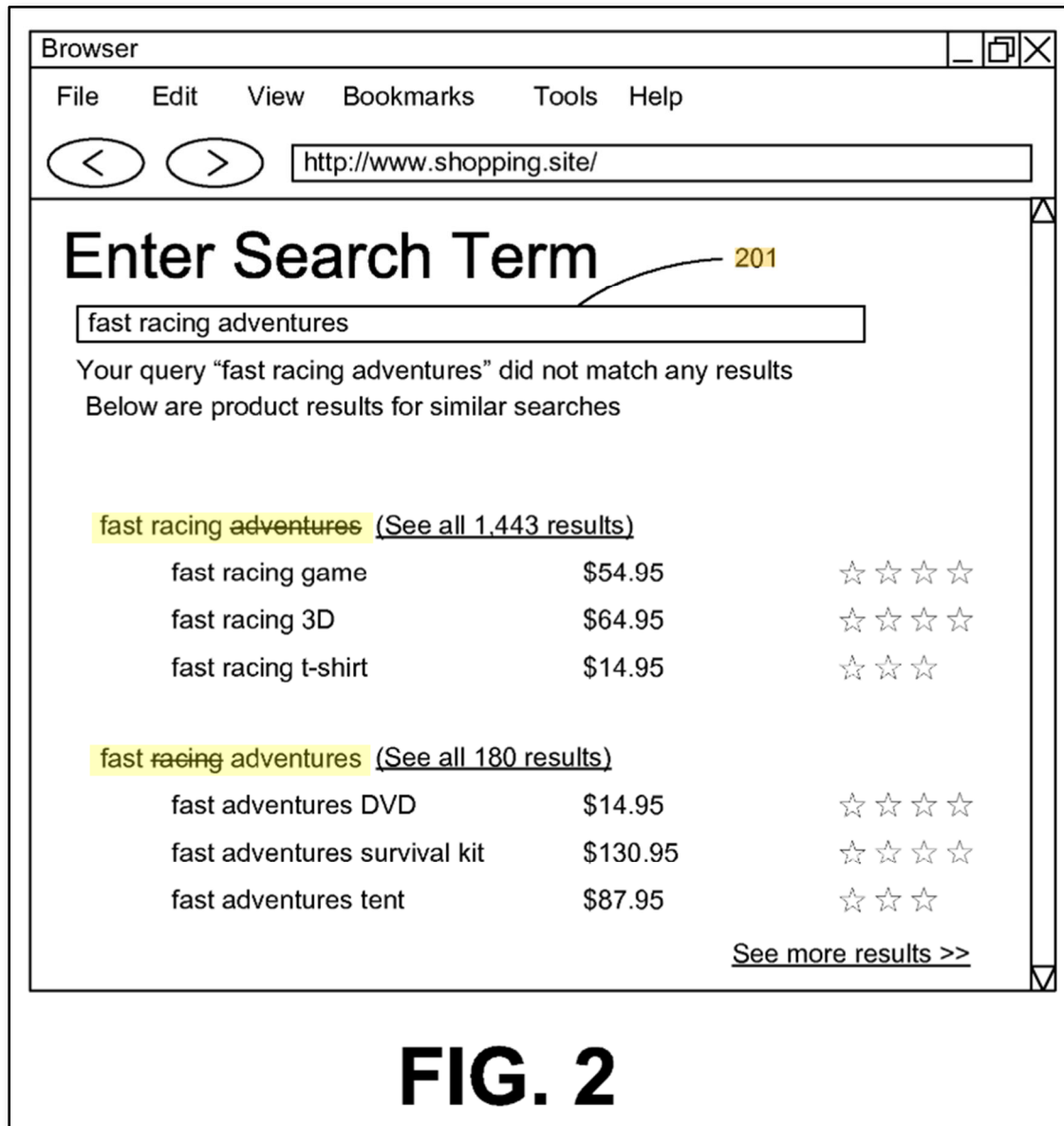
[0009], [0033]. As I illustrated above ([1G]), *the annotation for the second webpage enables the user to readily discern, without opening the second webpage and navigating away from the search results webpage, that the second webpage is missing the at least one search term element* because the missing term is written in an unassigned color, e.g., gray-font (Bates-alone) and/or with a strikethrough format (Bates-Bhagat). Thus, *a faster execution is enabled for the Internet search process* because the user need not spend time opening the second webpage and navigating away from the search results webpage to ascertain information about what search term(s) is/are missing from the second webpage.

2. Claim 2

The method of claim 1, wherein the annotation is displayed as one or more standalone lines in the second search result grouping; and wherein the annotation is displayed at the bottom of the second search result grouping.

148. Though Bates's example embodiments display correlation indicators on the righthand-side of each search-result grouping, POSAs understood that was an aesthetic design choice and it would have been obvious as a conventional, alternative design choice to display text-based *annotations* (as used in Bates-alone and Bates-Bhagat) *as one or more standalone lines in the search result grouping at the bottom of the search result grouping*. My opinion in this regard is corroborated by multiple prior art references, as I discuss below.

149. For example, Bhagat’s FIG. 2 (which I have highlighted below) displays a text-based annotation (yellow) – the altered search query text (*see supra* §VIII.B) – as a *standalone line* above each group of search results.



150. In my opinion, POSAs, given their background knowledge, would have considered displaying a text-based annotation (as in Bates-alone and Bates-Bhagat) **below** each group to be a simple and well-known design choice. For example, EX1029’s FIG. 3 (which I have highlighted below) corroborates POSAs’ background knowledge that “one of the many possible ways for” a “search engine to arrange” “content metadata” (*e.g.*, text-based annotations; highlighted yellow below) *as one or more standalone lines in that is displayed at the bottom of each search result grouping*. EX1029, 3:26-30 (annotations are “content metadata” for each website); 3:22-26 (noting “various orientations, prominence, and detail” for these text-based annotations are possible).

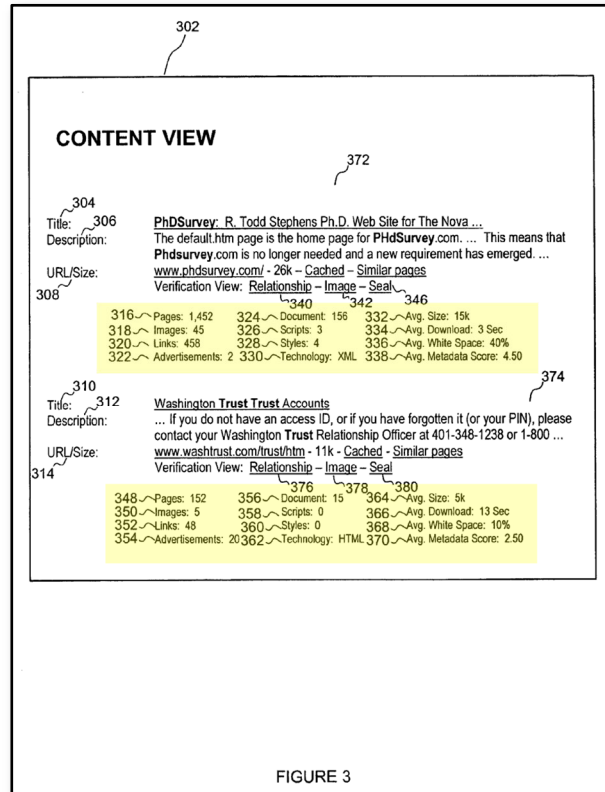
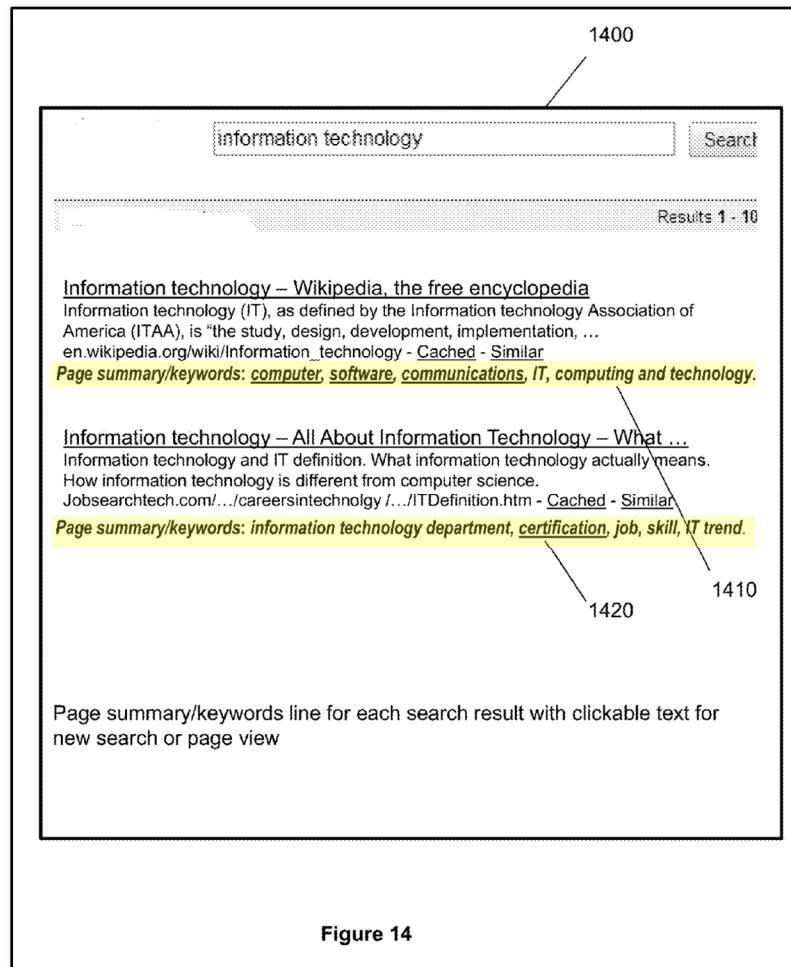


FIGURE 3

151. Likewise, EX1030's FIG. 14 (which I have highlighted below) shows a *standalone* “summary line” (yellow) – a text-based annotation – “**displayed at the bottom** part of each search result.” EX1030, 18:22-26 (explaining that annotations display “[a] list of prominent topic terms or sentences containing such terms”).



152. Thus, as I demonstrated above and EX1029-EX1030 corroborate that it was POSAs background knowledge that displaying text-based annotations (like

those in Bates-alone and Bates-Bhagat) *as one or more standalone lines at the bottom of a search result grouping* was a well-known, aesthetic design choice.

153. Moreover, a POSA would have had several reasons to display the text-based annotation at the bottom of each result grouping rather than, *e.g.*, on the side of a search result grouping. Bates says the correlation indicator is displayed “conveniently near each link.” Bates, [0039]. POSAs would have recognized that a text-based annotation (as in Bates-alone and Bates-Bhagat) is most naturally and conveniently rendered in a wide, shallow layout that fits below a result rather than beside it. Placing the annotation at the bottom of the search result would have also conveniently aligned with the user’s natural top-to-bottom scanning pattern for reviewing search results — the term annotation appears at the end of the user’s downward reading path for each result. Finally, as I demonstrated above in [2A] with corroboration, standard web-UI conventions consistently placed supplementary, text-based metadata — tags, attributes, categories — below the primary content of an item rather than beside it, and a skilled designer would have recognized keyword-presence information as exactly that kind of metadata, making bottom placement a natural and conventional design choice for Bates-alone and Bates-Bhagat.

154. Consistent with the examples in the prior art I discussed above in [2A], POSAs would have reasonably expected success in displaying a text-based

annotation at the bottom of a search result grouping. The '184 patent itself ascribes no challenge to displaying an annotation at the bottom of, as opposed to elsewhere within, a grouping.

155. Thus, in Bates-alone and Bates-Bhagat, it would have been obvious as a conventional design choice and/or a simple substitution one of one known location for an annotation for a search result grouping (adjacent thereto) for another (at the bottom thereof) to obtain the predictable result of *displaying* each correlation indicator *annotation at the bottom of each search result grouping*.

3. Claim 6

156. Claim 6 depends from claim 1 and, as I discuss further below, requires *a third and fourth type of search result* that each reference a respective webpage and that each have one or more *descendant webpages* that is *linked directly one level* from the referenced webpage. A “*descendant webpage*” is a webpage to which a search-result webpage links to; for example, if www.uspto.gov is the search-result webpage, then www.uspto.gov/patents is a “*descendant webpage linked directly one level*” from www.uspto.gov because a direct link to www.uspto.gov/patents is found at www.uspto.gov. EX1001, 10:24-11:11, FIGS. 6-7.

157. Limitation [6A] requires the *third type of search result* to reference a webpage that is itself missing a search term but has a *descendant webpage* that

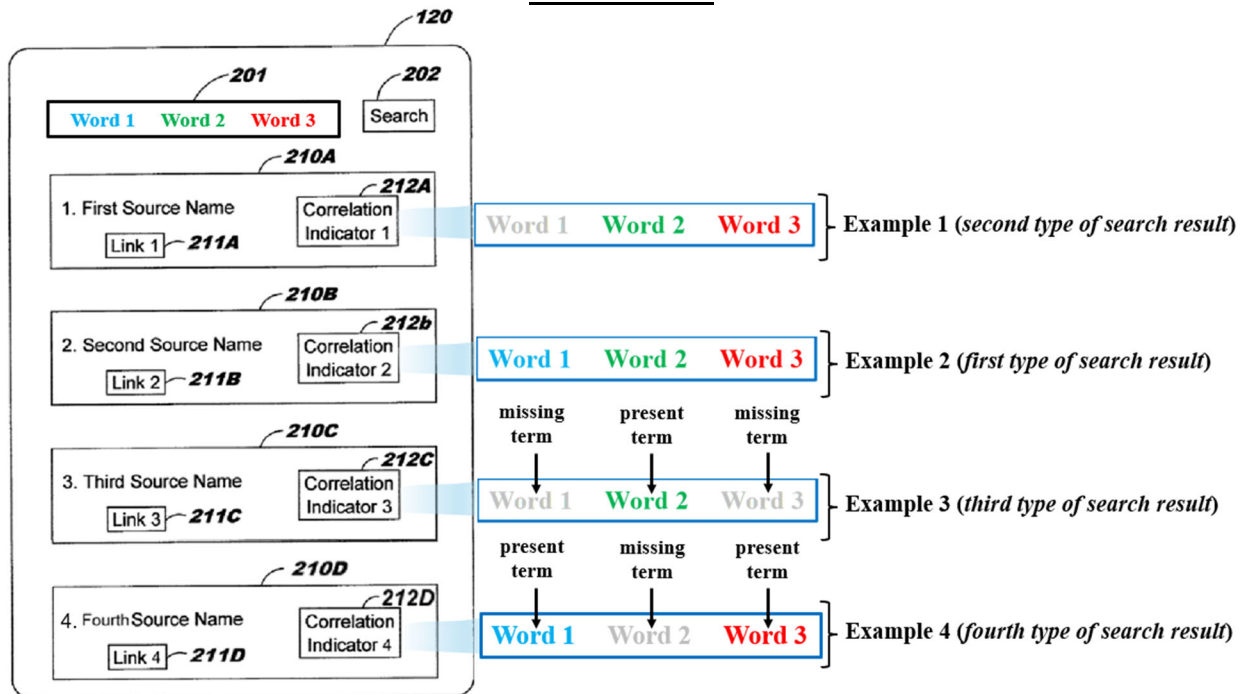
contains the missing term, whereas limitation [6B] requires the *fourth type of search* to reference a webpage that is itself missing a search term **and** whose *descendant webpages* are also all missing that same term. The last limitation of claim 6 ([6C]) requires the *fourth type of search result* to be displayed like limitation [1D]'s *second type of search result* (i.e., a search result which, as I discussed above ([1D]) references a webpage that is missing a search term and is displayed with an annotation). *See also* [1G] (discussing how the *second type of search result* is displayed).

158. Thus, although claim 6 requires the existence of descendant webpages that do or do not contain a search term, claim 6 does **not** require that the search term's presence or absence in the descendant webpage impacts how the *third* or *fourth type* of search results are displayed. Claim 6 does not specify how the *third type* is displayed. And, as shown below, because the *fourth type*'s webpage in each Ground 1A combination is itself missing a claim term, it will be displayed in the same manner as the *second type of search result* (e.g., with an annotation) regardless of the content of the *fourth type*'s descendant webpage(s)).

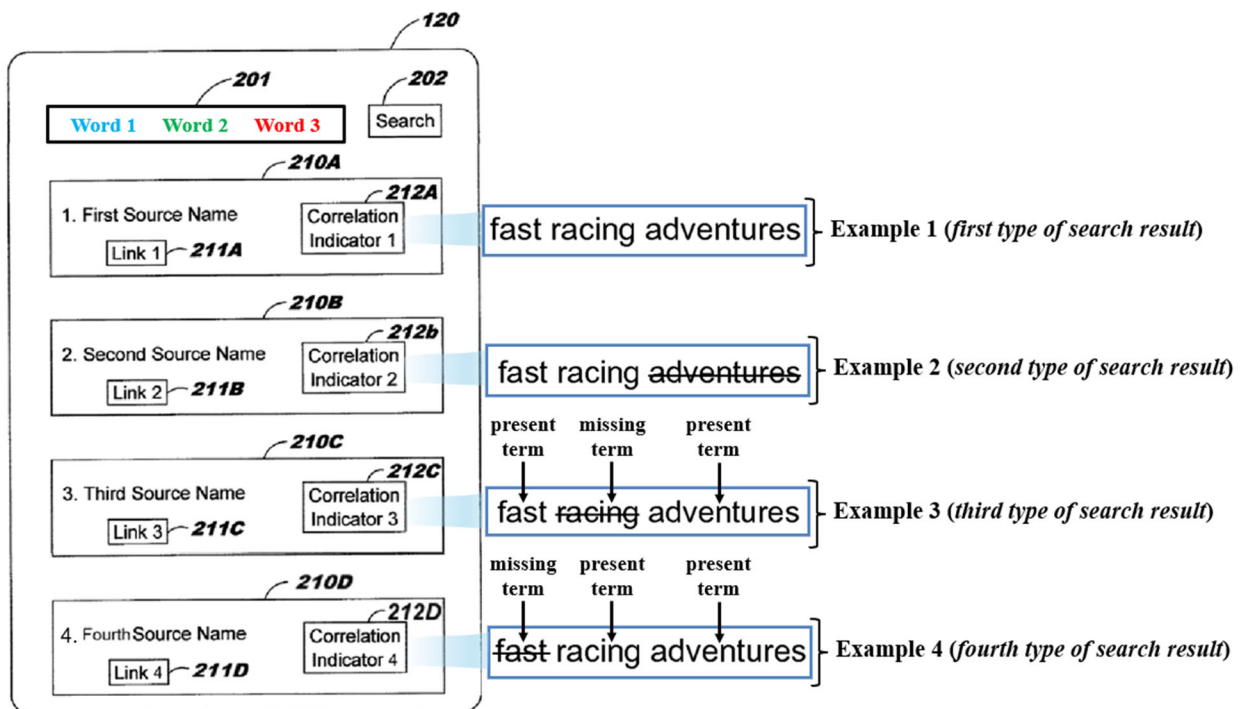
- a. **[6A] The method of claim 1, wherein the plurality of search results is further comprised of: (i) a third type of search result which references a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and**

159. Though Bates's FIG. 2B shows "three web pages found by a search, the number three is used here only for purposes of illustration, and the invention applies as well to more than three web pages." Bates, [0028]. Thus, consistent with Bates and conventional searches by 2011 (which would typically include a vast number of results), the illustrations of Bates-alone and Bates-Bhagat below each show four example search results, where each respective *third type of search result* 210C (Example 3) in each illustration below meets *a third type of search result which references a third webpage* (at link 211C) *that is missing at least one search term element* (the terms in grayed-out font in Bates-alone; the term in strikethrough in Bates-Bhagat). A POSA would have understood that most conventional display screens would have been able to display (at least) four results on the same search results webpage. Moreover, removing the color code map based on implementations of Bates's "implicit" color-code map that I discussed above (§§VIII.C.1-2) would have provided additional screen space for displaying an additional search result on the same display screen.

Bates-alone



Bates-Bhagat



160. In my opinion, POSAs would have also understood that it would have been commonplace for a *third* webpage discussed above (e.g., a website's

homepage) to *have a descendent webpage* (e.g., an about webpage) that is *linked directly one level* therefrom and *contains the search term element* that is *missing* from the *third webpage* (e.g., “racing” could be missing from a website’s homepage but contained in a descendant webpage). For example, EX1029 discusses an example search result webpage that displays for each search result “the number of links to other websites that are within” each search result’s webpage. EX1029, 3:65-4:5. EX1009 (Naick) similarly discloses as background information that it was typical for websites to have multiple webpages where search terms may or may not be present on different webpages of same website. Naick, [0003]-[0004].

- b. [6B] (ii) a fourth type of search result which references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and**

161. The illustrations of Bates-alone and Bates-Bhagat that I discussed above ([6A]) also each comprise a *fourth type of search result which references a fourth webpage* (at respective links 211D) *that is missing at least one search term element*, which is shown in gray-font (Bates-alone) and/or strikethrough format (Bates-Bhagat).

162. Like the *third type of search result* that I discussed above ([6A]), it would have been commonplace for each *fourth type of search result* to have

descendant webpages linked directly one level from the fourth webpage. It would have also been commonplace that those *descendant webpages* would sometimes *also be missing the at least one search term element* (e.g., all webpages in a multi-webpage website are all missing the search term “fast”).

- c. **[6C] further comprising: causing the display screen to display the fourth type of search result in a same manner as the second search result grouping.**

163. As I illustrated above ([6A]), in Bates-alone and Bates-Bhagat, *the fourth type of search result is caused to be displayed in a same manner as the second search result grouping—i.e., as a search result grouping comprising a Source Name (i.e., title), an Internet “link” that is a “URL 211[] that identifies the [fourth] web page,” and a correlation indicator comprising text representing the missing search term(s) in gray (Bates-alone) and/or strikethrough (Bates-Bhagat) font.* Bates, [0027]-[0028].

4. Claim 7

164. Independent claim 7 recites a system comprising components that perform steps that largely mirror the method recited in independent claim 1. As I indicate in the table below, most limitations in claim 7 are met by Bates-alone and Bates-Bhagat for the same reasons that I discussed above for similar limitations in claim 1 (or claim 2) that are indicated in the table below.

Limitation	Addressed in Section:
[7PRE]	§VIII.D.1.a ([1PRE])
[7A]	§VIII.D.1.b ([1A])
[7C]	§VIII.D.1.c ([1B], discussing the general design of Bates's example interface, which meets [7C]'s <i>search results webpage</i>)
[7D]	§VIII.D.1.d ([1C])
[7F]	§VIII.D.1.f ([1E]) <i>See also infra</i> §VIII.D.4.c ([7F])
[7G]	§VIII.D.1.g ([1F], <i>first search result grouping</i>), §VIII.D.1.h ([1G], <i>second search result grouping</i>)
[7H]	§VIII.D.1.g ([1F])

[7I]	§VIII.D.1.h ([1G])
[7J]	§VIII.D.2.b ([2B])
[7K]	§VIII.D.1.i ([1H])

165. Two limitations in claim 7 – limitations [7B] and [7E] – are not found and/or covered by my previous discussion of limitations in claim 1. Limitation [7B] (discussed further below, §VIII.D.4.a) requires that *the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider*. Limitation [7E] (discussed further below, §VIII.D.4.b) requires a *second type of search result that references a second webpage that is, **contrary to the search logic guidelines for AND operations** published by the search engine provider, **missing at least one search term element***. As to the aspect of [7E] that requires a *second type of search result which references a second webpage that is missing at least one submitted search term element*, Bates-alone and Bates-Bhagat each meet that for the reasons I discussed above for limitation [1D].

166. The '184 patent admits that, by 2011, it was conventional for search engines to use “an **implied** AND-function” (*i.e.*, by default), whereby each returned search result should “contain[] all the specified search term elements.” EX1001, 2:23-28. The Patent’s FIGS. 3-7 likewise show search terms entered into

the search bar without any explicit Boolean operator, indicating that there is an implied operation.

167. In my opinion, POSAs would have had reason to implement Bates-alone and Bates-Bhagat to publish guidelines for performing AND operations and further to include search results that were missing at least one search term (contrary to those guidelines), thereby meeting limitations [7B] and [7E], as I discuss further below.

168. Although Bates's example search engine uses an OR-based search by default, Bates observes that OR-based searching often "returns an unusably large number of sources." Bates, [0004]. Moreover, although Bates's color-coding technique helps users navigate OR-based search results, POSAs would have known that by 2011 an alternate and conventional search engine approach would have been based on AND-based searches, which would often yield a more manageable number of sources. As I noted above, the '184 patent itself admits that that was a conventional approach in prior art search engines. EX1001, 2:23-28. My opinion that AND-based searching was often the implied convention in prior art search engines is further corroborated by EX1071 (at [0096]), which states that "[m]ost search engines insert a Boolean 'AND' between each search term in the query, which mean[s] that all of these keywords must be present on the page to produce a 'match.'" My opinion in this regard is further corroborated by Wang (at [0002]),

which similarly discloses as background information that “[m]ost keyword-based search engines operate on the assumption that the user intends to only find documents that contain all of the search terms. Conventional search engines answer submitted queries by locating documents containing every keyword submitted. This is typically referred to as ‘and-based searching.’” *See also infra* §XII.A (discussing Wang).

169. For example, as I discussed above (§VIII.B), Bhagat’s default search is an AND-based search. This is exemplified by Bhagat’s Figure 2, which found no search results for the example three-word query “fast racing adventures,” and was only able to find search results when the query was reduced to two words “fast racing” or “fast adventures.” As I discussed above (§VIII.B), that informs POSAs that Bhagat’s default search is an AND-based search because if Bhagat’s default search were OR-based the search engine **would** have found results for the three-word query (*e.g.*, results from one of the alternative searches that identified results for the two-word queries that removed one of the three search terms).

170. Thus, making Bates use an AND-based search by default (*e.g.*, in situations where a sufficient number of search results include all of the query’s search terms) would have been the simple substitution of one default Boolean operation (OR) for another default Boolean operation (AND) to yield the

predictable result of returning search results based on an AND-operation, which, in general, would return fewer search results than a search based on an OR-operation.

171. As I discussed above, POSAs would have similarly known that an AND-based search would have beneficially yielded a more manageable number of sources (*e.g.*, fewer results for a user to review) compared to an OR-based search. This would have been especially true as the number of search terms increased. For example, even with just three search terms, POSAs would have understood that an OR-based search would have returned results having just one of the search terms, which oftentimes would have produced substantially more results (and thus a higher likelihood of including irrelevant results) compared to an AND-based search.

172. However, as I discussed above (§VIII.B), Bhagat teaches a potential drawback if a system **always** uses an AND-based combination of the search terms: depending on the query, sometimes there may be “few and/or no search results.” Bhagat, 1:58-61. To address this circumstance, Bhagat broadens the user’s original query using historical queries that each remove (for example) one search term from a multi-word query. Bhagat explains that “limit[ing] to only remove one search term” “reduce[s]” “the likelihood” of irrelevant results (Bhagat, 6:23-37) because, as POSAs would have understood, the more search terms that are removed, the higher likelihood of identifying irrelevant search results. That is, as

suggested by Bhagat, POSAs would have recognized that generating alternative queries that remove just one search term would have been one reasonable way to strike a balance between broadening the search to capture additional potentially relevant results, but not broadening it too much. *See also* Bhagat, FIG. 3 (which “generate[s] some search results” for a search query that removed one of the user’s search terms even where the user’s search terms returned some search results).

173. Thus, as I discussed above, POSAs had reasons to implement Bates to default to an AND-operation for joining the user’s search terms, because doing so would have yielded a more manageable number of search results. However, in scenarios where the AND-based search yielded too “few” search results (which POSAs understood and Bhagat explicitly taught was a possibility, Bhagat, 1:58-61), POSAs would have augmented the results using alternative search queries that each removed search terms, *e.g.*, one search term (as taught by Bhagat). As I discussed above, Bhagat teaches (or at least suggests) removing one search term provided a reasonable balance between increasing the number of search results but limiting the likelihood of returning irrelevant results. Bates itself similar provides an example of a three-word query where the user may only deem a result “relevant” if it is missing no more than one keyword (*i.e.*, results that had at least two of the three search terms). *See* Bates, [0006].

174. The resulting combinations (*i.e.*, implementations of Bates-alone and Bates-Bhagat that default to a Boolean-AND operation but broaden the search when that yielded an insufficient number of results) would have been little different than the illustrations of Bates-alone and Bates-Bhagat that I depicted previously. *Supra* §§VIII.C.1-2. The principal modification is what I just discussed above: using an AND-based search by default (*i.e.*, require search results to contain each search term) and, when that yielded too few results (where “too few” could have been a configurable design option for the search engine provider and/or searcher), using Bhagat’s technique of removing search terms (*e.g.*, one search term) from the query, so as to beneficially provide the user with an increased number of search results, rather than display too few. In those alternative implementations of Bates-alone and Bates-Bhagat, POSAs would have continued to have motivation to include the annotations that I discussed above to indicate the presence or absence of search terms in search results because some results—those returned when removing a search term from the user’s query word—would still be missing a search term and, therefore, the annotations would continue to inform the user of that fact, for the benefits I discussed above (§§VIII.C.1-2).

- a. **[7B] wherein the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider;**

175. As I discussed in the section immediately above, an alternative, obvious implementation of both Bates-alone and Bates-Bhagat would have used an AND-based, rather than OR-based, search as the system's default.

176. By 2011, POSAs knew that search-engine providers typically published search guidelines (*e.g.*, a help page) to inform users about the default for queries and/or how to construct queries. My opinion about POSAs' background knowledge in this regard is corroborated by EX1036 (at [0008]), which discloses as background information that "[c]onventionally, query languages are determined" by "reading the **help pages associated with a given search interface.**"

177. My opinion is further corroborated by EX1080 (at 309), which says that "HELP Systems" were "a standard feature of almost all IR [information retrieval] systems," and discusses examples of help system for several Internet search engines (which are examples of IR system) that were available at the time of EX1080's publication (2008).

178. Bates itself recognizes that the "details of the syntax for specifying Boolean logic often vary from browser to browser, and even a searcher who understands how to specify Boolean search criteria in principle maybe unable to do

so in practice for a particular web browser at hand.” Bates, [0003]. That reinforces my opinion that POSAs would have had motivation for the Bates-alone and Bates-Bhagat search engine provides to publish *search logic guidelines*.

179. Therefore, when implementing Bates-alone and Bates-Bhagat to perform AND-based searches by default, it would have been routine and expected (and thus obvious) for each respective search engine provider to *publish search logic guidelines* that explained the default search logic and/or helped user execute the *first search request* using default *AND operations*.

- b. **[7E] (ii) a second type of search result which references a second webpage that is, contrary to the search logic guidelines for AND operations published by the search engine provider, missing at least one search term element;**

180. As I discussed above (§VIII.D.4), an obvious implementation of Bates-alone and Bates-Bhagat would have joined search terms with an AND operation by default, but sometimes (*e.g.*, when too few results were returned) **also** included results *missing a search term* (as taught by Bhagat), *contrary to the AND operation*. See Bhagat, 8:45-56, FIG. 3 (displaying search results that included both all of the user’s search terms and results that were missing at least one search term). Thus, those obvious implementations of Bates-alone and Bates-Bhagat meet [7E].

181. Separately, POSAs understood that it would have also been conventional and beneficial for an Internet search engine like those in Bates-alone and Bates-Bhagat to include a search result if it contains a synonym of a search term, but did not include the search term itself. The benefits of including synonyms of the user's search terms would have accrued whether or not the search engine included Bhagat's technique of augmenting the search results with results obtained from queries that remove one search term. This is because including synonyms beneficially "allow[ed] the search engine to find **documents that do not contain exact matches** to the user's search query **but that are nonetheless relevant.**" EX1078, 1:51-57 (noting as background information that "[c]onventionally, additional search queries relating to an initial user query may be automatically formed by the search engine based on...synonyms of a search term (e.g., 'auto' instead of 'car'))").

182. My opinion that including synonyms of search terms when identifying relevant search results was conventional and beneficial in Internet search engines by 2011 is corroborated by several prior art references. In addition to EX1078 discussed above, EX1059 ("Sauls") corroborates POSAs background knowledge that a conventional technique for returning search results was to include results that contain a search-term's synonym rather than an "exact match[]" of the term itself. Sauls, [0025]-[0026], [0014]-[0015] (discussing "a search tool provides the user

with the ability to search for one or both of synonyms of, or syntactically similar words to search terms that they enter”). In Sauls’s process, which is consistent with a conventional process for including synonyms, the search engine “ascertains whether there are any words on the page(s) that constitute an exact match.” Sauls, [0048]. If not, the search engine will “ascertain[] whether there are any words on the page(s) that constitute synonyms for the search term entered by the user.” Sauls, [0049]. Thus, Sauls corroborates POSAs’ background knowledge that a conventional technique for returning search results would return results containing a search-term’s synonym, rather than an exact match of the term.

183. My opinion in this regard is further corroborated by the following prior art references:

- EX1071, [0107]: providing an example of including synonyms wherein “[s]ynonym modifiers are used to modify the query before it is sent” to a search engine;
- EX1073, [0005]: explaining as background information that “one strategy for improving recall [‘the proportion of all relevant documents...retrieved by a search’] is to enhance a query by expanding the original terms of the query with synonyms obtained from a thesaurus”;

- EX1074, 1:6-12: teaching as background information that
“[s]ynonyms are commonly used in query expansion. For example, when a user submits a search query to a search engine, the search engine can automatically expand the query to include synonyms for the terms of the query.”;
- EX1079, 13:11-20: noting that “search engines can return documents which do not contain the query terms” because, *e.g.*, they may “can return documents with related words.”

184. Thus, implementing Bates-alone and Bates-Bhagat, like Sauls (or one of the similar corroborating references above) to similarly consider synonyms, would have been a conventional design choice that POSAs routinely made so as to provide users with relevant search results that might otherwise have been excluded from an AND-based search because an exact match of one or more search terms was missing.

185. POSAs understood that the conventional way to augment a user’s search to include synonyms would have been to join each of the user’s search terms with its synonyms using a Boolean-OR operation. For example, for a search request of “A AND B” (or a search for “A B” that defaulted to an AND-based search), the search engine would convert the search to “(A **OR** A_{synonym(s)}) AND (B **OR** B_{synonym(s)}).” Thus, for example, the search engine would return as a search

result one that contained **either** A or one of its synonyms AND B or one of its synonyms. Therefore, a valid search result might not contain A itself and/or B itself, even where the original search request *comprised a plurality of search terms for performing AND operations according to search logic guidelines*.

186. In addition to the references I cited above, my opinion in this regard is further corroborated by the following references:

- EX1075, [0022]: “A synonym search uses a thesaurus database to use synonyms of an entered word or words, for example **by adding synonyms linked with a Boolean OR.**”
- EX1076, [0096]: describing an example where a “search is expanded by **creating a ‘Boolean OR’ query statement using common synonyms....** A query of ‘running shoes’ becomes ‘running shoes OR sneakers OR athletic shoes OR runner OR tennis shoes OR Nike OR Adidas OR Brooks’.”
- EX1077, 1:11-28: “Some conventional search interfaces include a capability to expand a single input query term to a list of known synonyms. For example, if the user’s query contains ‘sofa’, then the search interface may automatically expand the query to ‘(sofa or couch or settee or CHESTERFIELD or DAVENPORT)’.”

187. Thus, as I explained above, an obvious implementation of Bates-alone and Bates-Bhagat that defaulted to Boolean AND-operations and also accounted for synonyms of the user's search terms also meets [7E] because some results would have included webpages *missing at least one search term element (contrary to AND operations)* – results where the referenced webpage contained a synonym of that missing search term.

- c. **[7F] wherein the one or more servers provide the search results webpage via the Internet for displaying the plurality of search results on a display screen of the user-operated computing device;**

188. As I indicated above, Bates-alone and Bates-Bhagat meet limitation [7F] for the same reasons I discussed above (§VIII.D.1.f) that they meet the limitation added by [1E].

189. If limitation [7F] (and related limitations) also requires that the annotations themselves (*i.e.*, Bates-alone's or Bates-Bhagat's correlation indicators) that are displayed on the *search results webpage* must be within the webpage (*e.g.*, the html code) transmitted from the search engine server to the user-operated computing device via the Internet (as opposed to being generated by the browser based on the transmitted occurrence data and inserted in the displayed webpage), that would have been an obvious alternative implementation of the search-engine server in Bates-alone (§VIII.C.1) and Bates-Bhagat (§VIII.C.2) as a matter of design choice. POSAs would have known that it was common in the

prior art for annotations to be generated by a search engine server connected to the user-operated computing devices via the Internet. Having the server generate the annotations, as opposed to each user's individual computing device, would have beneficially reduced the processing load on user computing devices (which would have been especially advantageous for user using smaller devices and/or "dumb" terminals) and would have also made updating the user interface (*e.g.*, the look and feel of the annotations) easier because the updating would have primarily occurred at a small number of centralized servers as opposed to be pushed out to numerous end-user devices.

190. My opinion in this regard is corroborated by EX1012, which relates "to providing search results and associated information in response to a search term query." EX1012, [0001]. EX1012 discloses "a word or phrase index [that] is determined for a set of search results and this index is provided along with the search results." EX1012, [0021]. The "word index may also be displayed with one or more metrics," which "can be displayed as numbers or by some form of visual representation or map." EX1012, [0042]; EX1012, [0051] (disclosing that "visual aspects corresponding to a metric value, such as frequency or count" "may include color, font type, font size,..., etc."). EX1012 further discloses that the "word indexes may be determined by [a] search and index server," that is part of or separate from a "search server" accessible over the Internet. EX1012, [0029].

191. My opinion in this regard is further corroborated by EX1034, which “provid[es] a visual indication of [search] results that include both an identification of matching data objects and an extent to which the objects match respective ones of the search parameters.” EX1034, 4:11-14. Figure 1 “shows a graphical user interface that may be used in accordance with one aspect of the present invention.” EX1034, 4:42-43. Figure 3 “illustrates modules of the server” used in EX1034’s system and Figure 4 “illustrates logical operations of the server.” EX1034, 4:47-50. EX1034 discloses that the server includes “a User Interface Display Handler,” which “is invoked to calculated and return the results display user interface (previously described with reference to FIG. 1).” EX1034, 6:52-7:21.

192. My opinion is also corroborated by EX1049, which discloses in its Figure 1 a “graphical user interface” (EX1049, [0021]) that includes “color-segmented bar[s]...whose length indicates the strength of the [search] term in that document” (EX1049, [0031]), which are similar to Bates’s correlation indicators. As shown in EX1049’s FIGS. 3-4, EX1049 discloses a “User Interface Display Handler” in the search engine server that “is invoked to calculate and return the results display user interface (previously described with reference to FIG. 1) to provide an abstract graphic representation of the data and its relevance to the query.” EX1049, [0040].

5. **Claim 11**

- a. **[11A] The system of claim 7, wherein the plurality of search results is further comprised of: (i) a third type of search result referencing a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and**

193. Bates-alone and Bates-Bhagat meet the limitation added by **[11A]** for the same reasons I discussed above (§VIII.D.3.a) that they meet the limitation added by **[6A]**.

- b. **[11B] (ii) a fourth type of search result references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and**

194. Bates-alone and Bates-Bhagat meet the limitation added by **[11B]** for the same reasons I discussed above (§VIII.D.3.b) that they meet the limitation added by **[6B]**.

- c. **[11C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.**

195. Bates-alone and Bates-Bhagat meet the limitation added by **[11C]** for the same reasons I discussed above (§VIII.D.3.c) that they meet the limitation added by **[6C]**.

6. Claim 12

196. Independent claim 12 recites a system for providing an interactive GUI for an Internet search that largely mirrors the search-engine-provider system recited in independent claim 7. As I indicate in the table below, Bates-alone and Bates-Bhagat meet the following limitations of claim 12 for the same reasons that I discussed above for similar limitations in claim 7 that are indicated in the table below.

Limitation	Addressed in Section:
[12PRE]	§VIII.D.4 ([7PRE]) <i>See also</i> §VIII.D.1.a ([1PRE])
[12A]	§VIII.D.4 ([7A]); <i>see also</i> §VIII.D.1.b ([1A]) §VIII.D.4.c ([7F]: discussing the search results webpage displayed as <i>an interactive graphical user interface</i> on the <i>user-operated computing device</i>) Bates’s <i>user-operated computing device</i> is a “computer terminal” (which teaches or suggests <i>a desktop computer</i>) or “web-enabled cellular telephone” (which teaches or suggests <i>a smart phone</i>). Bates, [0023]-[0024].

[12B]	§§VIII.D.4 ([7A]-[7B]); <i>see also</i> §VIII.D.1.b ([1A]) §VIII.D.4.a ([7B]: discussing reasons for the search-engine providers in Bates-alone and Bates-Bhagat to have <i>publish[ed] search logic guidelines</i> that explained the default search logic and/or helped users execute the <i>first search request</i> using <i>AND operations</i>)
[12C]	§VIII.D.4 ([7C]); <i>see also</i> §VIII.D.1.c ([1B])
[12D]	§VIII.D.4 ([7D]); <i>see also</i> §VIII.D.1.d ([1C])
[12E]	§VIII.D.4.b ([7E]); <i>see also</i> §VIII.D.1.e ([1D])
[12F]	§VIII.D.4.c ([7F]: discussing the computing device's <i>display screen</i>); <i>see also</i> §VIII.D.1.f ([1E]) §VIII.D.4 ([7G]); <i>see also</i> §VIII.D.1.g ([1F], <i>first search result grouping</i>); §VIII.D.1.h ([1G], <i>second search result grouping</i>)
[12G]	§VIII.D.4 ([7H]); <i>see also</i> §VIII.D.1.g ([1F])
[12H]	§VIII.D.4 ([7I]; <i>see also</i> §VIII.D.1.h ([1G])
[12I]	§VIII.D.4 ([7J]; <i>see also</i> §VIII.D.2.b ([2B])
[12J]	§VIII.D.4 ([7K]); <i>see also</i> §VIII.D.1.i ([1H])

7. **Claim 16**

- a. **[16A] The system of claim 12, wherein: a third type of search result references a third webpage that is missing at least one search term element, and a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element;**

197. Bates-alone and Bates-Bhagat meet the limitation added by **[16A]** for the same reasons I discussed above (§VIII.D.3.a) that they meet the limitation added by **[6A]**.

- b. **[16B] a fourth type of search result references a fourth webpage that is missing at least one search term element, and all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and**

198. Bates-alone and Bates-Bhagat meet the limitation added by **[16B]** for the same reasons I discussed above (§VIII.D.3.b) that they meet the limitation added by **[6B]**.

- c. **[16C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.**

199. Bates-alone and Bates-Bhagat meet the limitation added by **[16C]** for the same reasons I discussed above (§VIII.D.3.c) that they meet the limitation added by **[6C]**.

IX. GROUND 1B: THE GROUND 1A COMBINATIONS IN VIEW OF BRINSON RENDER OBVIOUS CLAIMS 3-4, 8-9, AND 13-14

200. The claims challenged in Ground 1B each require that the claimed method/system include *a selectable filtering function that, when selected, automatically causes the second search result grouping to be removed from the search results webpage* (which I will refer to as “the *selectable-filtering-function* limitation”).

201. The ’184 patent’s filtering functionality is discussed primarily in connection with Figures 10 and 11. *See* EX1001, 4:66-5:7. Figure 11 shows an example of “a filtering criteria table” that includes “radio buttons” that “provide a ‘check box’ indication of which characteristics a user wishes to include in the filtering process and which they do not.” EX1001, 13:29-40. The patent says that after “a user first performs [] a normal web search,” “certain search results URLs and related search results groupings...are automatically removed according to a predetermined filter selection criteria.” EX1001, 12:61-13:4. That is, the user’s filtering criteria is selected before the user’s search is performed (*i.e.*, it is “predetermined”).

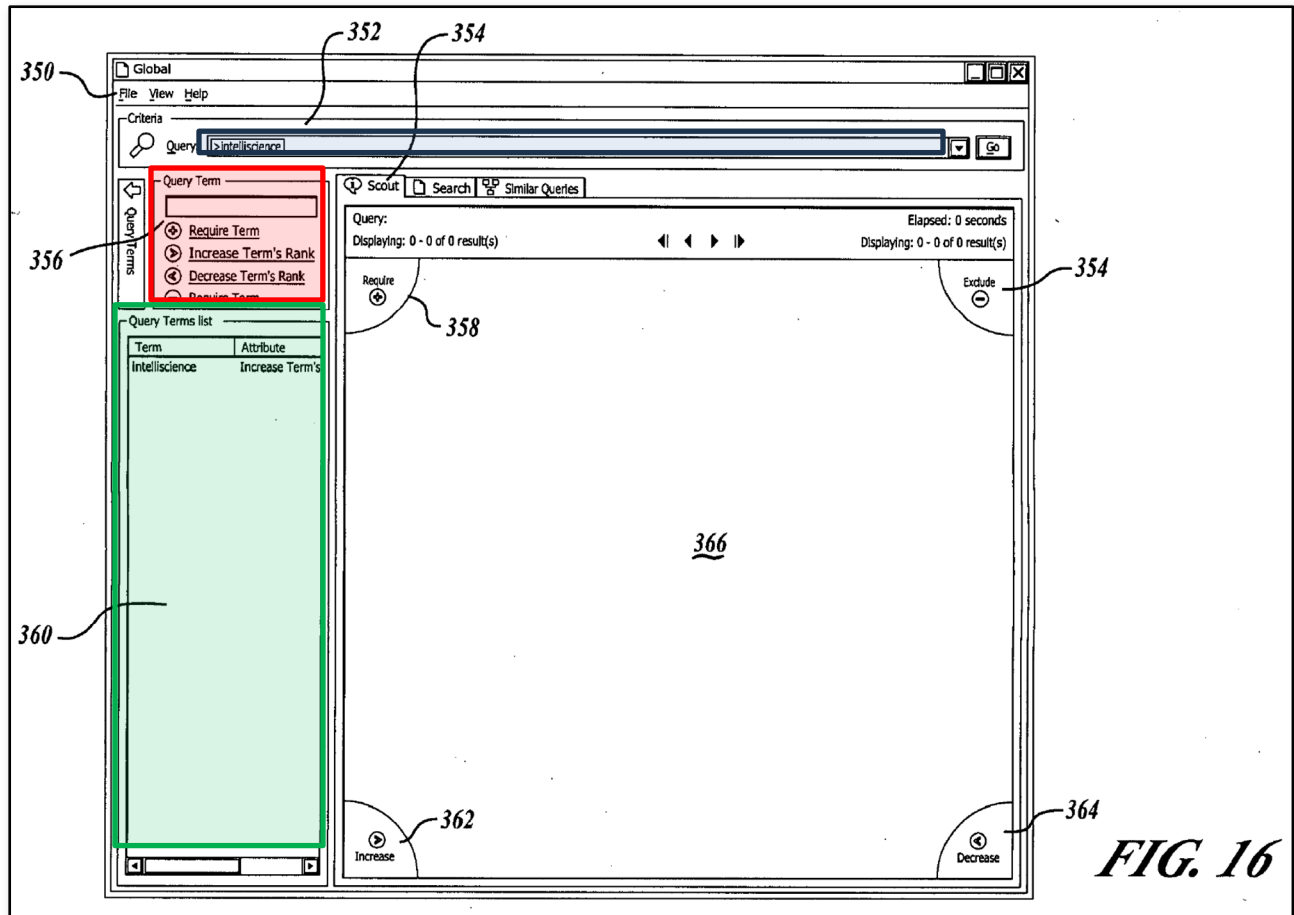
202. As I discuss below, POSAs would have had reason to incorporate such known filtering functionality into Ground 1A’s combinations (Bates-alone or Bates-Bhagat), thereby rendering the claims challenged in Ground 1B obvious.

A. Brinson (EX1007)

203. Brinson is a US patent application publication that published in 2007 (cover code (43)) from an application filed in 2006 (cover code (22)).

204. Brinson discloses a graphical user interface (GUI) for search engines that allows users to designate a search term's "weight" to indicate its "significance" to a search. Brinson, [0044]. If a user designates a term "required" as its "weight value," then "any data product [*e.g.*, a webpage] included in the results **must** include this term." Brinson, [0045]; Brinson, [0030] ("data products...includ[e]...web page[s]"). At the other end of the spectrum, if a user designates a term "exclude" as its "weight value" then "any data product included in the results must not include this term." Brinson, [0048].

205. Brinson's Figure 16 (annotated below) "shows a screen shot of" the GUI, which includes, among other elements, "a query text box 352" [blue] "where a user enters terms for a query," "a text box 356 [red] that allows a user to enter additional query terms" with a designated weight, and a "list box 360" [green] that "includes a list of terms currently used in the query." Brinson, [0069]-[0071].



206. As shown above, “text box 356 allows a user to enter a term and then further select, as an example, ‘require term,’” which adds the term to “text box 352 with the character ‘+’ preceding the entered term,” which “signifies to the system that the term directly following the ‘+’ is a required term.” Brinson, [0070]. “[L]ist box 360 [green] includes a list of terms currently used in the query,” each of which can be “selected by a user,” which places a selected term in box 356 “to allow a user to further modify the term[’s]” weight (*e.g.*, to make the term a “Require[d] Term”). Brinson, [0071], [0075]; *see also id.*, claims 7, 24.

207. A similar example is depicted in Bates's Figure 18 (below). In this example, certain terms that appear in each data product (which could be websites, Brinson, [0030]) are listed below each data product and a user can select a listed term to designate its weight, *e.g.*, to make it a required term. Brinson, [0073] (“The terms shown under a data product in the list 380 can be selected by the user to refine the present search, adding them to the query either as Required, Increase Decrease or Excluded.”).

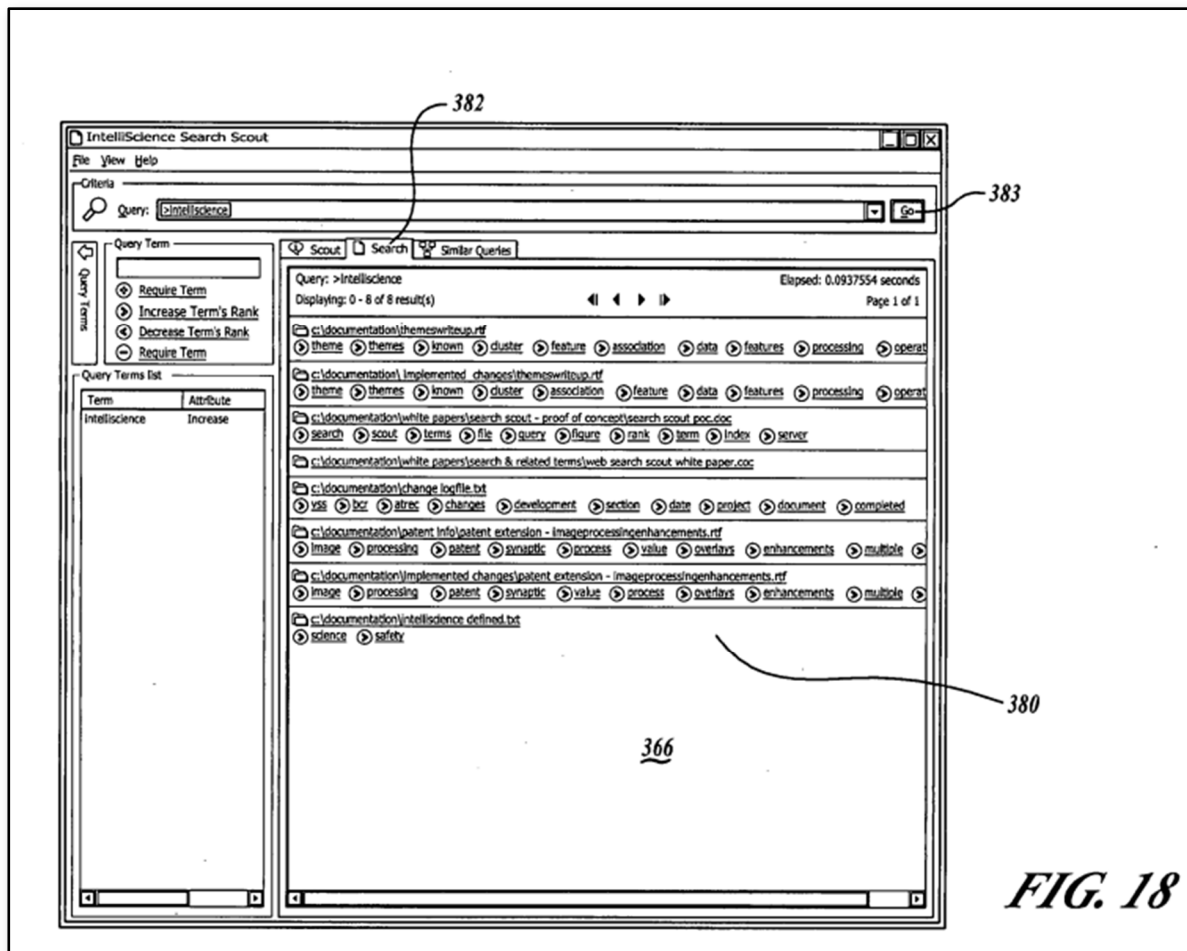


FIG. 18

B. The Bates-Brinson and Bates-Bhagat-Brinson Combinations

208. As discussed in Ground 1A (§VIII.A), Bates’s search engine may return search results missing one or more search terms. This would have been true regardless of whether Bates’s search engine’s default search is based on a Boolean OR search or Boolean AND search for the user’s search terms. However, POSAs knew users sometimes only wanted results that included a particular term, and therefore it was conventional for “search engines” to “support[] ‘include’ and ‘exclude’ Boolean operators,” where “the include operator” means “a document is a match *only if* the documents includes that word.” EX1035, [0009]; *see also* EX1036, [0024].

209. As I discussed in the section immediately above (§IX.A), Brinson discloses a search-engine GUI that includes a user-friendly way—an example of user-selectable GUI elements—to allow a user to indicate that a search term is “‘required’” so that “the results must include this term.” Brinson, [0045]; *see also* Brinson, FIGS. 16 & 18, [0069]-[0071], [0073].

210. In view of Brinson and their background knowledge that it was conventional to allow users to make search terms mandatory, POSAs had reason to augment the Ground 1A combinations to include aspects of Brinson’s GUI discussed above (or another conventional GUI element) that allow the user to make a term mandatory. For example, POSAs would have found it obvious to include in

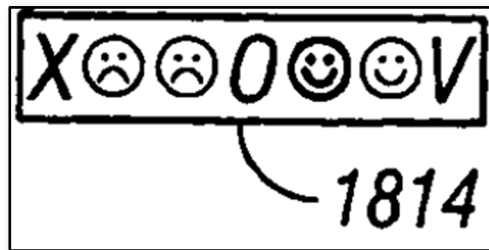
Bates’s search-engine interface one or more user-selectable GUI elements—similar in functionality to the “Require Term” options implemented in boxes 356 and 360 in Brinson’s Figure 16—that allow the user to select a previously-entered search term as a “require[d] term,” thereby “signif[ying] to the system that the term...is [now] a required term.” Brinson, [0069]-[0070], [0075]. Adding Brinson’s functionality for identifying a search term as required to Bates would have also furthered Bates’s goal of providing an interface that allows a user to “form an effective picture of the relevance of the sources found by the search engine” (Bates, [0009]), by allowing users to refine their searches to eliminate irrelevant results.

211. One obvious way to apply Brinson’s teachings to Bates-alone and Bates-Bhagat would have been to make the individual search terms presented next to each search result selectable so that the individual term’s weight could be designated as required. This implementation would have been similar to how Brinson’s Figure 18 example allows individual terms presented next to individual search results to be selected and designated as required. Brinson, [0073] (“The terms shown under a data product in the list 380 can be selected by the user to refine the present search, adding them to the query either as Required, Increase Decrease or Excluded.”).

212. POSAs would have also been aware of other user-friendly GUI elements for allowing a user to indicate the weight/importance of search-term elements (*e.g.*, a drop-down box or pop-up window).

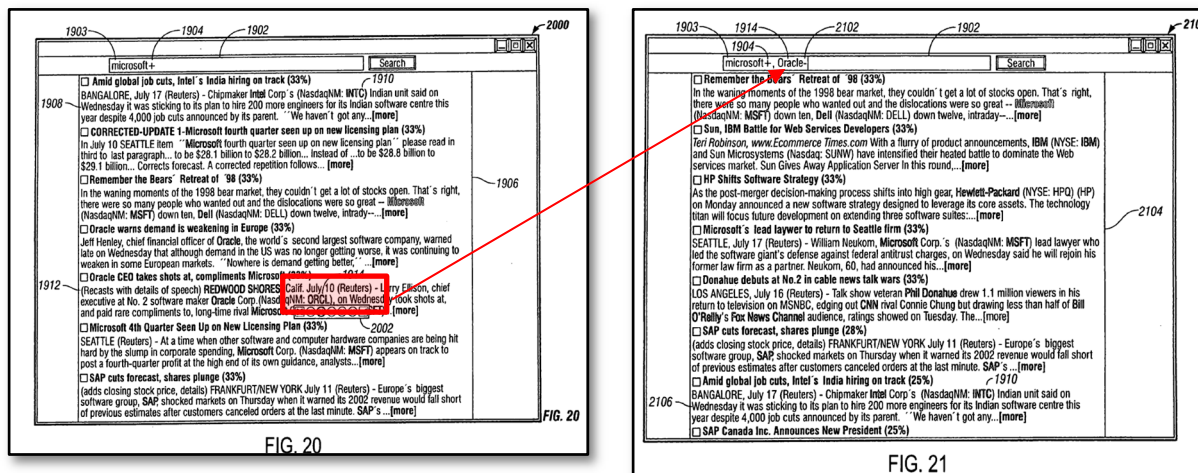
213. For example, EX1068 discloses a GUI for search results where “user preferences” “may be input by a user by way of a pop-up window with which the user may express a level of interest, or disinterest, with respect to a particular term.” EX1068, [0017]. EX1068 teaches that “inputting preference information in this way” provide the user “a more convenient and streamlined approach” for, *e.g.*, “an Internet search.” EX1068, [0018], [0198] (noting that with this approach “the user may perform searches quickly, easily, and efficiently”). EX1068 says that a pop-up window “may be obtained...by the user clicking on a particular discussion object [*e.g.*, a term in a search result] or simply by ‘hovering’ a cursor over the desired discussion object, using the user’s mouse.” EX1068, [0195]. As shown below in an excerpt of EX1068’s FIG. 18, the example pop-up window “includes a range of preference information which may be selected by the user, ranging from ‘never show information about this discussion object,’ represented by the ‘x’ at the left side of the pop-up window 1814, all the way to ‘always show information about this discussion object,’ represent by the ‘v’ on the right side of the pop-up window 1814.” EX1068, [0195] (noting that “other preference information could

be incorporated within the pop-up window”), FIG. 21 (“V” replaced by a checkmark).



214. In response to selecting a preference, “a new search result page” “may be generated accordingly.” EX1068, [0196]. For example, “[t]he new search result set may be generated automatically upon inputting preference information from the pop-up window 1814, or may be generated upon a ‘refresh’ command from the user.” EX1068, [1096]. “The preference information” selected by the user “may be used by the search engine [] to refine/alter the current search.” EX1068, [0197], [0199] (preferences range from “‘include’” to “‘don’t include’”). For example, EX1068’s FIG. 20 (below left) shows search results after “the user has entered the search term ‘Microsoft,’” where the “plus sign 1904 after the search term indicates that the term must be found in each returned document.” EX1068, [0200]. In FIG. 20 (below left) “the user has obtained a pop-up window 2002 [red] by selecting the discussion object 1914 [*i.e.*, the term “ORCL”] (that is, by clicking on the discussion object 1914, hovering the mouse over it, or using a similar technique...).” EX1068, [0203]. In this example, the user selected a

“negative preference,” which is indicated in FIG. 21 (below right) by the “minus sign 2102.” EX1068, [0204].



215. The search results shown in FIG. 21 differs from those shown in FIG. 20 to reflect the user’s slight negative preference for “ORCL” (the stock symbol for the Oracle Corporation). EX1068’s FIGS. 22-23 illustrate using the pop-up window on the term “Intel” with an “input the preference that information about [that] discussion object [] should never be included in future result sets, by selecting a box 2204 marked ‘X,’” which adds that term to the search bar “with an asterisk (*) 2302, indicating that it is a discussion object not to be included in future search results.” EX1068, [0206]-[0207]. In contrast, a POSA would understand that the checkmark option in the pop-up window would add the term to the search bar as an always include (*i.e.*, mandatory term) with a plus sign.

216. POSAs would have been aware of other conventional GUI elements for entering a preference / weight to search-term elements. *See also, e.g.*, EX1047,

FIG. 1D, [0020] (“a slider control can be provided in lieu of a textual field for entering variable weights for corresponding search terms in a search term entry user interface”); EX1050, FIG. 9, [0071]-[0072] (disclosing “a GUI [with drop-box selection boxes] displayed on a display...when the user inputs specifying-condition information,” where “the conditions include ‘must include’ a keyword”)).

217. Thus, adding a user-friendly GUI element to permit a user to identify a search-term element as mandatory would have also been obvious as a POSA applying aspects of Brinson’s (or other) known GUI elements for making a search term mandatory to known search engines ready for the improvement of making a term mandatory, to yield the predictable result of Bates’s search engine providing an interface that allows users to make a search term mandatory.

218. In Ground 1B’s Bates-based Brinson combinations, Bates’s search engine—as implemented in the Ground 1A combinations—is augmented, based on Brinson, to include user-selectable GUI elements that allow a user to designate a search term as a required (*i.e.*, mandatory) term such that the term must be included in each search result.

219. A known, beneficial technique for implementing what Brinson describes would have applied the “required”-term designation to the already-identified search results (rather than execute a new search), thereby causing the system to display an updated set of search results by removing, from the already-

identified search results, references to webpages that are missing one or more terms from the user's query. POSAs would have understood that Brinson's "required term" functionality — which mandates that search results include a specific term — could be implemented without re-executing an Internet search because the system would have already possessed, in memory or local storage, the information needed to know which websites contain which terms. As discussed below, designating a term as "required" eliminates already-retrieved results, where the remaining search results would have been the same results that would be identified by re-executing the same search with one term identified as "required." Thus, when the user designated a term as "required," rather than reformulating and resubmitting the query, it would have been obvious for the system to apply a filter to the already-loaded website list – retaining only those websites that included the now-required term – and re-render the search-results webpage. A POSA would have recognized that filtering already-retrieved search results without executing a new search would have beneficially produced updated results faster than having to execute and re-rank an entirely new search and beneficially reduced computational load on the server because filtering required minimal processing compared to a new search (which would have required parsing the new query, reexamining the search engine indices, scoring the results, and recompiling the results). And having the server filter out search results, as opposed to the user's local computing

device, would require less processing and storage/memory by the user's local device.

220. My opinion that it was known to filter search results by applying a user's filter conditions to already-identified search results (rather than execute a new search query based on the filter conditions) is corroborated by EX1081 ("Fowler"). Fowler discloses what it calls a "sifting operation" for a search engine that "aids the user in sifting through a list of search results from a search query on a collection of documents" by "allowing the user to select keywords and apply sifting operations to those keywords and" "producing a sifted list from the original list of search results using the user's selections." Fowler, Abstract. As shown in Fowler's FIG. 1 (c), after an initial search has been conducted, the keywords that the user has designated as keywords to include (*i.e.*, required) or exclude are processed without performing a new search, and the sifting operation will exclude results that do not include the term without running a new search. *See also* Fowler, FIG. 2 (displaying that it is optional whether to (i) "Form new search" or (n) "Display result" without executing the new search), [0022] (discussing, among other steps, step "5) **sifting** and reordering **the list of search results according to the user's choice of keywords** and sifting operations; and 6) **optionally resubmitting a more targeted, more refined version of the original search query** by adding to the original query the user's choice of keywords to include or

exclude”), [0038]-[0041] (explaining the “sifting process” illustrated in FIG. 2, which “will exclude certain results based on the selected keywords and sifting operations” and “[a]fter sifting the list of search results, the present invention then re-displays them to the user”; *e.g.*, the ““require”” sifting operation is “represented [as] a Boolean AND between the selected keyword and each document’s list of keywords,” similar to Brinson’s required designation).

221. My opinion in this regard is further corroborated by EX1082. EX1082 discloses a “method of providing search results” that “provid[es] a first list of results responsive to the search request, provid[es] a list of selectable terms based on content included in the first list of results, receiv[es] a user-selected term from the list of selectable terms, and provid[es] a second list of results.” EX1082, [0005]. Similar to the search results that would be displayed after applying Brinson’s “required” designation to a search term, EX1082’s “second list of results excludes results having content related to the user-selected term.” EX1082, [0005]. As shown in EX1082’s FIG. 6, the second list of web pages is presented to the user (610) without performing the search again (602). *See* EX1082, [0041]-[0043] (“FIG. 6 is a flow diagram illustrating a method 600 of providing focused search results,” where [a]t a step 606, a list of selectable terms based on content included in the first list of results may be provided,” and “[t]he user-selected terms

may be used to eliminate less relevant search results and focus on more relevant search results,” which is provided in “a second list of results”).

222. The above-described implementation would have used the same Bates-alone and Bates-Bhagat graphical user interfaces that I illustrated previously, except the text of the search terms in each search-result grouping (*e.g.*, in the correlation indicators) would have been selectable so that each term could be designated as a “required” search term.

223. In my opinion, POSAs would have reasonably expected success in Ground 1B’s Bates-based Brinson combinations because it would have required only ordinary programming skill to adapt the term-requiring aspects of Brinson’s GUI (which uses conventional user-selectable GUI elements, like clickable text and buttons) or other conventional GUI elements to be implemented in the search engines of the Ground 1A combinations.

C. Mapping to the Challenged Claims

1. Claim 3, 8, and 13

Claim 3: The method of claim 1 further comprising: causing the display screen to display, in combination with the annotation within the second search result grouping, a selectable filtering function that, when selected, automatically causes the second search result grouping to be removed from the search results webpage.

Claim 8/[13]: The system of claim 7/[12], wherein the display screen displays, in combination with the annotation within the second search result grouping, a selectable filtering function that, when selected, automatically causes the second search result grouping to be removed from the search results webpage.

224. Claims 3, 8, and 13 depend from independent claims 1, 7, and 12, respectively, which I discussed above in Ground 1A. Ground 1B's Bates-based Brinson combinations build on the combinations in Ground 1A (*i.e.*, Bates-alone and Bates-Bhagat) and thus meet independent claims 1, 7, and 12 for the same reasons that the Ground 1A's combinations do. *See supra* Ground 1A, §VIII.D.1 (claim 1), §VIII.D.4 (claim 7), §VIII.D.6 (claim 12).

225. Dependent claims 3, 8, and 13 add to those previously-discussed independent claims 1, 7, and 12, respectively, the *selectable-filtering-function* limitation (which I defined in §IX above).

226. As I discussed above (§IX.B), POSAs had motivation to augment the combinations in Ground 1A (*i.e.*, Bates-alone and Bates-Bhagat) to include, based

on Brinson, user-selectable GUI elements (*e.g.*, displayed within each search result grouping are clickable buttons or clickable search-term text) that allow users to designate a search term as a mandatory search term. As I discuss further below, POSAs also had motivation to display such user-selectable GUI elements in combination with the annotation within each search result groupings because, as I demonstrate below, that would have been a conventional, aesthetic design choice for similar filtering functionality in prior-art search-engine interface design (*e.g.*, Bhagat’s filtering functionality that I discuss further below). As I also discussed above (§IX.B; citing corroboration), Bates-Brinson and Bates-Bhagat-Brinson would have applied the “required”-term designation to the already-identified search results, rather than execute a new search.

227. Once augmented in this manner, the Ground 1B Bates-based Brinson combinations meet the *selectable-filtering-function* limitation because selecting the GUI element to designate a missing search term as “required” – *i.e.*, the term displayed in a gray and/or strikethrough font – *causes* the search-result webpages *missing* that search term *to be removed from being displayed*. The search results that are missing a required search-term element will be removed from being displayed *automatically* because those search results, by definition, do not include the search-term element that the user has now designated as a term that **must** be found in a search result for it to be a valid search result to the user. Moreover, in

this scenario, the *selectable filtering function*—displayed as the selectable search terms—is displayed “*in combination with the annotation*” because the filter function is accessed from *the annotation* itself—*e.g.*, by clicking the text of the missing term in [1G]. *See supra* [1G] (discussing the annotation comprised of a text rep-representing the missing search term element(s) in gray font and/or strikethrough format).

228. Brinson’s process for making a search term a “required” term – selecting the term to make “required” and then selecting the search button to apply that filter – works similar to the patent’s filtering functionality that I discussed above (§IX), where the user selects filtering criteria that is then applied to a subsequent search executed by the user. But if claims 3, 8, and 13 were to require the search results to be updated in response to a single click by the user, that would have also been obvious to a POSA as a simple, beneficial design option that to achieve the benefit of additional user convenience (*e.g.*, the added convenience of not requiring the user to select multiple filter button presses before the system updates the search results to reflect the user’s selection of a mandatory term).

229. My opinion that it would have been known to POSAs to use a single click to update the display of search results in response to a selection that designates a search term as mandatory is corroborated by EX1068. As I discussed above (§IX.B), EX1068 discloses a pop-up window that allows a user to mark a

preference (a search weight) for a search term and that “[t]he new search result set may be **generated automatically upon inputting preference information** from the pop-up window.” EX1068, [0196].

230. My opinion that it would have been known to POSAs to use a single click to update the display of search results in response to a selection that designates a search term as mandatory is also corroborated by Bhagat (EX1011). Bhagat’s FIG. 2 depicts a user interface that displays the results of (*e.g.*, two) “historical search queries” that were used “to generate search results for a user” (Bhagat, 8:16-19) when the user’s original search – in FIG. 2’s example “fast racing adventures” – “did not match any results” (Bhagat, FIG. 2). Bhagat further discloses that the “user interface...includes hyperlinks to historical search queries 113,” which the user can “follow[]” (*i.e.*, click on to display a new webpage). Bhagat, 8:16-19. Two examples of those hyperlinks are shown in Bhagat’s FIG. 2 – “(See all 1,443 results)” and “(See all 180 results).” POSAs understand that if a user clicks on the hyperlink for one of the historical queries, the system automatically generates a new search-results webpage that shows only the results related to the selected query. As discussed above (§VIII.B), the search results related to each historical search query are results that are missing the search term(s) indicated by the strikethrough. Thus, each hyperlink is a *selectable filtering function that, when selected by the user as a single click causes one or*

more Internet search results referencing webpages that are missing one or more search term elements (the search-term element in gray font and/or with a strikethrough) to be removed from being displayed on the search results webpage on the computing device.

231. My opinion in this regard is also corroborated by Mills (EX1006). Mills, like Bhagat, includes a search-results page with clickable hyperlinks to generate a new results webpage that only displays results that are responsive to a particular “Alternative Search,” which, as I discuss further below (§XII.B), are results that are missing a search term that is shown with a strikethrough on the original search-results webpage. Mills, FIG. 2, 6:49-53 (“link 166 is associated with the respective group 153 that may be manipulated by the user in order to view a subsequent network page 149 that includes all of the results for the respective group 153 that are presented apart from the other groups 153 of items 136”), 6:53-57 (“each altered search string 163 may be presented as a link that may be clicked upon to facilitate a selection of such group 153 to be presented in a separate network page 149 apart from other groups 153 of items 136”).

232. Thus, Mills discloses selectable filtering function that, when selected by the user as a single click causes one or more Internet search results referencing webpages that are missing one or more search term elements (the search-term element in a gray font and/or with a strikethrough) to be removed from being

displayed on the search results webpage on the computing device. *See also* Mills, FIG. 2, 6:53-58.

233. My opinion in this regard is further corroborated by EX1031, which discloses a “system [that] allows a user to define and refine search intent and enhance the user’s search experience.” EX1031, [0004]. EX1031’s GUI includes a “‘Result Presentation’ control (RP),” which “is used to present search results.” EX1031, [0022]. Figure 4 shows “an exemplary GUI that responds to user expression of search intent by adjusting rankings of search results.” EX1031, [0009]. EX1031 discloses that “manipulation of the user input graph 310 can cause the RP control to **automatically** update the search results” (*i.e.*, in response to a single click). EX1031, [0042].

234. My opinion in this regard is also corroborated by EX1068, which discloses a GUI for “sample search result page” for a search engine. EX1068, [0194]. EX1068 discloses a “pop-up window” that “may be obtained...by the user clicking on a particular discussion object” (*e.g.*, a word in a search result) that presents “a range of preference information which may be selected by the user,” like “never show information about this discussion object” “all the way to ‘always show information about this discussion object’” (*i.e.*, make it mandatory in the search results). EX1068, [0195]. EX1068 discloses that once the user “has expressed additional preference information about” “the discussion objects []

within the [search results] page” a “new search result set may be generated **automatically upon inputting preference information** from the pop-up window” as opposed to “be[ing] generated upon a ‘refresh’ command from the user.” EX1068, [0196].

235. Thus, claims 3, 8, and 13 would have also been obvious over Ground 1B’s Bates-based Brinson combinations if the *selectable-filter-function* limitation requires the search results to be updated in response to a single click identifying a search term as a mandatory term.

2. Claims 4, 9, and 14

- a. [4A]/[9A]/[14A] The method[/system/system] of claim 3[/8/13], wherein the user’s/[user-operated] computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer’s display screen, and

236. Bates says “terminal 110” (*the personal computing device*) can be “a personal digital assistant, [or] a web-enabled cellular telephone” (Bates, [0023]), which POSAs understood discloses (or at least renders obvious) *a smart phone with a smaller display screen than the other devices recited in [4A]/[9A]/[14A]—a laptop, desktop, notebook, or tablet computer’s display screen.*

237. My opinion in this regard is corroborated by EX1067, which discusses “the Ericsson model R380 and R380s **web-enabled phones**” ([0007]), which EX1067 also refers to as “the Ericsson R380 or R380s **smartphone**” ([0031]).

- b. **[4B]/[9B]/[14B] wherein the automatic removal of the second search result grouping enables the smaller display screen to display an increased number of first type of search results.**

238. POSAs would have understood that *the automatic removal of the second search result grouping* discussed above (§IX.C.1, **claims 3, 8, & 13**) *enables the smaller display screen to display an increased number of first type of search results* (*i.e.*, results with all terms) because removing results provides additional screen space on the computing device's display screen for other search result groupings.

239. Once that one or more result is removed from the display, a POSA would understand that the search engine will display (or cause to be displayed from already identified) additional search results that are not removed (*i.e.*, a *first type of search result*, which is not missing the search term element missing in the *second search result grouping*). Bates itself notes that while its FIG. 2B “shows an exemplary presentation of information about three web pages found by a search, the number three is used here only for purposes of illustration, and the invention applies as well to more than three web pages and less than three web pages.” Bates, [0028]. My opinion in this regard is further corroborated by EX1015, which notes as background information that, in general, “the search results corresponding to a given user query can exceed a single web page, a web search engine may deliver search results across a series of web search results pages that can be consecutively

accessed by a user.” EX1015, [0005]. Thus, by removing *the second search result grouping* from being displayed, at least one additional result that satisfies the search query and that is not missing the search term element (*i.e.*, the *first type search result*) will fill-in the space left by the removed search result grouping.

240. Thus, the updated Internet-search user interface will enable the smaller display screen to display an increased number of *first type of search result* compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user. That is because, as I noted above, additional results will be able to occupy screen space freed-up by removing a search result grouping.

241. Thus, Bates-Brinson and Bates-Bhagat-Brinson render obvious claims 4, 9, and 14.

X. GROUND 1C: THE GROUND 1A COMBINATIONS IN VIEW OF MEHTA RENDER OBVIOUS CLAIMS 5, 10, 15, AND 17-20

242. Ground 1C challenges dependent claims 5, 10, and 15, and independent claims 17 and 19 (and its dependent claims 18 and 20, respectively), which require displaying *one or more selectable advertisements...related to one or more of the search term elements* (hereinafter “the *selectable-advertisement* limitation”). As the ’184 patent concedes (and POSAs would have independently understood), including such selectable advertisements was “common” in the art. EX1001, 2:54-58, FIG. 1.

243. As I discuss below (§X.B), POSAs would have had reason to incorporate such common advertising functionality into the Ground 1A combinations (*i.e.*, Bates-alone and Bates-Bhagat), and the claims challenged in Ground 1C would have been obvious to POSAs (*see* §XI.C below).

A. Mehta (EX1008)

244. Mehta is a US patent application publication that published in 2009 (cover code (43)) from an application filed in 2008 (cover code (22)).

245. Mehta explains that advertisers “lure a consumer to the advertiser’s website...by strategically placing [an] advertisement in [a] search results webpage.” Mehta, [0005]. Mehta says “advertisers define their advertisements based on one or more keywords that they believe will be used by consumers searching for products/services similar to the ones offered by the advertisers.”

Mehta, [0005]. “The search engine” “searches an ad inventory to determine if the [consumer’s] keywords match keywords that define an advertisement” and “the relevant advertisement[s] will be included with search results” by “appear[ing] next to or above the search results webpage.” Mehta, [0005].

246. As shown in Mehta’s Figure 2, potential advertisement results are stored in a separate repository (320) from the repository for potential search results (330). That is because, as Mehta suggests and would have been conventional, the search engine identifies advertising results in parallel with and separately from identifying non-sponsored search results. The search engine will try to identify advertising results based on all of the user’s search terms and may identify advertising results responsive to all search terms even if the search engine cannot identify non-sponsored search results that include all search terms. For example, if the user searches for the terms “A,” “B,” and “C,” the system will preferably identify and display advertisements related to “A,” “B,” and “C” and that part of the system is agnostic to whether (or how many) non-sponsored search results are related to all three search terms.

247. Mehta’s Figure 3A (highlighted below) depicts a search-result webpage with “sponsored advertisements” (red) displayed “along with a plurality of search results.” Mehta, [0033]. As seen below, the webpage includes both

“sponsored advertisements that match the search parameters,” *i.e.*, the user’s initial search query, as well as the search results that match the query. *Id.*

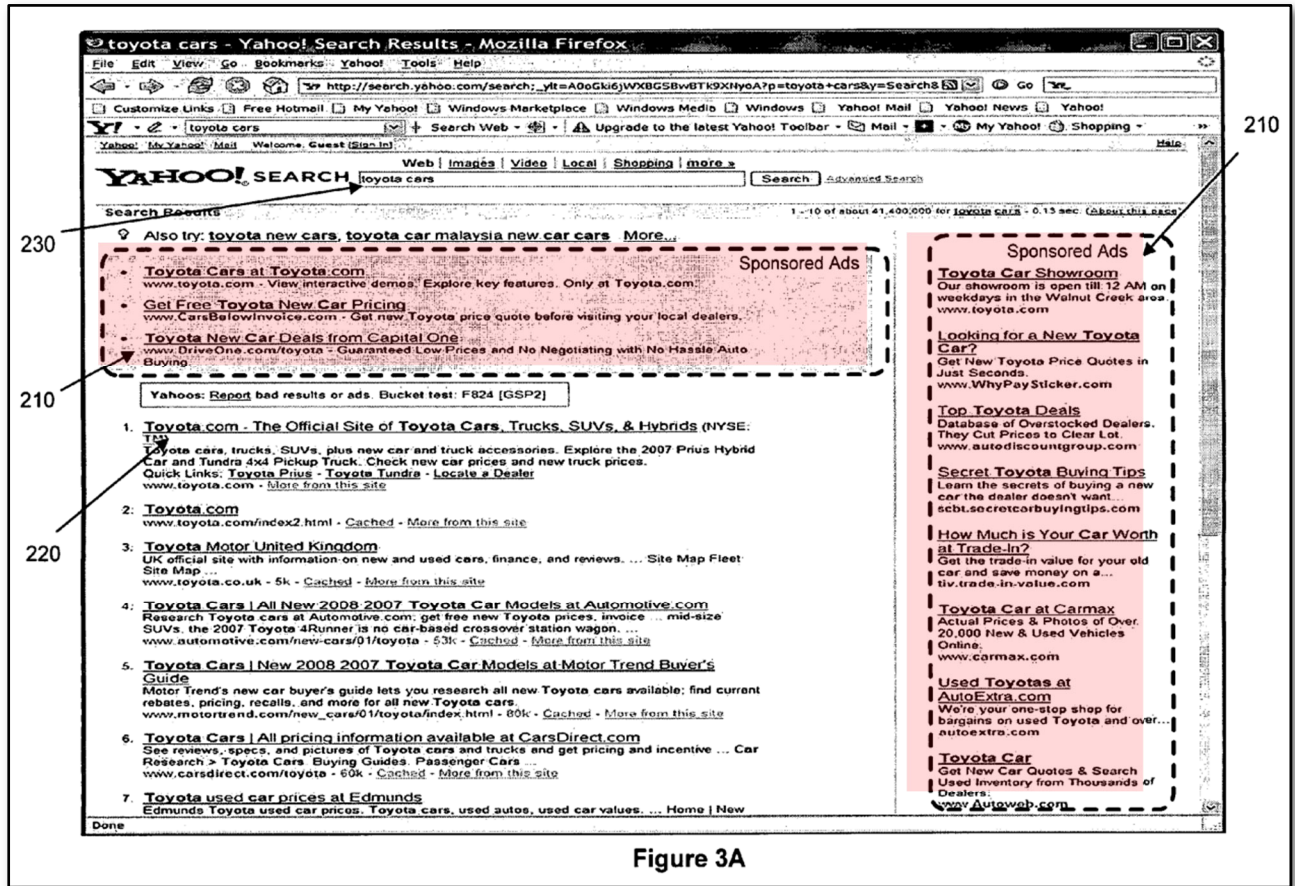


Figure 3A

A. The Bates-Mehta and Bates-Bhagat-Mehta Combinations

248. Mehta demonstrates that displaying *selectable* “relevant advertisement[s]” alongside search results was known. Mehta, [0005]. The ’184 patent itself recognizes this fact too. EX1001, 2:54-58, FIG. 1. And POSAs knew that search-engine providers typically displayed selectable advertisements related to the user’s search terms to generate revenue. My opinion in this regard is corroborated by EX1015 (at [0004]), which discloses as background information

that “search engine providers need to offer advertising opportunities [to] finance their operating costs” and EX1016 (at [0006]), which discloses as background information that search-engine providers derive “significant amount[s]” of revenue from advertisements. *See also* EX1015, [0004] (noting that advertisers were “often paid by the providers of the advertisements per **user selection** of each advertisement, e.g., per user click”), [0005] (noting that ads were typically ranked “based on a likelihood of each ad being **selected** by the user”).

249. In view of Mehta, POSAs would have had a motivation—*e.g.*, to generate revenue—to implement the combinations set forth in Ground 1A (Bates-alone and Bates-Bhagat)—such that the search-engine interface in each combination (*i.e.*, an interface like the one depicted in Bates’s Figure 2B) would have included selectable advertisement with “[s]ponsored links” that are “relevant to [the user’s] search criteria” that would have been displayed on Wang-Mills-Mehta’s search-engine interface. Mehta, [0005]-[0006]; *see also* EX1017, [0006]; EX1018, 1:25-30 (“[T]he user can be presented with **advertisements related to the search query.**”).

250. These implementations would have also been a POSA’s use of a known technique (*i.e.*, search-term-based selectable advertisements) to improve similar systems (*i.e.*, search engines) in the same way (*e.g.*, allowing for the search-engine provider to generate revenue). POSAs would have had a reasonable

expectation of success in implementing the Ground 1A combinations with Mehta because it would have required only ordinary programming skill to include conventional advertising functionality (like Mehta's) into Bates's search engine and user interface.

B. Mapping to Challenged Claims

1. Claims 5, 10, and 15

Claim 5: The method of claim 1 further comprising: causing the display screen to display one or more selectable advertisements on the search results webpage, wherein the one or more selectable advertisements are related to one or more of the search term elements.

Claim 10[/15]: The system of claim 7[/12], wherein the display screen displays one or more selectable advertisements on the search results webpage, where the one or more selectable advertisements are related to one or more of the search term elements

251. Claims 5, 10, and 15 depends from independent claims 1, 7, and 12, respectively, which I addressed above in Ground 1A (§VIII.D). Ground 1C's combinations (*i.e.*, Bates-Mehta and Bates-Bhagat-Mehta) build on Ground 1A's combinations (*i.e.*, Bates-alone and Bates-Bhagat) and meet independent claims 1, 7, and 12 for the same reasons that the Ground 1A's combinations do. *See supra* Ground 1A, §VIII.D.1 (claim 1), §VIII.D.4 (claim 7), §VIII.D.6 (claim 12).

252. Dependent claims 5, 10, and 15 adds to claims 1, 7, and 12, respectively, the *selectable-advertisement* limitation (which I defined above in

§X). As I discussed above, Mehta provides POSAs with motivation—*e.g.*, to generate revenue—to augment the combinations in Ground 1A such that their search-engine interfaces would have displayed “[s]ponsored *advertisements*” *related to one or more of the search term elements* with *selectable* links (*e.g.*, users “click[]” a link to open an advertised webpage). Mehta, [0005]-[0006]. Once augmented in this manner, the Ground 1C combinations meet the *selectable-advertisement* limitation and render claims 5, 10, and 15 obvious.

2. Claim 17

253. Ground 1C’s combinations (*i.e.*, Bates-Mehta and Bates-Bhagat-Mehta) build on Ground 1A’s combinations (*i.e.*, Bates-alone and Bates-Bhagat) and meet independent claims 1, 7, and 12 for the same reasons that the Ground 1A’s combinations do. *See supra* Ground 1A, §VIII.D.1 (claim 1), §VIII.D.4 (claim 7), §VIII.D.6 (claim 12). Independent claim 17 recites a system that largely mirrors the system recited in independent claim 7, though it also includes limitations found in dependent claim 5 (*advertisements*) and dependent claim 6 (*third* and *fourth* search results), which I discussed previously. As I indicate in the table below, Bates-Mehta and Bates-Bhagat-Mehta meet the following limitations of claim 17 for the same reasons that I discussed above for similar limitations, as indicated in the table below.

Limitation	Addressed in Section:
[17PRE]	§VIII.D.4 ([7PRE]) <i>See also</i> §VIII.D.1.a ([1PRE])
[17A]	§VIII.D.4 ([7A]) <i>See also</i> §VIII.D.1.b ([1A])
[17B]	§VIII.D.4.a ([7B])
[17C]	§VIII.D.4 ([7C]) <i>See also</i> §VIII.D.1.c ([1B], discussing interface that meets [17C]’s the <i>search results webpage</i>)
[17D]	§VIII.D.4 ([7D]) <i>See also</i> §VIII.D.1.d ([1C])
[17E]	§VIII.D.4.b ([7E])
[17F]	§VIII.D.4 ([7F]), §VIII.D.4.c ([7F]) <i>See also</i> §VIII.D.1.f ([1E])
[17G]	§VIII.D.4 ([7G])

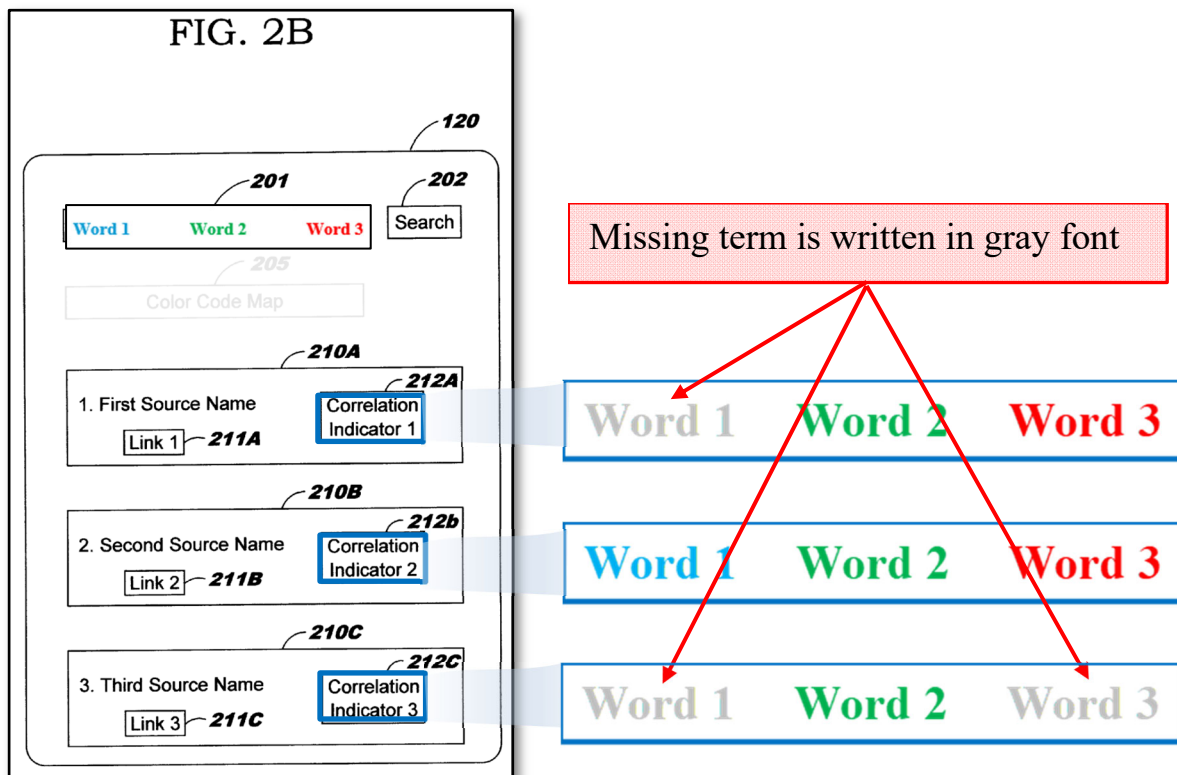
	<i>See also</i> §VIII.D.1.g ([1F], <i>first search result grouping</i>), §VIII.D.1.h ([1G], <i>second search result grouping</i>)
[17H]	§VIII.D.4 ([7H]) <i>See also</i> §VIII.D.1.g ([1F])
[17I]	§VIII.D.4 ([7I]) <i>See also</i> §VIII.D.1.h ([1G])
[17J]	§VIII.D.4 ([7J]) <i>See also</i> §VIII.D.2.b ([2B])
[17K]	§X.C.1 (claim 5)
[17L]	§VIII.D.3.a ([6A])
[17M]	§VIII.D.3.b ([6B])
[17N]	§ VIII.D.3.c ([6C])
[17O]	§VIII.D.4 ([7K]) <i>See also</i> §VIII.D.1.i ([1H])

3. Claim 18

The system of claim 17 wherein each missing search term annotation comprises text representing at least one search term element in at least one of the following formats: (i) a font representing the text has been altered; (ii) the text is shown with one or more lines merged with the text; (iii) the text is shown with one or more lines superimposed thereupon; (iv) the text is shown within a shaded area; and (v) the text is shown with a reversed format.

254. Claim 18 requires that *each missing search term annotation* recited in limitations [17I], [17L]-[17N] take one of four specified formats. As I discuss below, both Bates-Mehta and Bates-Bhagat-Mehta meet claim 18 because each of their correlation indicators (*annotations*) *comprise text representing at least one search term element in at least one of the formats* recited in claim 18.

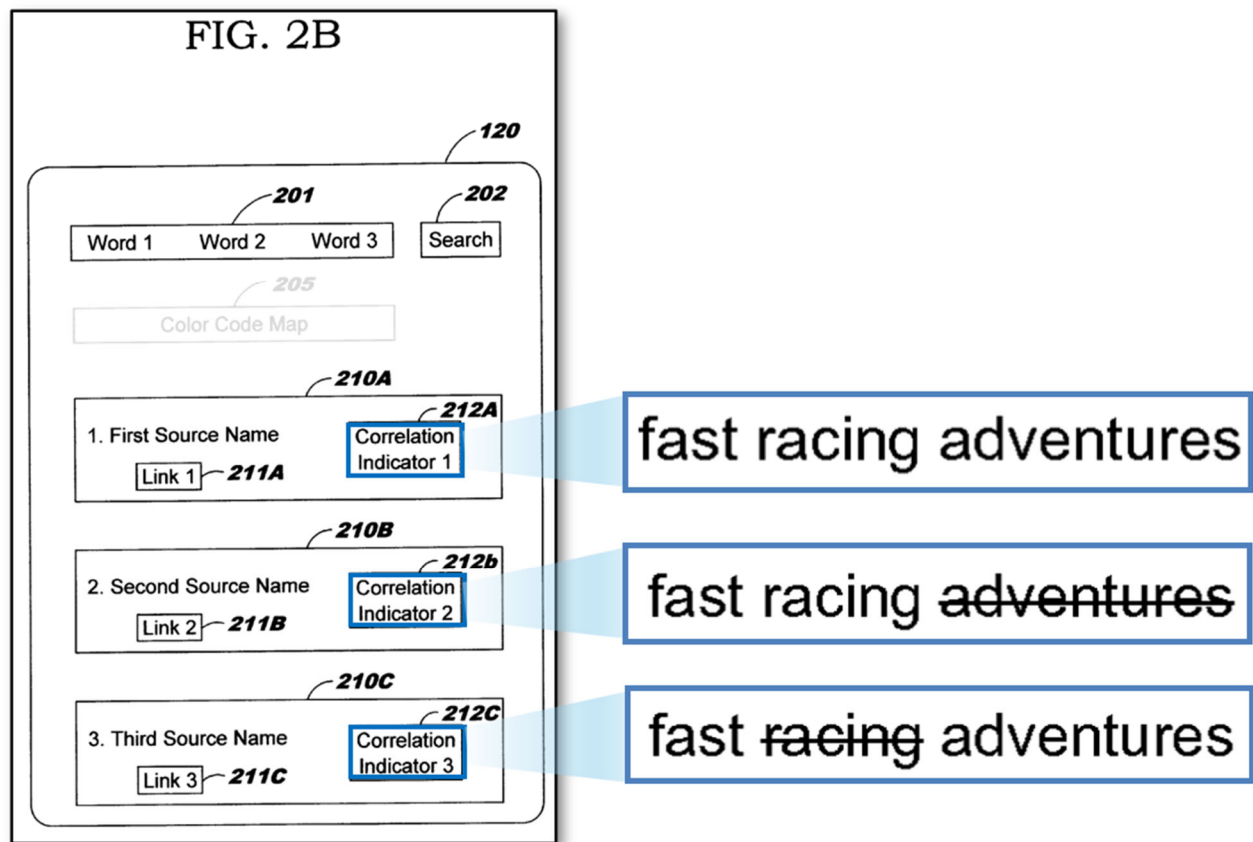
255. Starting with Bates-Mehta, as I discussed above (§X.B) and illustrate again below, each missing *search term element* is written in a font “color not associated with any keyword by the color code map 205” (Bates, [0033]) (*e.g.*, muted-gray), which meets *(i) a font representing the text has been altered* at least because the font for the element has been *altered* from its initially assigned color (*e.g.*, “blue” or “red”) to a different color (*e.g.*, muted-gray).



256. As I discussed above (§VIII.C.1), EX1046 and EX1024 corroborate my opinion that using a gray/muted-gray color would have been a conventional way to indicate a metric that has a presence of zero (*i.e.*, is missing) or unavailable in a search result. See EX1046, FIG. 6, [0046]-[0047]; EX1024, [0005].

257. As for Bates-Bhagat-Mehta, as I discussed above for Bates-Bhagat (§VIII.C.2) and illustrate again below, each missing *search term element* is written with a strikethrough (and optionally with a grayed-out font for the text), which meets at least the *formats* of (i) *a font representing the text has been altered*; (ii) *the text is shown with one or more lines merged with the text*; and/or (iii) *the text is shown with one or more lines superimposed thereupon*.¹⁰

Bates-Bhagat-Mehta



¹⁰ The '184 patent does not explain or illustrate distinct *formats* for text having *lines merged* versus *lines superimposed thereupon*; however, POSAs understand Bate-

4. Claim 19

258. Ground 1C's combinations (*i.e.*, Bates-Mehta and Bates-Bhagat-Mehta) build on Ground 1A's combinations (*i.e.*, Bates-alone and Bates-Bhagat) and meet independent claims 1, 7, and 12 for the same reasons that the Ground 1A's combinations do. *See supra* Ground 1A, §VIII.D.1 (claim 1), §VIII.D.4 (claim 7), §VIII.D.6 (claim 12). Independent claim 19 recites a method that largely mirrors the system recited in independent claim 7 and certain dependent claims discussed previously. As I indicate in the table below, Bates-Mehta and Bates-Bhagat-Mehta meet the following limitations of claim 19 for the same reasons that I discussed above for similar limitations, as indicated in the table below.

Limitation	Addressed in Section(s):
[19PRE]	§VIII.D.4 ([7PRE]) §X.C.1 (claims 5/10/15 ; advertisements displayed based on <i>submitted search terms</i> , independent of

Bhagat-Mehta's strikethrough meets at least one (if not both) of those formats because the strikethrough line is either merged or superimposed (or both) with the search term text.

	<p>whether <i>some search results...do[] not contain all...terms</i>)</p> <p>§X.A (explaining that Mehta and conventional search engines identify advertisements to display related to the user’s search terms, independent of whether non-sponsored results comprise all search terms)</p> <p><i>See also</i> §VIII.D.1.a ([1PRE])</p>
[19A]	<p>§VIII.D.4 ([7PRE]) (<i>interactive GUI</i>)</p> <p>§VIII.D.4 ([7A]) (<i>server receiving search request submitted via the Internet from user-operated computing device</i>)</p> <p>§VIII.D.4 ([7B]), §VIII.D.4.a ([7B]) (<i>first search request comprising a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider</i>)</p> <p><i>See also</i> §VIII.D.1.a ([1PRE]), §VIII.D.1.b ([1A])</p>
[19B]	<p>§VIII.D.4 ([7C]) (<i>performing an Internet search to produce a search results webpage comprising a</i></p>

	<p>plurality of <i>search results</i>)</p> <p>§VIII.D.4.b ([7E])’s <i>second type</i> meets [19B]’s <i>first search result</i>)</p> <p><i>See also</i> §VIII.D.1.c ([1B])</p>
[19C]	<p>§VIII.D.4.c ([7F]) (server provides, <i>via the Internet</i>, the <i>search results webpage</i> for displaying on the user-operating <i>computing device</i>)</p> <p><i>See also</i> §VIII.D.1.f ([1E])</p>
[19D]	<p>§VIII.D.4 ([7I])’s <i>second grouping</i> meets [19D]’s <i>first grouping</i>)</p> <p><i>See also</i> §VIII.D.1.h ([1G])</p>
[19E]	<p>§VIII.D.4 ([7J])</p> <p><i>See also</i> §VIII.D.2.b ([2B])</p>
[19F]	<p>§X.C.1 (claims 5/10/15)</p>
[19G]	<p>§VIII.D.4 ([7K])</p> <p><i>See also</i> §VIII.D.1.i ([1H])</p>

5. Claim 20

- a. **[20A] The method of claim 19, wherein the one or more search results further includes: (i) a second search result which references a second webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the second webpage contains the at least one missing search term element; and**

259. Bates-Mehta and Bates-Bhagat-Mehta meet the limitation added by [20A] for the same reasons I discussed above (§VIII.D.3.a) that Bates-alone and Bates-Bhagat, respectively, meet the limitation added by [6A], where [6A]’s *third type of search result* meets [20A]’s *second search result*.

- b. **[20B] (ii) a third search result which references a third webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the third webpage are also missing the at least one search term element; and further comprising:**

260. Bates-Mehta and Bates-Bhagat-Mehta meet the limitation added by [20B] for the same reasons I discussed above (§VIII.D.3.b) that Bates-alone and Bates-Bhagat, respectively, meet limitation added by [6B], where [6B]’s *fourth type of search result* meets [20B]’s *third search result*.

- c. **[20C] causing the display screen to display the third search result in a same manner as the first search result grouping.**

261. Bates-Mehta and Bates-Bhagat-Mehta meet the limitation added by [20C] for the same reasons I discussed above (§VIII.D.3.c) that Bates-alone and

Bates-Bhagat, respectively, meet the limitation added by [6C], where [6C]’s *fourth type of search result* meets [20C]’s *third search result*.

XI. GROUND 1D: THE GROUND 1C COMBINATIONS IN VIEW OF BRINSON RENDERS OBVIOUS CLAIMS 21-22

A. The Bates-Mehta-Brinson and Bates-Bhagat-Mehta-Brinson Combinations

262. Ground 1D challenges claim 21 (and its dependent claim 22), which requires claim 19’s method to include the *selectable-filtering-function* limitation (which I defined above §IX).

263. For the same reasons that I discussed above for Ground 1B that POSA had to incorporate such known filtering functionality into the Ground 1A combinations (Bates-alone and Bates-Bhagat, §§VIII.C.1-VIII.C.2) based on Brinson (§IX.B), POSA would have incorporated such known filtering functionality into Ground 1C’s combinations (Bates-Mehta and Bates-Bhagat-Mehta). POSAs would have reasonably expected success in Ground 1D’s Bates-Mehta-Brinson and Bates-Bhagat-Mehta-Brinson combinations for the same reasons that I discussed above in Ground 1B (§IX.B) that POSAs would have reasonably expected success in adding Brinson to the Ground 1A combinations because the filtering features added based on Brinson would operate largely independently of the advertising features added based on Mehta.

B. Mapping to Challenged Claims

1. Claim 21

The method of claim 19, wherein the display screen displays, in combination with the annotation within the first search result grouping, a selectable filtering function that, when selected, automatically causes the first search result grouping to be removed from the search results webpage.

264. Dependent Claim 21 depends from independent claim 19 and adds the *selectable-filtering-function* limitation (which I defined above §IX). Ground 1D's combinations build on Ground 1C's Bates-Mehta and Bates-Bhagat-Mehta combinations, respectively, and thus meet claim 19 for the same reasons that Ground's 1C combinations do. *Supra* §X.C.4 (Ground 1C).

265. As I discussed above (§IX.B), for the same reasons POSAs would have augmented Ground 1A's combinations (Bates-alone and Bates-Bhagat) to include, based on Brinson, user-selectable GUI elements (*e.g.*, clickable search-term text displayed within each search result grouping) for designating a search term as required, POSAs would have added that functionality to Ground 1C's combinations. Once augmented in that manner, Ground 1D's combinations meet claim 21 for the same reason Ground 1B's combinations meet claim 3 (*supra* §IX.C.1), with claim 21's *first search result grouping* corresponding to claim 3's *second search result grouping*. That's because selecting a search term that is missing from *the first search result grouping* and designating that term as

“required” *automatically causes that grouping to be removed from the search results webpage* because it is missing the now-required term.

2. Claim 22

- a. **[22A] The method of claim 21, wherein the user-operated computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer’s display screen, and**

266. Bates-Mehta-Brinson and Bates-Bhagat-Mehta-Brinson meet the limitation added by **[22A]** for the same reasons I discussed above (§IX.C.2.a) that Bates-Brinson and Bates-Bhagat-Brinson, respectively, meet the limitation added by **[4A]**.

- b. **[22B] wherein the automatic removal of the first search result grouping enables the smaller display screen to display an increased number of first type of search results.**

267. Bates-Mehta-Brinson and Bates-Bhagat-Mehta-Brinson meet the limitation added by **[22B]** for the same reasons I discussed above (§IX.C.2.b) that Bates-Brinson and Bates-Bhagat-Brinson, respectively, meet the limitation added by **[4B]**, with **[22B]**’s *first search result grouping* corresponding to **[4B]**’s *second search result grouping*.

XII. GROUND 2A: WANG-MILLS RENDERS OBVIOUS CLAIMS 1-2, 6-7, 11-12, AND 16

A. Wang (EX1005)

268. Wang is a US patent application publication that published in 2010 (cover code (43)) from an application filed in 2008 (cover code (22)).

269. Wang concerns keyword-based search engines. Wang, [0001], [0014], [0016]. Wang says “[m]ost keyword-based search engines operate on the assumption that the user intends to only find documents that contain all of the [user-selected] search terms.” Wang, [0002]. Wang calls this “and-based searching.” Wang, [0002]. POSAs would understand that Wang is describing prior art searches that use as their default search strategy a so-called Boolean “AND” logical operation, which is satisfied when a search result contains all of the search terms joined by the “AND.” For example, if the search query is “A AND B,” only a search result that contains A and B (as opposed to just A or just B) will be identified as satisfying the user’s search query.

270. Wang says that a problem with “and-based searching” occurs when a user “over-specifies a query by including unnecessary terms.” Wang, [0002]. When the user over-specifies (over-constrains) the search query, Wang says relevant search results that are “missing one or more of the extra terms will not be located.” Wang, [0002]. For example, if a user searches for “dentists in Seattle Wash,” the search engine “will not return documents that do not include all four

keywords” even though there may be relevant webpages that hit only some of those keywords, *e.g.*, three out of four.¹¹ Wang, [0001]-[0002].

271. To reduce the risk of excluding potentially relevant documents, Wang teaches a technique called “relaxed searching” where a search engine identifies search results “that include only a subset of the keywords submitted by a user.” Wang, [0014], [0031]. “The subset of keywords equals the total number of keywords (N) minus a given number (K) less than N.” Wang, [0014]. “For example, if a query” contained four keywords – “[1] Seattle [2] dentists [3] in [4] Washington” – “and K was equal to 1, documents would only have to include any three of the above words to be included on the results list.” Wang, [0014], [0031].

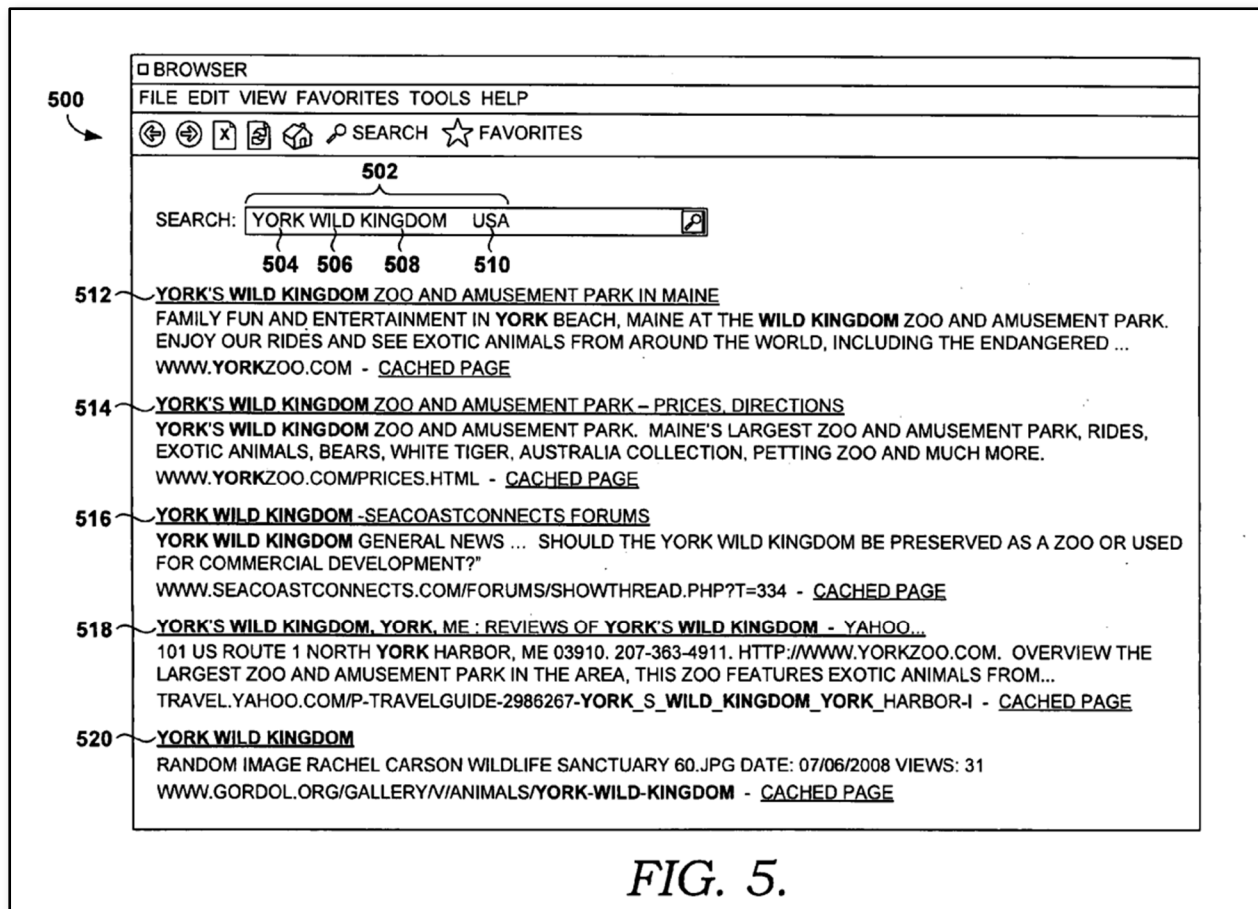
272. Wang’s Figure 5 (below) illustrates “a search-results list from a search engine performing relaxed searching.” Wang, [0053].¹² In the Figure 5 example, a

¹¹ In Wang, “documents” include Internet webpages. Wang, [0030].

¹² A POSA would recognize that Wang has a typographical error in Paragraph [0053] in referring to a “FIG. 6.” *See* Wang, [0053] (“Specifically, FIG. 6 illustrates a screen shot of a web browser window 500 rendering a web site for the search engine.”). Wang does not include a Figure 6 and it would be readily apparent to a POSA that the reference to “FIG. 6” in [0053] was intended to refer

user submitted a four-word query (“york,” “wild,” “kingdom,” and “USA”), and the search engine “returned a list of results that contained N-K keywords,” where N=4 and K=1. Wang, [0053]. “The resulting documents thus have at least 3 of the 4 keywords,” which is illustrated in Figure 5, where a user’s keyword is also emphasized in bold within each search result wherever a keyword appears in the result’s title, URL, or summary text. Wang, [0053]. POSAs would have understood that it was conventional in prior art search engines to bold (or otherwise annotate) search terms that are shown in a search-results webpage (*e.g.*, in a search result’s title, summary, and/or URL). *See, e.g.*, EX1026, 6:62-7:3 (disclosing that “search terms used in the search query are highlighted in bold font in the document title 330 and the snippet 350”).

to “FIG. 5” as the rest of the paragraph refers to reference numbers that all begin with a “5” and that those reference numbers are shown in FIG. 5 and only FIG. 5. A POSA would have also understood FIG. 5 (and only FIG. 5) to be consistent with “illustrat[ing] a screen shot of a web browser window 500 rendering a web site for the search engine.”



273. As shown above, Wang emphasizes search terms that **appear** in each search-result grouping (*e.g.*, with bold font), which explicitly informs the user that those search terms are present in the corresponding search result's webpage and thereby **suggests** which search term(s) is/are missing (terms that are not shown in bold in a search result). However, a search term that is **not** bolded is not necessarily missing from a search result: that search term may or may not be present in that search result's webpage. For example, POSAs and possibly more-sophisticated searchers would know that "USA" could be present on one or more of the webpages displayed in the above search results even though "USA" is not

shown in any of the search-result groupings on the search-results webpage. “USA” does not appear in any of these webpage’s title or URL or paragraph displayed by the search engine, but “USA” could be present in another portion of one or more of these webpages (*e.g.*, in a portion of the webpage that is not shown in the text selected to be displayed by the search engine).

274. Wang reinforces that understanding by disclosing that “**As is shown, results 512, 514, 516, 518, and 520 all contain at least 3 of keywords 504, 506, 508, and 510**” (Wang, [0053]), but notably Wang does not say that Figure 5 shows that these results contain **only** those three keywords. A POSA would understand that it is consistent with Wang’s disclosure (including what’s shown in Figure 5) if one or more of these websites also included the keyword “USA.” Indeed, some prior art search systems “automatically generated [a] summary that is **independent of the search terms entered by the user** ([*i.e.*,] the search terms are used to determine which documents are retrieved, **but not the summary**).” *See* EX1056, [0005]. For example, even in Wang’s FIG. 5, the snippets for results 518 and 520 do not include **any** of the user’s search terms, which corroborates my opinion that the snippet is not necessarily indicative of which search terms are and are not present in a search-result’s webpage.

275. My opinion in this regard is further corroborated by EX1055, which notes as background information that typically the “snippet” on a search-results

webpage “includes a small portion of the web page that **often contains one or more of the search terms** of the search query.” EX1055, [0006]. That is, though search engines often displayed snippets that contained at least some of the user’s search terms, it was known that the snippets can also contain fewer than all of the search terms – *e.g.*, because one of the search terms is far apart from the other search terms on the same webpage and thus it would have required displaying an excessively long snippet that included every one of the user’s search terms.

276. My opinion that a search-engine’s “snippet” does not necessarily display each of the user’s search terms that appear on the corresponding webpage is further corroborated by EX1057. EX1057 (at [0002]) discloses as background information that “search engines” “typically return a snippet of the context text that includes, **or is near** the submitted keywords”; displaying context text that is merely “near” the submitted keywords means that the snippet may not include any (let alone) all of the submitted keywords present in the webpage.

277. As I discuss further below (§XII.C), because Wang may display search results that contain fewer than all search terms but does not make clear which search term (if any) is missing in each search result, POSAs would have been motivated to extend Wang by making explicit which search terms are missing in each search result.

B. Mills (EX1006)

278. Mills is a US patent that issued in 2014 from an application filed in July 2009 (cover code (22)).

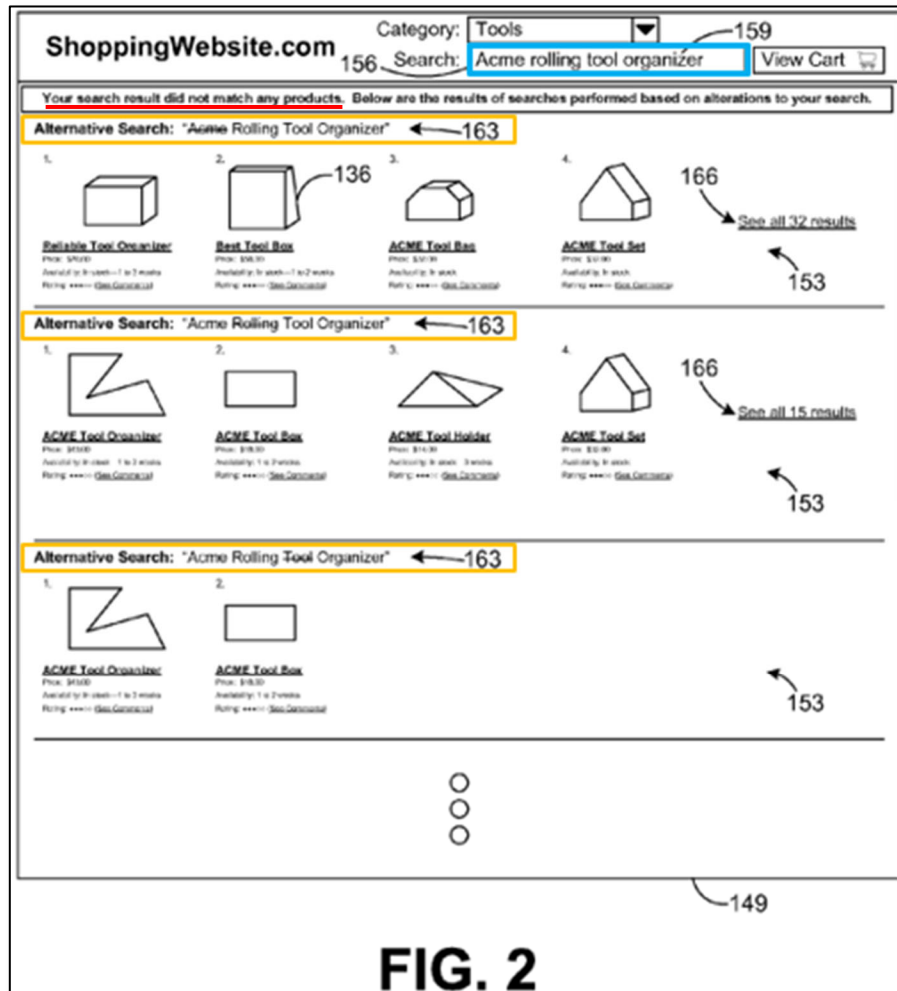
279. Mills relates to keyword searching, including for general-purpose Internet searches. Mills discusses examples where the search is “to identify... products for purchase,” but also says this is just “one example” and the described techniques are applicable more generally, such as “to perform a web search.” Mills, 2:40-44, 4:16-19. *See also* Mills, 1:39-45 (disclosing that Mills “relat[es] to the enhancement of word searching using a search string in the context of an online marketplace or **any other search context**”), 3:26-28 (disclosing that “the user may be performing a search for items 136 **other than products** in some other context as can be appreciated”), 4:16-19 (disclosing that “the user may enter a search string **for some other purpose** other than identifying items 136 for purchase,” *e.g.*, “the search string may be used **to perform a web search** or for some other purpose”). Performing a “web search” teaches (or at least suggests) that rather than an “item” (a product) each search result is a webpage.

280. Like Wang, Mills observes a problem when a “customer...enter[s] a word search that has too many terms”: the search engine may return few (if any) results because of the “overly constrained” search parameters. Mills, 1:8-11; *see also id.* 3:29-56. For example, Mills is considering the problem when the search

engine only displays results that include all of the user's search terms but none (or too few) match all of the user's search terms.

281. To address this problem, Mills discloses a search engine that “detects when a query that is generated from a search string fails to identify at least a predefined threshold number of items,” *e.g.*, at least 10 “items” or even just one result, which in a web-search embodiment would be search results from a “web search.” Mills, 4:39-47; *see also* Mills, 2:40-44, 4:16-19. When this happens, “the search engine [] is configured to generate one or more altered versions of the search string by making various modifications to the search string.” Mills, 4:48-53. Mills's “altered” search strings can be generated by removing one or more keywords from the original search string. Mills, 5:60-63.

282. Mills's Figure 2 (which I have annotated below) illustrates an interface for Mills's search engine. Mills, 1:25-27. As seen below, the user inputs a search string into a search box 156. Mills, 6:29-33. I have highlighted blue the example search string—“acme rolling tool organizer.”



283. In this example, Mills's Figure 2 says the user's four-word search string "does not provide any results for a search" (as shown by the notification text that I have underlined in red above). Mills, 6:33-36. Because no results were found for the user's original search string, the search engine "generates a plurality of altered versions of the search string 159 that are displayed as altered search strings 163" on the user interface. Mills, 6:38-46. I have added orange boxes to the three altered search strings above, and each is the original four-word search string with one word removed (i.e., these example alternative searches used

different combinations of 3 of the 4 original search terms). For example, the second altered search string is “Acme ~~Rolling~~ Tool Organizer,” which indicates that the original search string was altered by removing the word “Rolling” and based on just the three search terms “Acme,” “Tool,” and “Organizer.”

284. “Each altered search string is graphically associated with a group 153 of items identified based upon a second query generated from the altered search string 163 itself.” Mills, 6:43-46. For example, the second resulting “group 153” identifies results that matched the three-word search “acme tool organizer.” The strikethrough annotation (“~~Rolling~~”) indicates that in each result in the second group the search engine found three of the search terms – “Acme,” “Tool,” and “Organizer” – but did **not** find “Rolling” in any of those results because, otherwise, the original search **would** have found products that matched all four terms.

285. Mills says that Mills’s system ensures that a “user advantageously receives results to a search even though the search string 159 that they entered would result in no identified items 136” and “educate[s] users...as they can compare and contrast” the results of their original search with the results from various altered searches. Mills, 7:32-40.

286. I note that the first set of search results above have a strikethrough to “~~ACME~~” but the third and fourth results include “ACME” in their title. Keyword-based search engines often identified search results based on so-called inverted

indexes that listed keywords and, for each keyword, which items (*e.g.*, products, webpages, etc.) in the index include that keyword. POSAs knew that including an item's title as part of the index to be searched was a design option and thus some search engines would not include titles as part of their search space.

287. My opinion in this regard is corroborated by EX1052, which “discusses conventional text and image retrieval systems.” EX1052, [0003]. EX1052 discloses as background information that “Internet search engines” typically had “the whole text of the web pages held on various web servers [] indexed automatically” by so-called “‘robots’ or ‘spiders.’” EX1052, [0004]. EX1052 teaches that “[t]he way in which” documents are indexed “is dependent on the respective robot,” wherein “**some index the HTML title or the first paragraphs** in a document, while **others sift through the entire document** and index each individual word letter by letter.” EX1052, [0005]. Thus, EX1052 corroborates my opinion that it was known that indexes for search engines may or may not include an item's / webpage's “title” as part of the index being searched by the search engine.

288. My opinion in this regard is also corroborated by EX1053, which similarly discloses as background information that “[e]ach search robot has its own strategy for crawling the Internet,” and “**may either** parse the entire document, **the**

title of the document **or** the first paragraph” (*i.e.*, whether to include the title as part of a search was a design choice). EX1053, [0003].

289. My opinion in this regard is further corroborated by EX1054, which discloses a search engine that “determines whether a result contains the selected term by scanning the title and abstract of each result” or “[a]lternatively” the search engine “can examine the actual web content associated with the result” (*i.e.*, not the title and abstract). EX1054, [0039].

290. The example shown in Mills’s Figure 2 informs POSAs that the search engine in this example does not consider titles when determining whether a potential result includes the user’s keywords. Thus, to this search engine, the third and fourth items in the first group of results above do not include “ACME” even though “ACME” is in the product title shown in the search-result webpage.

C. Wang-Mills Combination

291. In view of Mills, in my opinion POSAs would have had reason to modify Wang’s interface to annotate each search result with the user’s keywords and to identify the keyword(s) (if any) missing in each corresponding webpage of the search result.

292. Wang and Mills relate to a common problem: preparing search results based on over-constrained search strings. They address that problem in similar ways: displaying search results of altered (and broadened) versions of the user’s

original search string (*e.g.*, search results that are responsive to a search with one of the user's original keywords removed).

293. Mills, however, recognizes a potential problem with altering and broadening the user's search query: "irrelevant items [] may be included in a search result generated based upon part [*i.e.*, subset] of [an] entire search string." Mills, 3:61-64. By increasing the likelihood of adding irrelevant results, it may cause a user to "lose faith that" the search engine "will reveal relevant results," which may "discourage further user participation" with the search engine. Mills, 3:64-4:4.

294. To mitigate that problem (while maintaining the benefits of broadening the user's search), Mills annotates search results by "graphically associat[ing]" the search results with the altered search strings that yielded those results. Mills, 6:43-46. Mills identifies at least two principal benefits to its annotations.

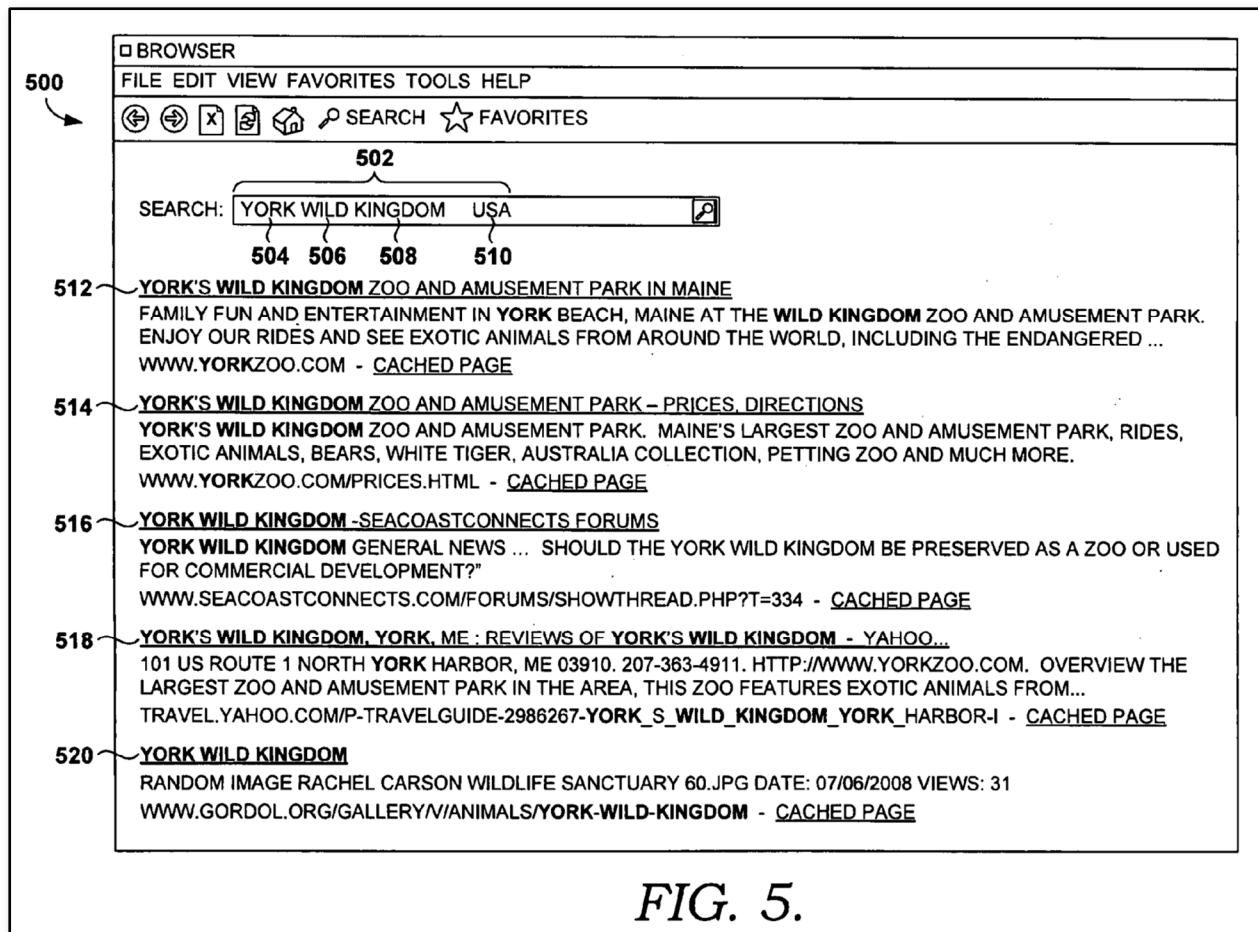
295. First, Mills teaches that displaying search results "along with the associated altered search strings 163 allows a user to see how other permutations of the original search string" yielded results whereas the original search string did not. Mills, 7:18-23. Mills teaches that this "disabuse[s]" the user of the belief that there are no search results relevant to the user's original search string. Mills, 7:23-25.

296. Second, Mills teaches that because “the altered search strings 163 are displayed in association with” their respective search results, “a user can see how the alteration made to the respective altered search string 163 may have resulted in” search results “that are not particularly relevant” to the user’s original search string. Mills, 7:25-31. That is, displaying annotations like Mills’s annotations informs the user what term(s) was removed to identify corresponding search result and thus what term is missing in those results, which may make those results less relevant to the user (*e.g.*, if the missing term is particularly important to the user). The inverse is also true—the annotation allows a user to see that removing a certain term caused additional relevant search results to be returned. *See also* Mills 7:35-40 (explaining that the annotations “serve[] to educate users”), 5:18-28 (the user is “informed that the search string entered was problematic” because it was “too narrow” while also allowing the user to “not select” a group when another “appear[s] to be more relevant”).

297. POSAs would have recognized that Mills’s teaching to annotate search results to identify which of the user’s terms are present and missing in the corresponding webpages is applicable to any system that displays search results that can match only a subset of a user’s search terms. As I discussed above, Wang is such a system that displays search results based on a subset of the user’s search terms. For that reason, POSAs would have recognized that Wang suffers the

potential problems that Mills identified in broadening a user's search query: some of Wang's search results might only match a subset of the user-supplied search terms, as I discussed above (§XII.A), but (without Mills) Wang does not indicate to the user which search terms have been removed for each broadened search result.

298. As I discussed above (§XII.A), Wang's Figure 5 example (below) includes four keywords—YORK WILD KINGDOM USA—and Wang says “[t]he resulting documents...have at least 3 of the 4 keywords.” Wang, [0053]. Each of these search result groupings includes in **bold** “YORK,” “WILD,” and “KINGDOM,” and thus each corresponding result clearly includes those keywords. However, it would be unclear to the user whether any result's webpage also includes “USA” because even though “USA” is not displayed in the search results “USA” could still be present somewhere in the webpage (*e.g.*, somewhere other than in the title, URL, or excerpt displayed by the search engine). *See* Wang, [0053] (“**As is shown**,...all [results] contain **at least 3** of [the] keywords.”).



299. Because Wang's search-results webpage can be unclear whether and which un-displayed keyword is actually missing from each webpage (and which webpages are missing the keyword and which are not), POSAs would have recognized that Wang's system is ready for improvement via the above-described benefits of Mills's annotations (e.g., helping the user ignore potentially irrelevant results), which would have been achieved in Wang's system (based on Mills) by graphically depicting the specific keywords that Wang used to identify each search result and crossing out keywords that are missing in the associated webpage. The combination would have thus been the use of a known technique (Mills's

graphically-displayed altered search string annotation) to improve a similar device (Wang’s search engine) in the same way (providing users with additional search-term information that improves their searching experience).

300. Wang displays a single list of results that are ordered based on conventional ranking methodologies, such as the frequency with which a particular result has been accessed previously or the user’s geographic location. Wang, [0050] (explaining that “other alternatives are [] possible”). POSAs would have also been aware of various known search-result ranking methodologies that rank results individually, as in Wang. Thus, under a conventional ranking methodology (including Wang’s examples), the first-ranked search result might only have three of the four search terms (but rank particularly high under some other metrics), the second-ranked search result might match a different combination of three search terms, and maybe only the third-ranked search result matches all four search terms, etc.

301. Thus, to support Wang’s (and other conventional) search-ranking methodologies, in one obvious combination of Wang and Mills (which I will refer to as “Wang-Mills” or the “Wang-Mills combination”) **each** search result would include a search-term annotation specific to that search result. Including the annotations adjacent to (or below) each search result is consistent with Wang’s FIG. 5, which already bolds search terms present in each search result and would

be consistent with how known search engines annotated search results on a per-search-result basis, as opposed to a single annotation for a group of search results, as discussed below.

302. For example, EX1029 (a US patent that issued in 2002) “relates to a system and method for viewing search results.” EX1029, 1:7-8. EX1029 discloses as background information that some prior art search results webpages made it “difficult to analyze” “because many users have no choice but to, manually and laboriously, verify that the website contains data in which he is interested by reading each Web address, the few words surrounding the keywords, and, in some cases, the short summary.” EX1029, 1:42-49. EX1029’s FIG. 3 (color-annotations added below) shows a search results webpage with a text-based annotation added to the bottom of each search result grouping that provides “a view showing data and content metadata associated with each of two websites resulting from a search of a network” (*e.g.*, various “metadata” associated with each website). EX1029, 5:63-6:49. For example, “[f]irst and second pages 316 and 348 preferably include the number of typical computer screens needed to display the typically displayed text associated with first website 372 and second website 374, respectively.” EX1029, 3:53-56. The “[f]irst and second styles 328 and 360 preferably include the number of different styles (such as a particular ‘look and feel,’ a cascading style sheet, or use of particular fonts, text sizes,

images, and page layouts) used within first and second websites 372 and 374, respectively.” EX1029, 4:36-40. *See also* EX1029, 3:49-7:4 (describing the various other information provided by EX1029’s annotations).

302

CONTENT VIEW

372

304
Title: 306
Description:
URL/Size:
308 Verification View: Relationship – Image – Seal

PhDSurvey: R. Todd Stephens Ph.D. Web Site for The Nova ...
The default.htm page is the home page for **PHdSurvey.com**. ... This means that **Phdsurvey.com** is no longer needed and a new requirement has emerged. ...
www.phdsurvey.com/ - 26k - Cached - Similar pages

316 Pages: 1,452	324 Document: 156	332 Avg. Size: 15k
318 Images: 45	326 Scripts: 3	334 Avg. Download: 3 Sec
320 Links: 458	328 Styles: 4	336 Avg. White Space: 40%
322 Advertisements: 2	330 Technology: XML	338 Avg. Metadata Score: 4.50

310
Title: 312
Description:
URL/Size:
314 Verification View: Relationship – Image – Seal

Washington Trust Trust Accounts
... If you do not have an access ID, or if you have forgotten it (or your PIN), please contact your Washington **Trust** Relationship Officer at 401-348-1238 or 1-800 ...
www.washtrust.com/trust/htm - 11k - Cached - Similar pages

348 Pages: 152	356 Document: 15	364 Avg. Size: 5k
350 Images: 5	358 Scripts: 0	366 Avg. Download: 13 Sec
352 Links: 48	360 Styles: 0	368 Avg. White Space: 10%
354 Advertisements: 20	362 Technology: HTML	370 Avg. Metadata Score: 2.50

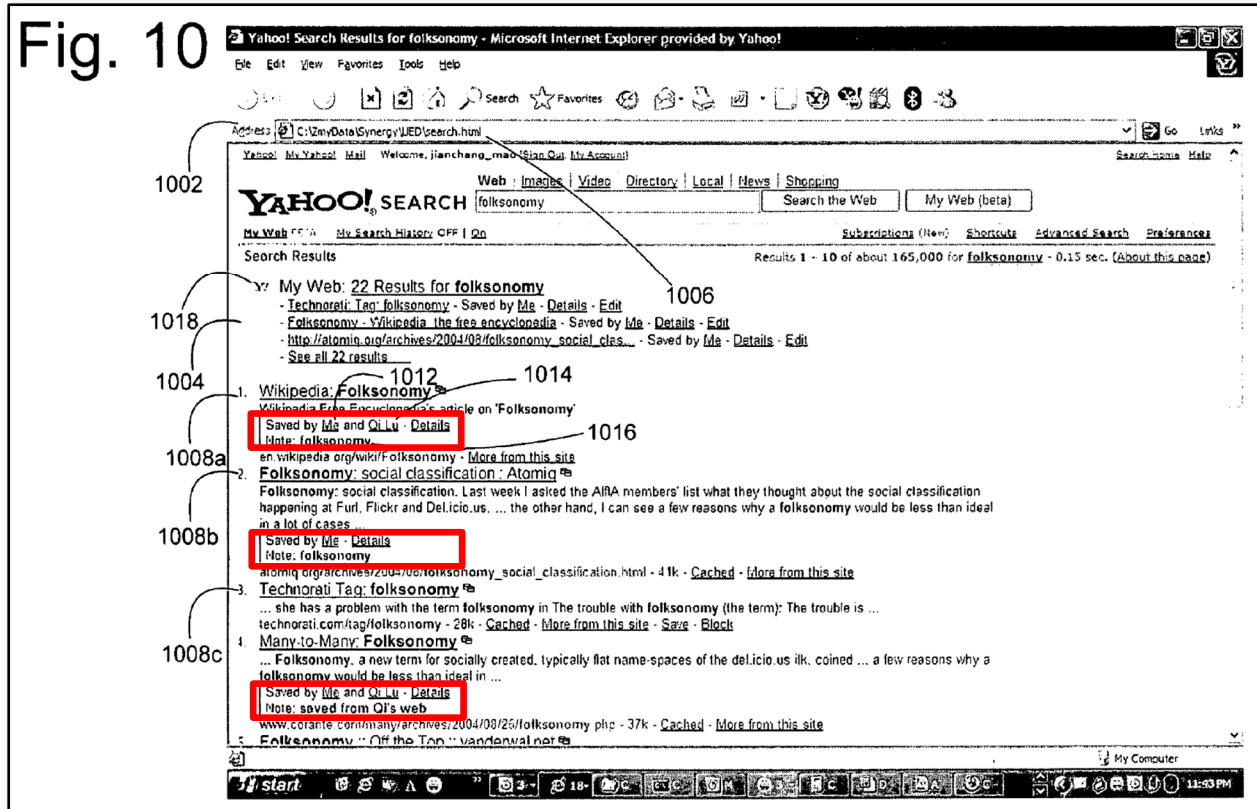
374

EX1029, FIG 3 (red boxes added)

303. As another example, EX1043 (a US patent that issued in 2000) “relate[s] to the searching of collections of information.” EX1043, 1:7-10. EX1043’s Figures 7-9 “are illustrations of search results presented by one embodiment of the invention.” EX1043, 3:6-7. As shown in EX1043’s Figures 7-9, “scores are shown for each item” (i.e., an annotation is shown at the bottom of each search result grouping). EX1043, FIGS. 7-9, 13:9-31.

304. As another example EX1044 (a US patent application published in 2007) “relates to systems and methods for improving the reliability of search results.” EX1044, [0003]. EX1044’s Figure 10 “illustrat[es] the ranked output of a search provider according to one embodiment of the present invention.” EX1044, [0034]. As shown in EX1044’s Figure 10 (color-annotations added below), each search result grouping includes text-based annotations, specifically “content item 1012 and 1014 [which are annotations], as well as **annotations** that users have associated with a given content item.” EX1044, FIG. 10, [0095].

Fig. 10



305. As another example, EX1049 taught as background information the “need for a system or method that takes a compound query” and provides “an indication [an annotation] of how closely each data object matches each of the compound query’s search terms.” EX1049, [0015], [0019] (disclosing a way to indicate “an extent to which the objects [e.g., websites] match respective one of the search parameters”).

306. As another example, EX1027 discloses that providing information (an annotation) about the frequency of each search term in **each** search result helps a user to determine “the potential relevance of **each** displayed returned document.” EX1027, [0021], [0064]-[0065].

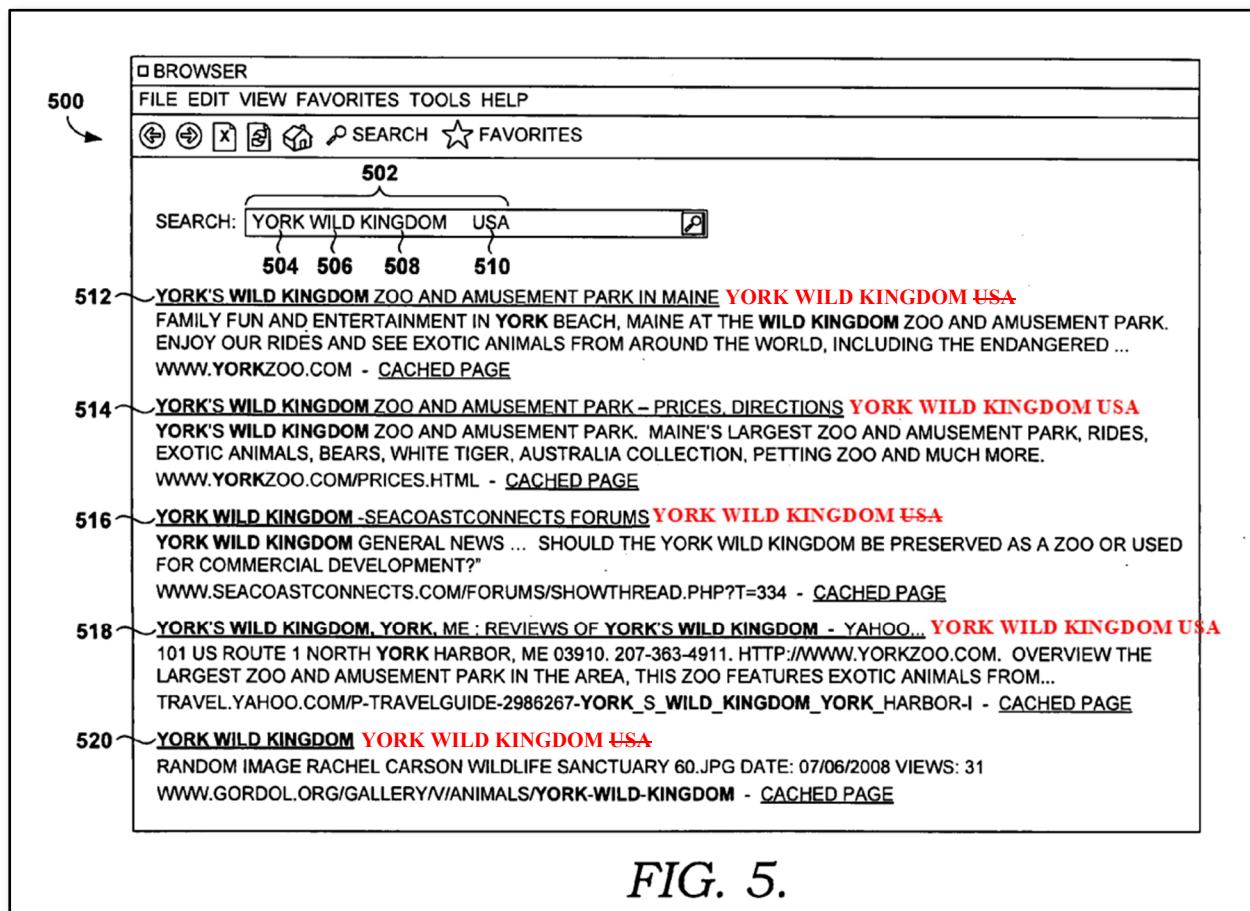
307. As another example, EX1048 discloses as background information that it is a “disadvantage” not to help the user determine “whether a document listed in the results window is relevant” by indicating which search term(s) are present/missing in each result. EX1048, 1:48-56, 4:37-40.

308. As I discussed above, Wang’s FIG. 5 example is consistent with one or more search results missing “USA” on their corresponding webpage. In Wang-Mills, the interface would have displayed the altered search string adjacent to (or below) each search result, with a strikethrough applied to any term(s) missing from the corresponding search result. As a consequence of Wang’s ranking methodology, one search result to the next might match a different subset of the original search query—say, one result matches “york, wild, kingdom” (but not “USA”) whereas another result matches “york, wild, USA” (but not “kingdom”). For example, in the hypothetical example below, “USA” is missing from the webpages at results 512, 516, and 520 (as indicated by the strikethrough to “USA”) but “USA” is present in the webpages at results 514 and 518.¹³ *See also* EX1028,

¹³ As I discussed above, a user understands that “USA” may or may not be present in each search result in Wang’s Figure 5. Of course, even if “USA” were present in Wang’s FIG. 5 example, POSAs would understand that Wang’s search does not **require** each search term to be present in every result and, at least sometimes, it

2:52-3:26 (explaining that POSAs would have understood that the search-ranking methodology “criteria for importance of a term ... may differ from those of the user”).

Wang-Mills



309. In my opinion, POSAs would have had a reasonable expectation of success in Wang-Mills. Wang and Mills both relate to search engines that identify

would be unclear from Wang’s search-result page which search term(s) is/are missing from which search result(s).

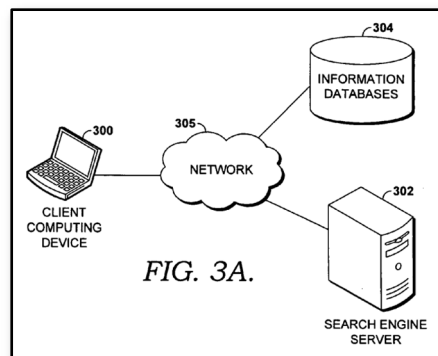
search results that match a subset of a user's multi-word search query; modifying Wang's interface to display keywords used in an altered query with each search result would have required only routine software-programming skills. Mills, 10:26-45.

D. Mapping to the Challenged Claims

1. Claim 1

- a. [1PRE] In an Internet search system for displaying search results during an Internet search process, the search results being generated based on user-specified search term elements, where at least one search result references a webpage that is missing at least one search term element, a method for providing an interactive graphical user interface for the user to readily discern such search result without opening its referenced webpage, the method comprising:**

310. As shown in Wang's FIG. 3A (below), Wang discloses "a networked environment [a *system*] for performing relaxed searching on a search engine" (Wang, [0009]) connected to "the Internet" (Wang, [0042])—*i.e., an Internet search system. See also* Wang, [0020], [0032], FIG. 3A, FIG. 4, FIG. 5 (search request 502).

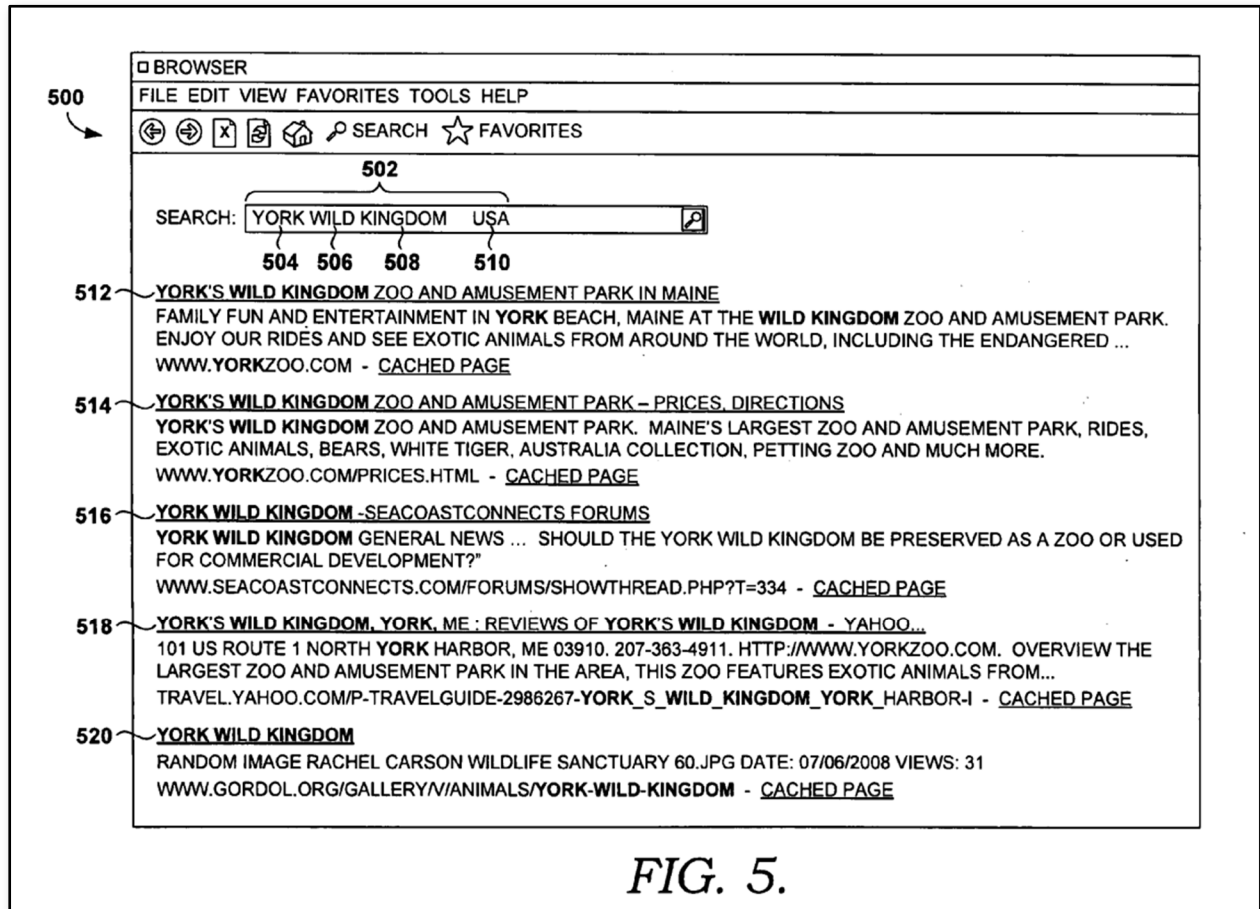


311. In Wang’s *method*, the “search engine [] creates a list of results for a search-engine query by identifying documents [*e.g., webpages*] that include only a subset of the keywords [*search term elements*] submitted by *a user*.” Wang, [0014]; *see also* Wang, [0035]. Wang’s search engine identifies webpages by “search[ing] one or more inverted indexes for documents that contain” at least a subset of the search query’s “keywords.” Wang, [0040], FIG. 5 (search request 502).

312. A POSA would understand that search results generated by the search engine using inverted indexes, as in Wang, is an *Internet search process* because each “inverted index is prepared by web [*i.e., Internet*] crawlers browsing documents stored in the information databases 304,” which “may be hosting a web page comprising numerous online documents.” Wang, [0041], [0035] (“search-engine server 302 hosts **a search engine designed to** receive queries from remote computing devices...and **locate information on the Web...to satisfy the queries**”), [0016] (“A search-engine query, as discussed herein, refers to any **keyword search of the Web by a search engine.**”).

313. “Once the web pages are located, their URLs are transmitted back to the client computing device [] and *displayed* as hyperlinks” (*i.e., search results are generated based on the user-specified search term elements*). Wang, [0035]; FIG. 5.

314. Wang's Figure 5 (below) depicts a "web browser window 500 rendering a web site for the search engine," which provides the example *interactive GUI* below. Wang, [0053] ("FIG. 5 is a diagram of a search-results list from a search engine...."), [0035].



315. As I discussed above (§XII.C) and further below ([1G], §XII.D.1.h), based on Mills, Wang-Mills enhances Wang's GUI by providing annotations to search results *missing at least one search term element, i.e.,* by displaying those terms with a strikethrough font.

316. Thus, Wang-Mills enables *readily discern[ing] such search result without opening its referenced webpage* because the annotation allows the user to identify a missing term without having to click on each website to ascertain that information.

- b. [1A] receiving, on a server, a first search request submitted via the Internet by a user operating a computing device with a display screen, wherein the first search request is comprised of one or more search term elements;**

317. Wang's "search-engine server" "*receive[s]* queries from remote *computing devices...and locate[s]* information on the Web...that satisfy the query." Wang, [0035], FIG. 3B (illustrating "SEARCH ENGINE QUERY [A]" being received by "PARSER 312" in the SEARCH ENGINE SERVER 302" from "WEB BROWSER 306" in "CLIENT COMPUTING DEVICE 300").

318. The user's computing device is "equipped with a web browser" (and *display screen*) that "*display[s]*...information located on the Web" and "communicates with the search-engine server." Wang, [0038]. "The user can submit keywords to the search engine, and the client computing device 300, in turn, transmits the keywords to the search engine server 302" (Wang, [0039]) *via "the Internet"* (Wang, [0032], [0042], FIG. 3A (above)).

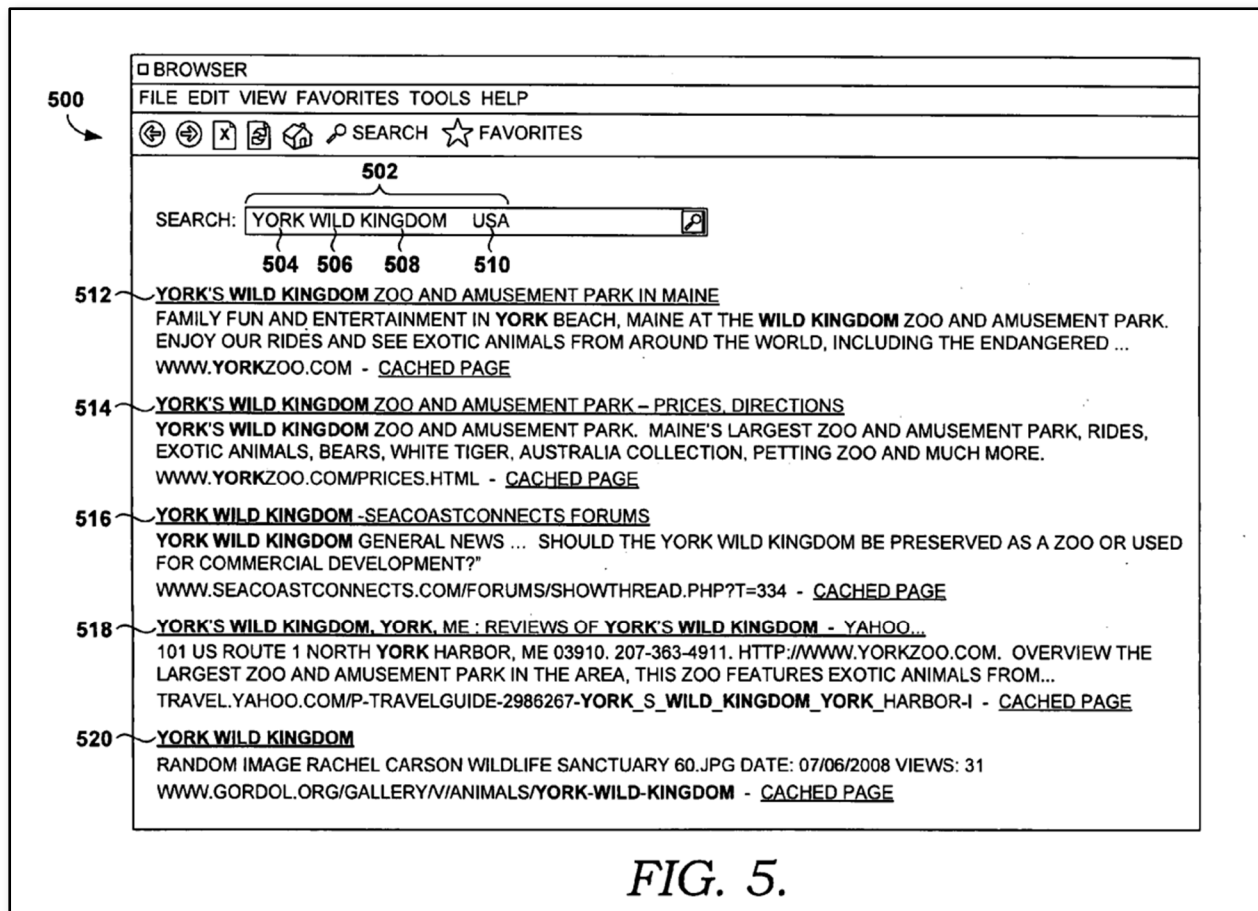
319. Thus, Wang's "query" is *a first search request submitted via the Internet by a user operating a computing device that is receiv[ed] on the server*

and *comprised of search term elements* (“keywords”). Wang, [0035], [0002] (“Conventional search engines answer submitted queries by locating documents containing every keyword submitted.”), [0004] (“Once a user submits the query to a search engine, the search engine parses the query into keywords and determines whether a subset of the keywords have been found by a web crawler in any online documents.”).

c. [1B] generating a plurality of search results based at least in part on the submitted first search request, wherein the plurality of search results is comprised of:

320. After a user *submits the first search request*, “web documents” “contain[ing] at least a portion of the query’s keywords” “are identified” by the system and “transmitted back to the client computer device” “for presentation to the user.” Wang, [0052], [0035] (“Once the web pages are located, their URLs are transmitted back to the client computing device 202 and displayed as hyperlinks.”), [0040] (“search engine server 302 receives the query” and “searches one or more inverted indexes for documents [*e.g.*, webpages] that contain N–K keywords”).

321. Wang’s Figure 5 (below) depicts “a web browser window 500 rendering a web site for the search engine,” which shows the *generated search results* (512-520). Wang, [0053], FIG. 3B (“RESULT GENERATOR 322” in “SEARCH ENGINE SERVER 302” returning “SEARCH-RESULTS LIST [F]” to the “CLIENT COMPUTING DEVICE 300”).



322. In this example, the “user submitted a search-engine query 502 with [four] keywords ‘york,’ ‘wild,’ ‘kingdom,’ and ‘USA.’” Wang, [0053]. Wang’s “relaxed search[.]” identified “documents” (websites) that “have at least 3 of the 4 keywords” (*i.e.*, the results are generated based on the submitted search request). Wang, [0053].

d. [1C] (i) a first type of search result which references a first webpage that contains all submitted search term elements; and

[1D] (ii) a second type of search result which references a second webpage that is missing at least one submitted search term element;

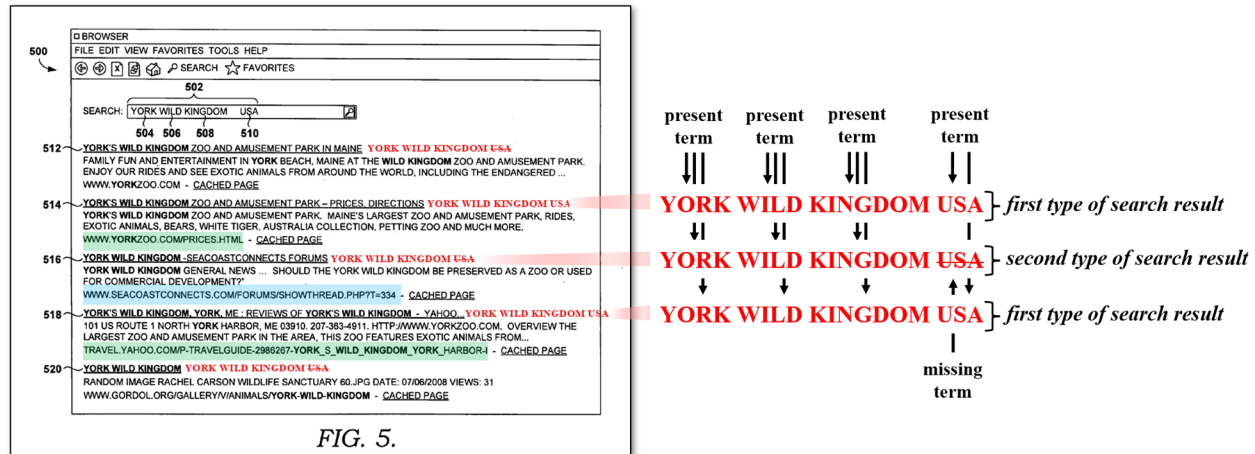
323. Though Wang’s “relaxed” search does not *require* all search terms, it does not preclude results containing all search terms and thus POSAs would have expected Wang-Mills’s search to often include at least one *first type of search result which references a first webpage that contains all submitted search term elements* as that was the conventional expectation at that time. Wang, [0049] (“the back end 310 transfers a list of documents D that contain **at least one of the keywords B.**”), [0052]-[0053]; *see also* Wang, [0002] (explaining that prior-art search engine required “all of the search terms”).

324. As I discussed above (§XII.C) and illustrated below based on Wang’s Figure 5 (which I annotated below), Wang-Mills augments Wang’s search results with the text of the search terms, based on Mills.

325. Results 514 and 518 below meet [1C]: *a first type of search result which references a first webpage (green) that contains all submitted search term elements (red) displayed without strikethroughs.*

326. Result 516 meets [1D]: *a second type of search result which references a second webpage (blue) that is missing at least one submitted search*

term element (red) displayed in a strikethrough format (“USA” displayed as “~~USA~~”).¹⁴



- e. [1E] causing the display screen to display the first and second types of search results on a search results webpage;

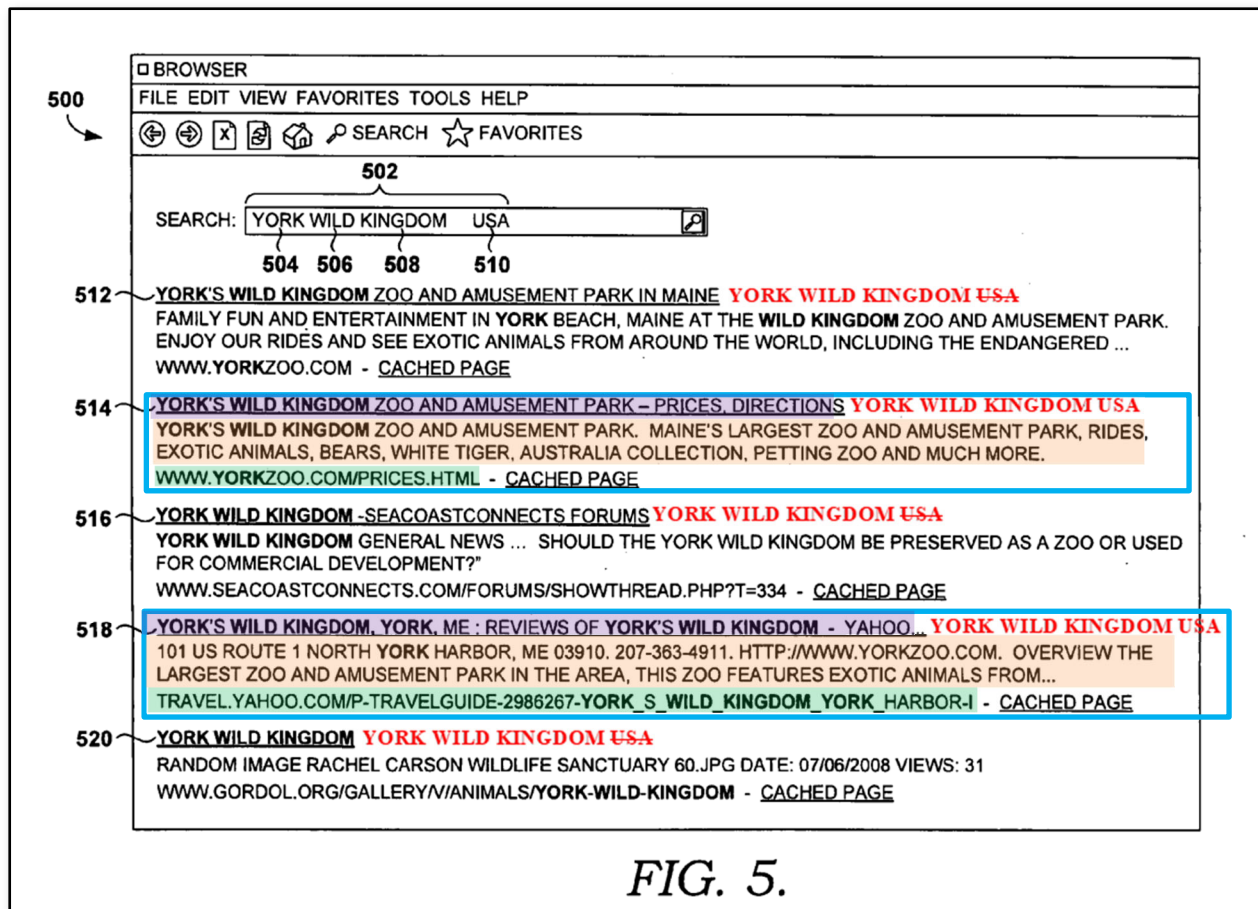
327. As I illustrated above ([1C]-[1D]), the first and second types of search results are caused to be “listed in a search-results list and transmitted...to the client computing device 300 for display to the user” on the user-operated computing device’s display screen. Wang, [0040], FIG. 3B (Web Browser 306), FIG. 5; see

¹⁴ Search results 512 and 516 would also meet [1D] as they too are missing at least one search term element (also “USA” as indicated by the strikethrough format “~~USA~~”). Certain other claims (e.g., claim 6) require, among other limitations, a third and fourth webpage that are missing a search term element, which are met by results 512 and 516 for the reasons I discuss below.

also Wang, [0035] (“Once the web pages are located, their URLs are transmitted back to **the client computing device 202** and **displayed as hyperlinks.**”), [0038] (“The client computing device 300 may be equipped with a web browser. **The web browser is** a software application enabling a user **to display** and interact with information located on the Web.”).

- f. [1F] causing the display screen to display the first type of search result as a first search result grouping, wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage, and wherein the first search result grouping does not include any annotation for missing search term elements;

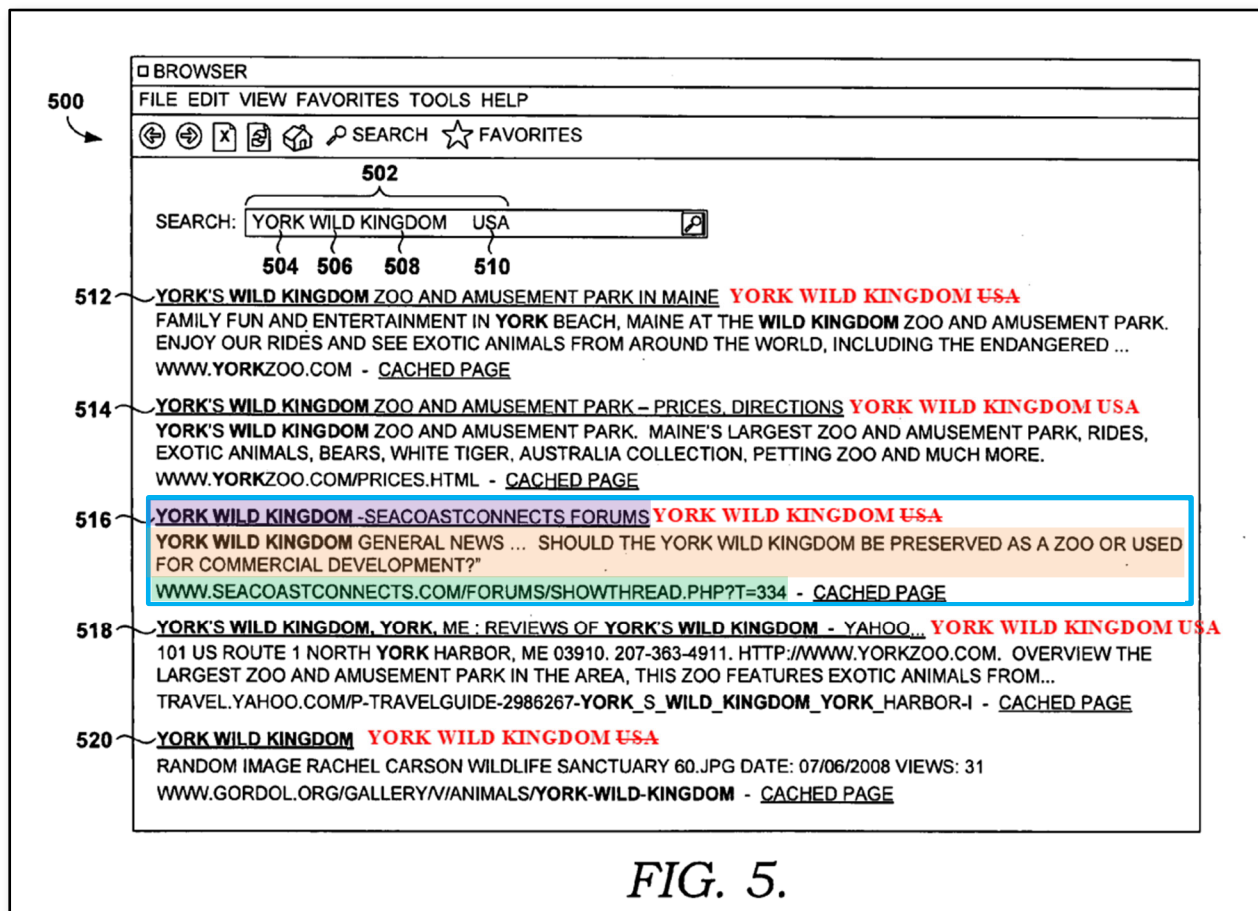
328. In the example of Wang-Mills illustrated below (based on an annotated version of Wang’s FIG. 5), each example *first type of search result* (514 or 518 below; *see supra* [1C], §XII.D.1.d) is displayed as a *first search result grouping* (blue boxes), comprising a *title for the first webpage* (purple), an *Internet link displaying a URL for the first webpage* (green), and an *excerpt of the first webpage* (orange). *See* Wang, [0035], [0053]. Those *first type of search results* do not include any annotation for missing search term elements because, as illustrated below, their referenced webpages are not missing any search terms. Their annotations display all of the search terms (red) without strikethrough; thus, those annotations are **not** annotations *for missing search term elements*, as claimed.



- g. [1G] causing the display screen to display the second type of search result as a second search result grouping, wherein the second search result grouping is comprised of an annotation showing the at least one search term element missing in the second webpage and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage, and wherein the annotation is comprised of a text representing the at least one search term element; and

329. The *example second type of search result* that I discussed above (516 below; *see supra* [1D], §XII.D.1.d) is *displayed as a second search result grouping* (blue box), comprising *a title for the second webpage* (purple), *an Internet link*

displaying a URL for the second webpage (green), an excerpt of the second webpage (orange), and an annotation (red) showing the at least one search term element missing in the second webpage, wherein the annotation is comprised of a text representing the at least one search term element (“USA” written as “USA”).
See Wang, [0035], [0053].



- h. **[1H] wherein the annotation enables the user to readily discern, without opening the second webpage and navigating away from the search results webpage, that the second webpage is missing the at least one search term element, and by not opening the second webpage a faster execution is enabled for the Internet search process.**

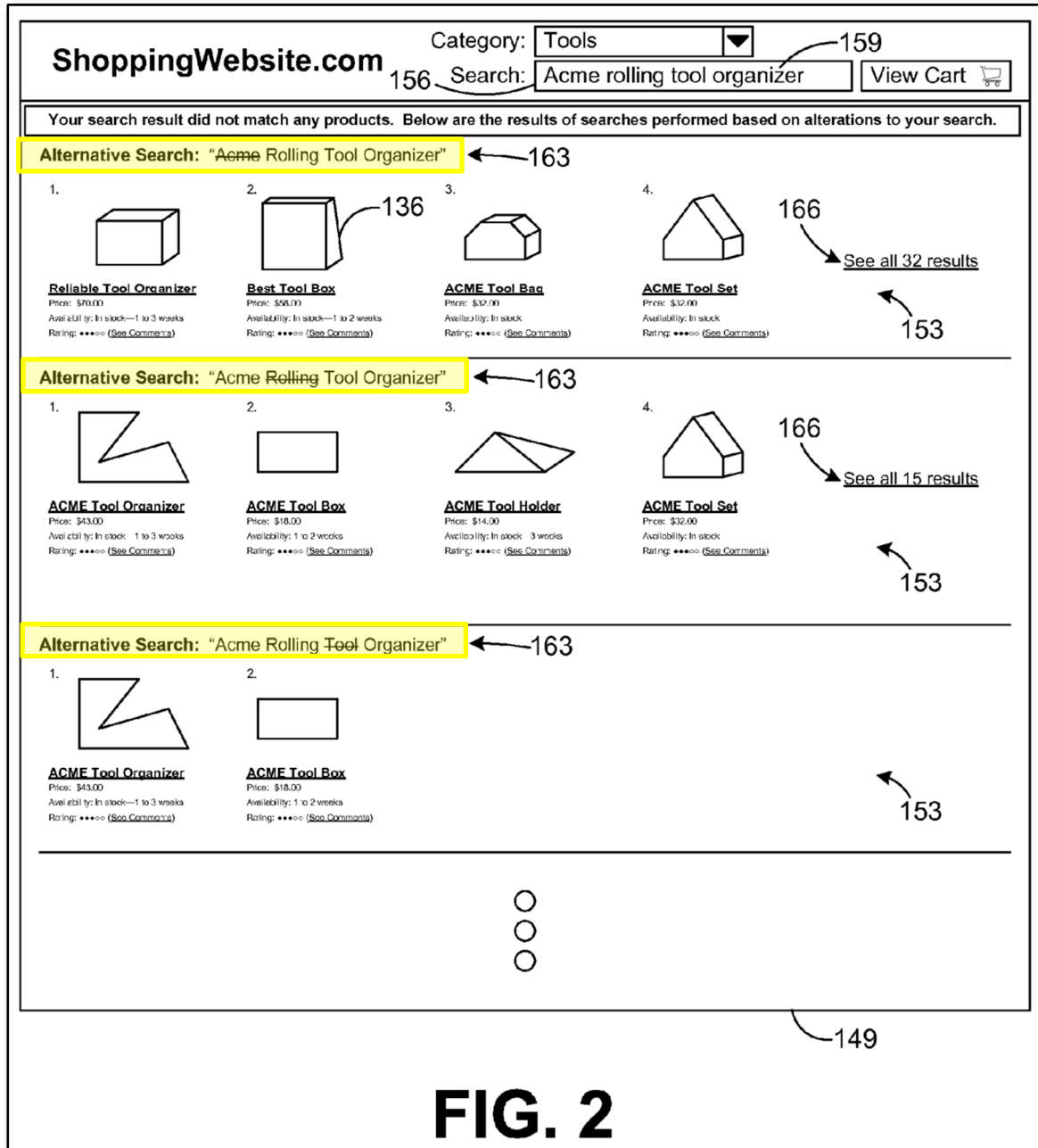
330. As I illustrated above ([1G], §XII.D.1.g), *the annotation for the second webpage enables the user to readily discern, without opening the second webpage and navigating away from the search results webpage, that the second webpage is missing the at least one search term element* because the missing term is written in a strikethrough format (e.g., “~~USA~~”). See Mills, 5:25-26 (search-term annotations allow user to “not select such a group [of results] where other groups appear to be more relevant”). Thus, *a faster execution is enabled for the Internet search process* because the user need not spend time opening the second webpage and navigating away from the search results webpage to ascertain information about what search term(s) is/are missing from the second webpage.

2. Claim 2

The method of claim 1, wherein the annotation is displayed as one or more standalone lines in the second search result grouping; and wherein the annotation is displayed at the bottom of the second search result grouping.

331. As I discussed above (§XII.C), Wang-Mills’s annotations are based on Mills. Mills’s FIG. 2 (which I have highlighted below) displays each text-based

annotation 163 (yellow) as a *standalone line in* (above) each group of search results.



332. As I demonstrated above with corroboration from EX1029 and EX1030 (§VIII.D.2.b, Ground 1A, **claim 2**), displaying text-based annotations

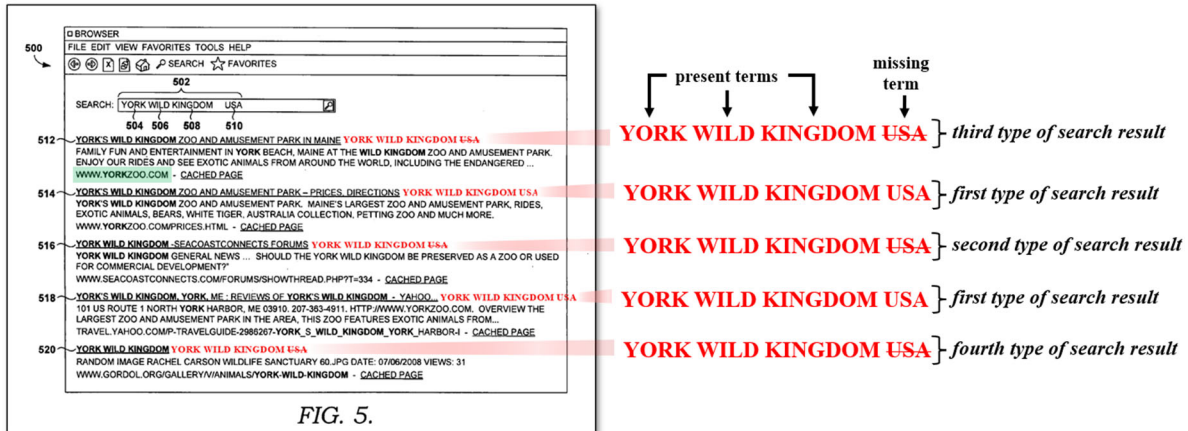
(like Wang-Mills's) *at the bottom of a search result grouping* was a well-known aesthetic design choice and would have been an obvious, logical alternative location for displaying additional information in Wang's search-results interface (FIG. 5).

333. Thus, *displaying* text-based annotations like Wang-Mills's annotations *as one or more standalone lines in the search result grouping* would have been a conventional design choice to a POSA, based on Mills and the reasons I discussed *supra* §VIII.D.2.a (Ground 1A, **claim 2**; citing corroboration).

3. Claim 6

- a. **[6A] The method of claim 1, wherein the plurality of search results is further comprised of: (i) a third type of search result which references a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and**

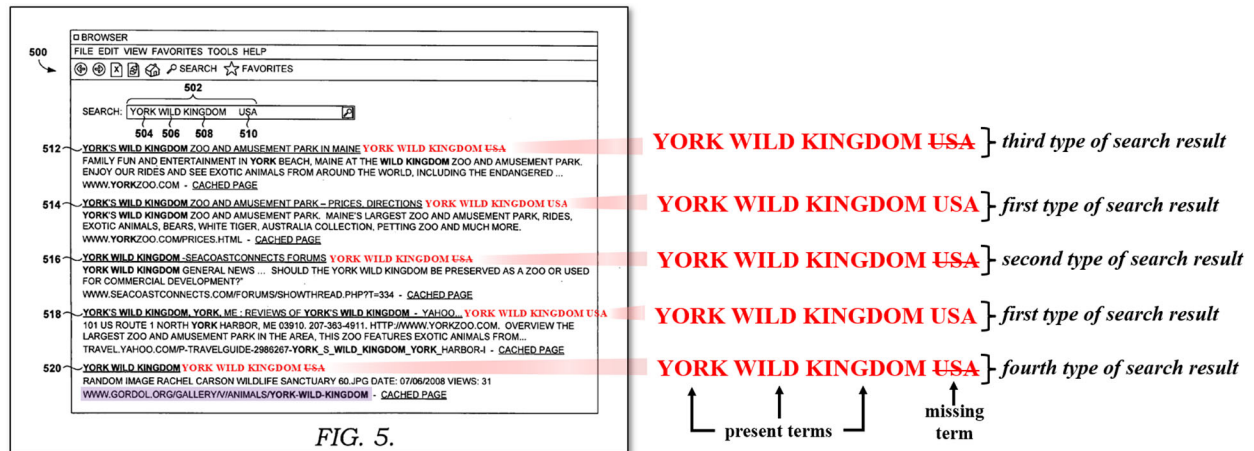
334. In the example illustration of Wang-Mills that I have discussed above and illustrate again below, *search result 512 meets a third type of search result which references a third webpage (green highlight) that is missing at least one search term element ("USA") shown in strikethrough format ("USA")*.



335. As I discussed above (§VIII.D.3.a, Ground 1A, [6A]; citing corroboration), it would have been commonplace for a webpage (e.g., a website’s homepage) to have a descendant webpage linked directly one level therefrom (e.g., the website’s “prices” page) that contains the at least one missing search term element (“USA”). For example, in Wang’s FIG. 5 (annotated above), result 514’s webpage (“WWW.YORKZOO.COM/PRICES”) teaches (or at least renders obvious) a descendant webpage linked directly one level from result 512’s webpage (“WWW.YORKZOO.COM”) and result 514’s webpage in the hypothetical example above contains “USA,” which is missing from result 512’s webpage (as indicated by the strikethrough “USA”).

- b. [6B] (ii) a fourth type of search result which references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and

336. The Wang-Mills’s example that I discussed above (§XII.D.3.a, Ground 2A, [6A]) and display again below comprises *a fourth type of search result* (520) which references a fourth webpage (purple highlight) that is missing at least one search term element (“USA”) shown in strikethrough format (“~~USA~~”).

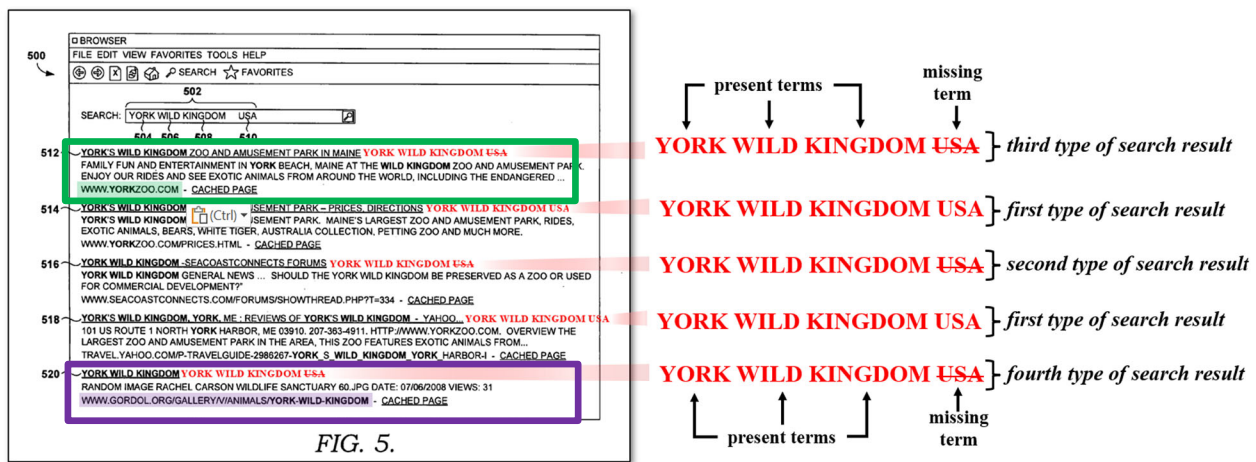


337. For the same reasons that I discussed above for the third type of search result (§XII.D.3.a, Ground 2A, [6A]), it would have been commonplace for the *fourth type of search result* to have descendant webpages linked directly one level from the fourth webpage (not illustrated in the search results webpage above). Similarly, for the same reasons that I discussed above for the Ground 1A combinations (§VIII.D.3.b, [6B]), it would have also been a commonplace scenario for *all* of a webpage’s descendant webpages to also be missing the at least one

search term element that is missing from the parent (referenced) webpage (*i.e.*, the webpage from which they are descendants of).

- c. [6C] further comprising: causing the display screen to display the fourth type of search result in a same manner as the second search result grouping.

338. In the example of Wang-Mills that I discussed above (§XII.D.3.a, Ground 2A, [6A]) and display again below, *the fourth type of search result* (purple box) is displayed *in a same manner as the second search result grouping* (green box, *see* §XII.D.1.h, [1G])—*i.e.*, as a search result grouping comprising a title for the fourth webpage, an Internet link displaying a URL for the fourth webpage (purple), an excerpt of the fourth webpage, and the same type of annotation (red) showing the at least one search term element missing in the fourth webpage, wherein the annotation is comprised of a text representing the (same) at least one search term element in a strikethrough font (“USA” written as “~~USA~~”). Wang, FIG. 5, [0035], [0053].



4. Claim 7

339. Independent claim 7 recites a system comprising components that perform steps that largely mirrors the method recited in independent claim 1. As I indicate in the table below, most limitations in claim 7 are met by Wang-Mills for the same reasons that I discussed above for similar limitations in claim 1 (or claim 2) that are indicated in the table below.

Limitation	Addressed in Section:
[7PRE]	§XII.D.1.a ([1PRE])
[7A]	§XII.D.1.b ([1A])
[7C]	§XII.D.1.c ([1B]; discussing the general design of Wang’s example interface, which meets [7C]’s <i>search results webpage</i>)
[7D]	§XII.D.1.d ([1C])
[7F]	§XII.D.1.e ([1E]) <i>See also infra</i> §XII.D.4.c ([7F])
[7G]	§XII.D.1.f ([1F], <i>first search result grouping</i>), §XII.D.1.g ([1G], <i>second search result grouping</i>)
[7H]	§XII.D.1.f ([1F])

[7I]	§XII.D.1.g ([1G])
[7J]	§XII.D.2.b ([2B])
[7K]	§XII.D.1.h ([1H])

340. As I discussed in Ground 1A (§VIII.D.4), claim 7 introduces two new limitations—[7B] and [7E]. Limitation [7B] (discussed further below, §XII.D.4.a) requires that *the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider*. Limitation [7E] (discussed further below, §XII.D.4.b) requires a *second type of search result that references a second webpage that is, **contrary to the search logic guidelines for AND operations published by the search engine provider, missing at least one search term element***. As to the aspect of [7E] that requires *a second type of search result which references a second webpage that is missing at least one submitted search term element*, Wang-Mills meets that for the reasons I discussed above for limitation [1D].

341. In my opinion, POSAs would have had motivation to implement Wang-Mills to publish guidelines for performing AND operations and further to include search results that were missing at least one search term (contrary to those guidelines), thereby meeting limitations [7B] and [7E], as I discuss further below.

As Wang observes, “[m]ost keyword-based search engines operate” by assuming “the user intends to only find documents that contain **all** of the search terms.... This is typically referred to as ‘and-based searching.’” Wang, [0002]. Wang recognizes that “and-based searching” can have problems “[w]hen a user over-specifies a query by including unnecessary terms” such that a sufficient number of documents (*e.g.*, webpages) containing all the specified terms may not exist. Wang, [0002]. But by the same token, POSAs would have known that these problems only arise when not enough search results match all the terms (*e.g.*, when the query is over-specified), and that when there **are** enough search results that match all of the user-supplied search terms, those are the results the user would prefer to receive (as those are the terms the user identified). Mills confirms that this problem with AND-based searching (over-specifying terms) only needs addressing “[i]n some situations,” *e.g.*, when “few or no items [*e.g.*, webpages] can be identified based upon the search string.” Mills, 4:38-47.

342. Therefore, in view of Wang, Mills, and their background knowledge, POSAs would have been motivated to implement Wang-Mills to first look for any documents (webpages) matching all N terms of the user’s query—*i.e.*, to first try an AND-based search—and then proceed to Wang’s invention’s of a relaxed search that identifies documents matching N-K terms in cases where not enough results matching all N terms were found. For example, as taught by Mills, the

search engine may initially try an AND-based search, and follow with Wang’s relaxed search if the AND-based search “fails to identify at least a predefined threshold number of” results—*e.g.*, “10” results. Mills, 4:38-61 (“[A] threshold of 10 items may be specified, although it may be any number...”).¹⁵ That is, if the initial AND-based search returned fewer than, *e.g.*, 10 search results (or any configurable number of search results), Wang’s relaxed searching would have been performed, in much the same way that Mills performs its form of relaxed searching when Mills’s AND-based search returns too few results. That is, as suggested by Mills, POSAs would have recognized that only using relaxed searching when an AND-based search returned too few results would have been one reasonable way to strike a balance between reducing the risk of including irrelevant results (by starting with an AND-based operation) but broadening the results when the AND-based search appeared to be too restrictive (over-specified).

343. The resulting, alternative combination of Wang-Mills that I discussed above (*i.e.*, one that starts with a Boolean-AND operation and relaxes the search

¹⁵ That Mills performs AND-based searching is reflected in Mills’s Figure 2, which returns no results for a four-word query, but did return results for three-word queries that included three of the four original search terms. *See also supra* §XII.B (discussing Mills).

when an insufficient number of results are identified) would have been little different than the illustrations of Wang-Mills that I depicted previously. The principal modification is what I just discussed above: rather than always use Wang's relaxed searching, the underlying search engine would use an AND-based search (*i.e.*, require search results to contain each search term) but, based on Mills, when the number of search results returned by the AND-based was below some threshold number, the search engine would use Wang's relaxed search to identify additional, potentially relevant results. This implementation of the Wang-Mills combination would have still included the annotations that I have discussed above to indicate the presence or absence of search terms in search results because some searches—those proceeding to Wang's relaxed-search technique when the initial AND-based search produced too few results—would have included among the results, some results that referenced webpages that were missing a search term and the annotations would have informed the user of that fact, for the benefits I discussed above (§XII.C).

- a. [7B] wherein the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider;**

344. As I discussed in the section immediately above, an obvious, alternative implementation of Wang-Mills is one in which Wang's search engine uses an AND-based search as its initial default before determining to proceed to

Wang’s relaxed search because an insufficient number of search results were identified by the AND-based search.

345. As I discussed above (Ground 1A, [7B]; citing corroboration), by 2011, POSAs knew as their background knowledge that it was conventional for search-engine providers to publish their search guidelines, *e.g.*, on a help page, to inform users as to how the search engine treats queries entered without explicit Boolean operators. Therefore, when implementing Wang-Mills to perform AND-based searches by initial default, POSAs would have found it to be routine, expected, and obvious to publish guidelines informing users that the default initial treatment of a multi-word query is an AND-based search.

346. POSAs therefore would have had reason for Wang-Mills to *publish search logic guidelines* explaining how to *perform AND operations*, *e.g.*, for the initial default search in which each term is treated as being connected with an AND operator. For example, the exemplary four-term search query executed in Mills’s Figure 5, *i.e.*, *the first search request*, would have been treated initially as: “york” AND “wild” AND “kingdom” AND “USA.”

- b. [7E] (ii) a second type of search result which references a second webpage that is, contrary to the search logic guidelines for AND operations published by the search engine provider, missing at least one search term element;**

347. As I discussed above (§XII.D.4), an obvious, alternative implementation of Wang-Mills would have joined the user's search terms with an AND operation for an initial search but, *contrary to the AND operation*, would have **also** returned results according to Wang's relaxed searching when too few results (*i.e.*, a number less than a configurable threshold) were returned from the initial AND-based search. Mills, 4:38-39. As I've discussed (*see, e.g.*, §XII.A), Wang's relaxed searching would have included search results that are *missing at least one search term element*, which would have been *contrary to the AND operations published by the search engine provider*. Thus, the above-discussed alternative, obvious implementation of Wang-Mills meets [7E].

- c. [7F] wherein the one or more servers provide the search results webpage via the Internet for displaying the plurality of search results on a display screen of the user-operated computing device;**

348. As I indicated above, Wang-Mills meets limitation [7F] for the same reasons I discussed above (§XII.D.4) that it meets the limitation added by [1E].

349. If limitation [7F] (and related limitations) also requires that the annotations themselves (*i.e.*, the search-term text in each search-result grouping) that are displayed on the *search results webpage* must be within the webpage (*e.g.*,

the html code) transmitted from the search engine server to the user-operated computing device via the Internet, that would have been an obvious alternative implementation of the search-engine server in Wang-Mills as a matter of design choice. In Mills, “search engine 129 generates” the “altered versions of the search string 159 that are displayed as altered search strings 163,” *i.e.*, the search engine generates the *annotations*. Mills, 6:38-41, FIG. 1. That is, the search engine generates the annotated Internet search results and transmits them via the Internet to the user-operated computing device. Based on Mills, it would have thus been obvious for Wang-Mills’s search engine server to *provide the search results webpage via the Internet for displaying the plurality of search results on a display screen of the user-operated computing device* both because that is what Mills does and because having that information provided to the computing device from a server on the Internet would have been a conventional, beneficial design choice (*e.g.*, to reduce the processing load at the computing device), as I discussed above in Ground 1A, [7F] (§VIII.D.4.c; citing corroboration).

5. **Claim 11**

- a. **[11A] The system of claim 7, wherein the plurality of search results is further comprised of: (i) a third type of search result referencing a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and**

350. Wang-Mills meets the limitation added by **[11A]** for the same reasons

I discussed above (§XII.D.3.a) that Wang-Mills meets the limitation added by **[6A]**.

- b. **[11B] (ii) a fourth type of search result references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and**

351. Wang-Mills meets the limitation added by **[11B]** for the same reasons

I discussed above (§XII.D.3.b) that Wang-Mills meets the limitation added by **[6B]**.

- c. **[11C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.**

352. Wang-Mills meets the limitation added by **[11C]** for the same reasons

I discussed above (§XII.D.3.c) that Wang-Mills meets the limitation added by **[6C]**.

6. Claim 12

353. Independent claim 12 recites a system for providing an interactive GUI for an Internet search that largely mirrors the search-engine-provider system recited in independent claim 7. As I indicate in the table below, Wang-Mills meets the following limitations of claim 12 for the same reasons that I discussed above for similar limitations in claim 7 that are indicated in the table below.

Limitation	Addressed in Section:
[12PRE]	§XII.D.4 ([7PRE])
[12A]	<p>§XII.D.4 ([7A]); <i>see also</i> §XII.D.1.b ([1A])</p> <p>§XII.D.4.c ([7F]: discussing the search results webpage displayed as <i>an interactive graphical user interface</i> on the <i>user-operated computing device</i>)</p> <p>Wang’s <i>user-operated “computing device 300</i> may be a...<i>desktop computer,...[or] smartphone”</i> (Wang, [0037])</p>
[12B]	<p>§§XII.D.4 ([7A]-[7B]); <i>see also</i> §XII.D.1.b ([1A])</p> <p>§XII.D.4.a ([7B]: discussing reasons for the search-engine provider in Wang-Mills to have <i>publish[ed] search logic guidelines</i> that explained the default</p>

	search logic and/or helped users execute the <i>first search request</i> using <i>AND operations</i>)
[12C]	§XII.D.4 ([7C]); <i>see also</i> §XII.D.1.c ([1B])
[12D]	§XII.D.4 ([7D]); <i>see also</i> §XII.D.1.d ([1C])
[12E]	§XII.D.4.b ([7E]); <i>see also</i> §XII.D.1.d ([1D])
[12F]	§XI.D.4.c ([7F]: discussing the computing device's <i>display screen</i>); <i>see also</i> §XII.D.1.e ([1E]) §XII.D.4 ([7G]); <i>see also</i> §XII.D.1.f ([1F], <i>first search result grouping</i>); §XII.D.1.g ([1G], <i>second search result grouping</i>)
[12G]	§XII.D.4 ([7H]); <i>see also</i> §XII.D.1.f ([1F])
[12H]	§XII.D.4 ([7I]); <i>see also</i> §XII.D.1.g ([1G])
[12I]	§XII.D.4 ([7J]); <i>see also</i> §XII.D.2.b ([2B])
[12J]	§XII.D.4 ([7K]); <i>see also</i> §XII.D.1.h ([1H])

7. **Claim 16**

- a. **[16A] The system of claim 12, wherein: a third type of search result references a third webpage that is missing at least one search term element, and a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element;**

354. Wang-Mills meets the limitation added by **[16A]** for the same reasons I discussed above (§XII.D.3.a) that Wang-Mills meets the limitation added by **[6A]**.

- b. **[16B] a fourth type of search result references a fourth webpage that is missing at least one search term element, and all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and**

355. Wang-Mills meets the limitation added by **[16B]** for the same reasons I discussed above (§XII.D.3.b) that Wang-Mills meets the limitation added by **[6B]**.

- c. **[16C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.**

356. Wang-Mills meets the limitation added by **[16C]** for the same reasons I discussed above (§XII.D.3.c) that Wang-Mills meets the limitation added by **[6C]**.

XIII. GROUND 2B: WANG-MILLS-BRINSON RENDERS OBVIOUS CLAIMS 3-4, 8-9, AND 13-14

357. Ground 2B challenges claims that recite the *selectable-filtering-function* limitation (which I defined in §IX above in Ground 1B).

A. The Wang-Mills-Brinson Combination

358. As I discussed above in Ground 2A (§XII.C), Wang-Mills uses Wang’s relaxed search, which identifies search results containing a subset, but potentially not all, of the user’s search terms. But Wang also says “certain keywords in the search-engine query may be designated not to be relaxed, meaning all retrieved documents **must include** the non-relaxed word.” Wang, [0045]. However, Wang does not say how the user can designate a mandatory term to the search engine, *i.e.*, to indicate that a particular search term is not allowed to be absent from a search result.

359. As I discussed above for Ground 1B (§IX.A), Brinson discloses a user-friendly GUI that allows a user to designate a search term as a “Require[d] Term,” which means search “results must include this term” (*i.e.*, the term is mandatory). Brinson, [0045], [0070]-[0071], [0075]. For example, as I discussed above (§IX.A), Brinson’s Figure 18 suggests making each search term listed next to a search-result grouping selectable to designate its weight; for example, each individual keyword displayed adjacent to search results “can be selected by the user to refine the present search,” e.g., by designating them “Required.” Brinson,

[0073]; FIG. 18. This is also consistent with Mills, which teaches that its altered-search strings “may be clicked upon” to refine the search results. Mills, 6:53-57. As I also discussed above (§IX.B; citing corroboration), a known, beneficial technique for implementing what Brinson describes would have applied the “required”-term designation to the already-identified search results, rather than execute a new search.

360. Thus, in my opinion, in view of Brinson, POSAs would have had reason to augment Wang-Mills (Ground 2A) to include a user-selectable GUI elements (*e.g.*, clickable buttons or text) for “designat[ing]” that a search term “must [be] include[d]” in the search results by adapting aspects of Brinson’s (or another conventional) GUI for adjusting the importance/weight of search term elements. Wang, [0045]. Doing so would have also been obvious to a POSA applying aspects of Brinson’s known GUI (or aspects of other conventional GUIs, like clickable pop-up menus, drop-down boxes, and/or slider controls) for beneficially making a search term mandatory to known search engines ready for the improvement (of being able to make a term mandatory) to yield the predictable result of Wang’s search engine providing an interface that lets users make a search term mandatory (as Wang says to do). *See* EX1068, FIGS. 21-23, [0195]-[0207]; EX1047, FIG. 1D, [0020]; EX1050, FIG. 9, [0071]-[0072].

361. In Ground 2B's Wang-Mills-Brinson combinations, the search engine is augmented to include a user-selectable GUI element that allows a user to select a previously entered search term and make it a required (mandatory) term that must be included in each search result. *See also* §IX.B *supra* (citing corroboration of other conventional GUI elements in the prior art for adjusting search-term weight/importance).

362. In my opinion, POSAs would have had a reasonable expectation of success in the combinations because, as I discussed above, Wang expressly supports the ability to make a search term mandatory (Wang, [0045]), and it would have required only ordinary programming skill to adapt weight-selecting aspects like those in Brinson's GUI (which used conventional webpage elements, like clickable text and buttons) to be implemented in Wang-Mills's search engines.

B. Mapping to Challenged Claims

1. Claims 3, 8, and 13

363. Claims 3, 8, and 13 depend from independent claims 1, 7, and 12, respectively, which I discussed above in Ground 2A. Ground 2B's Wang-Mills-

Brinson combinations build on Ground 1A’s Wang-Mills combinations¹⁶ and thus meet independent claims 1, 7, and 12 for the same reasons that Wang-Mills does. *Supra* §XII.D.1 (Ground 2A, **claim 1**), §XII.D.4 (Ground 2A, **claim 7**), §XII.D.6 (Ground 2A, **claim 12**).

364. Dependent claims 3, 8, and 13 add to those previously-discussed independent claims 1, 7, and 12, respectively, the *selectable-filtering-function* limitation (which I defined in §IX above).

365. As I discussed above (§XIII.A), POSAs would have had motivation to augment Wang-Mills to include, based on Brinson, user-selectable GUI elements (*e.g.*, clickable buttons or text) that allow users to designate a search term as mandatory. As I discussed above (§XIII.A), Wang-Mills-Brinson would have applied the “required”-term designation to the already-identified search results, rather than execute a new search. Once augmented in this manner, Wang-Mills-Brinson meets the *selectable-filtering-function* limitation because selecting the GUI element to designate a search term as “required” *automatically causes* the search-result webpages *missing* that search term (*e.g.*, *the second search result*

¹⁶ The primary Wang-Mills combination is as I discussed above in §XII.C; I also discussed above an alternative, obvious implementation of Wang-Mills when addressing claim 7 (§XII.D.4).

grouping) to be removed from the search results webpage because those webpages are missing the now-required search term.

366. If claims 3, 8, and 13 require the search results to be updated in response to a single click by the user, that would have been obvious as a simple, beneficial design option for user convenience (*e.g.*, the added convenience of not requiring the user to select multiple filter buttons before updating the search results), for the reasons I discussed above with corroboration (§IX.C.1, Ground 1B, **claims 3, 8, & 13**).

2. Claims 4, 9, and 14

a. [4A]/[9A]/[14A]

367. Wang’s user-operating “computing device...may be a...*smartphone*” ([0019], [0037]), which POSAs understood conventionally had a smaller display screen than *a laptop, desktop, notebook, or tablet computer’s display screen*, which are the other devices recited in [4A]/[9A]/[14A].

b. [4B]/[9B]/[14B]

368. POSAs understood that the automatic removal of the second search result grouping discussed above (§XIII.B.1, **claims 3, 8, & 13**) enables the smaller display screen to display an increased number of first type of search results (*i.e.*, results with all terms) because removing results provides additional screen space on the computing device’s display screen.

369. Once that one or more result is removed from the display, a POSA would understand that the search engine will display (or cause to be displayed from already identified) additional search results that are not removed (*i.e.*, a *first type of search result*, which is not missing the search term element missing in the *second search result grouping*). See Wang, [0050] (noting that Wang’s “results generator [] creates a search-results list F that includes documents E,” which POSAs understood would, in general, include more than the five example search results in Wang’s FIG. 5). My opinion in this regard is further corroborated by EX1015, which notes as background information that, in general, “the search results corresponding to a given user query can exceed a single web page, a web search engine may deliver search results across a series of web search results pages that can be consecutively accessed by a user.” EX1015, [0005]. Thus, by removing *the second search result grouping* from being displayed, at least one additional result that satisfies the search query and that is not missing the search term element (*i.e.*, the *first type search result*) will fill-in the space left by the removed search result grouping.

370. Thus, the updated Internet-search user interface will enable the smaller display screen to display an increased number of *first type of search result* compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user. That is because,

as I noted above, additional results will be able to occupy screen space freed-up by removing a search result grouping.

371. Thus, Wang-Mills-Brinson renders obvious claims 4, 9, and 14.

XIV. GROUND 2C: WANG-MILLS-MEHTA RENDERS OBVIOUS CLAIMS 5, 10, 15, AND 17-20

372. Ground 2C challenges dependent claims 5, 10, and 15, and independent claims 17 and 19 (and its dependent claims 18 and 20, respectively), which require displaying *one or more selectable advertisements...related to one or more of the search term elements* (hereinafter “the *selectable-advertisement* limitation”). As the ’184 patent concedes (and POSAs would have independently understood), including such selectable advertisements was “common” in the art. EX1001, 2:54-58, FIG. 1.

373. As I discuss below (§XIV.A), POSAs would have had reasons to incorporate such common advertising functionality into the Ground 2A Wang-Mills combinations, and the claims challenged in Ground 2C would have been obvious to POSAs (*see* §XIV.B below).

A. The Wang-Mills-Mehta Combination

374. As I discussed above in Ground 1C (§X.A), Mehta teaches displaying “relevant advertisement[s]” as *selectable* “[s]ponsored links” alongside Internet search results. Mehta, [0005]. *See also* EX1001, FIG. 1, 2:54-58 (the ’184 patent itself recognizing that displaying selectable advertisements that relate to a user’s

search terms was conventional in the prior art). As I discussed in Ground 1C (X.B, citing corroboration from EX1015, [0004] & EX1016, [0006]), POSAs would have had motivation to include in the Ground 1A combinations advertisements relating to a user's search terms based on Mehta and POSAs' background knowledge (*e.g.*, to generate revenue). In my opinion, based on the same teaching in Mehta and POSAs' corroborated background knowledge, POSAs would have had the same reasons to display advertisements relating to a user's search terms in Ground 2A's Wang-Mills combinations.

375. Based on Mehta, Wang-Mills-Mehta would have included "relevant advertisement[s]" as selectable "[s]ponsored links" that are "relevant to [the user's] search criteria," which would have been displayed on Wang-Mills-Mehta's search-engine interface. Mehta, [0005]-[0006]; *see also* EX1017, [0006]; EX1018, 1:25-30 ("[T]he user can be presented with **advertisements related to the search query.**").

376. In my opinion, POSAs would have had a reasonable expectation of success in Wang-Mills-Mehta because, as I discussed above (§X.B, citing corroboration), displaying such selectable advertisements was conventional in the field and required only ordinary programming skill to implement in a search-engine user interface.

B. Mapping to Challenged Claims

1. Claims 5, 10, and 15

377. Claims 5, 10, and 15 depend from independent claims 1, 7, and 12, respectively, and add the *selectable-advertisement* limitation. Ground 2C’s Wang-Mills-Mehta combinations build on Ground 2A’s Wang-Mills combinations and meet claims 1, 7, and 12 for the same reasons that Wang-Mills does. *See supra* Ground 2A, §XII.D.1 (claim 1), §XII.D.4 (claim 7), §XII.D.6 (claim 12).

378. Dependent claims 5, 10, and 15 add to claims 1, 7, and 12, respectively, the *selectable-advertisement* limitation (which I defined above in §X). As I discussed above (§XIV.A), Mehta provides POSAs with motivation—*e.g.*, to generate revenue—to augment the combination in Ground 2A such that its search-engine interfaces would have displayed “[s]ponsored *advertisements*” *related to one or more of the search term elements* with *selectable* links (*e.g.*, users “click[]” a link to open an advertised webpage). Mehta, [0005]-[0006]. Once augmented in this manner, the Ground 2C Wang-Mills-Mehta combination meets the *selectable-advertisement* limitation and renders claims 5, 10, and 15 obvious.

2. Claim 17

379. Ground 2C's Wang-Mills-Mehta builds on Ground 2A's Wang-Mills and meets claims 1, 7, and 12 for the same reasons that Wang-Mills does. *See supra* Ground 2A, §XII.D.1 (claim 1), §XII.D.4 (claim 7), §XII.D.6 (claim 12). Independent claim 17 recites a system that largely mirrors the system recited in independent claim 7, though it also includes limitations found in claims that I previously discussed — dependent claim 5 (*advertisements*) and dependent claim 6 (*third and fourth search results*). As I indicate in the table below, Wang-Mills-Mehta meet the following limitations of claim 17 for the same reasons that I discussed above for similar limitations, as indicated in the table below.

Limitation	Addressed in Section:
[17PRE]	§XII.D.4 ([7PRE]) <i>See also</i> §XII.D.1.a ([1PRE])
[17A]	§XII.D.4 ([7A]) <i>See also</i> §XII.D.1.b ([1A])
[17B]	§XII.D.4 ([7B])
[17C]	§XII.D.4 ([7C])

	<i>See also</i> §XII.D.1.c ([1B], discussing interface that meets [17C]’s the <i>search results webpage</i>)
[17D]	§XII.D.4 ([7D]) <i>See also</i> §XII.D.1.d ([1C])
[17E]	§XII.D.4.b ([7E])
[17F]	§XII.D.4.c ([7F]) <i>See also</i> §XII.D.1.e ([1E])
[17G]	§XII.D.4 ([7G]) <i>See also</i> §XII.D.1.f ([1F], <i>first search result grouping</i>), §XII.D.1.g ([1G], <i>second search result grouping</i>)
[17H]	§XII.D.4 ([7H]) <i>See also</i> §XII.D.1.f ([1F])
[17I]	§XII.D.4 ([7I]) <i>See also</i> §XII.D.1.g ([1G])
[17J]	§XII.D.4 ([7J]) <i>See also</i> §XII.D.2.b ([2B])

[17K]	§XIV.B.1 (claim 5)
[17L]	§XII.D.3.a ([6A])
[17M]	§XII.D.3.b ([6B])
[17N]	§XII.D.3.c ([6C])
[17O]	§XII.D.4 ([7K]) <i>See also</i> §XII.D.1.h ([1H])

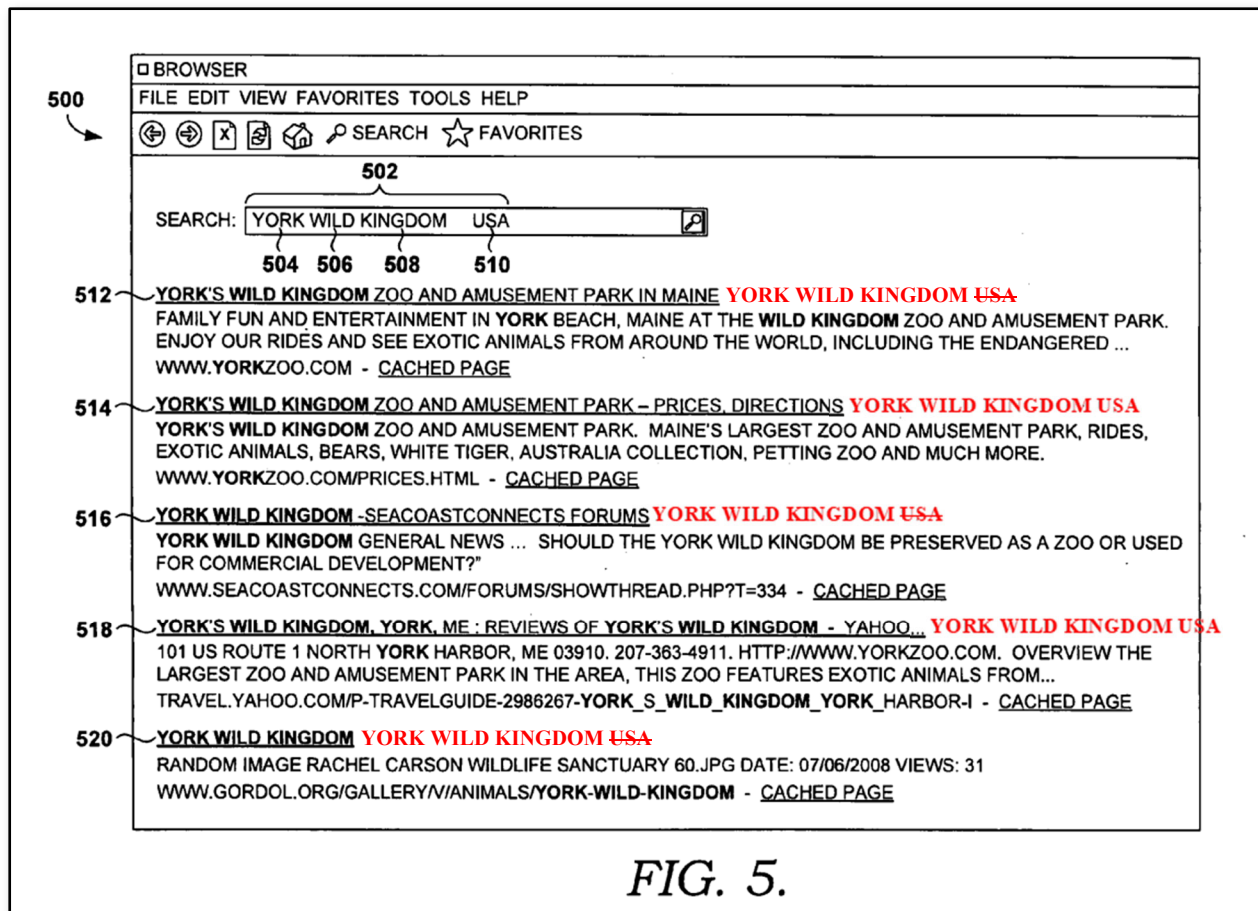
3. Claim 18

The system of claim 17 wherein each missing search term annotation comprises text representing at least one search term element in at least one of the following formats: (i) a font representing the text has been altered; (ii) the text is shown with one or more lines merged with the text; (iii) the text is shown with one or more lines superimposed thereupon; (iv) the text is shown within a shaded area; and (v) the text is shown with a reversed format.

380. Claim 18 requires that *each missing search term annotation* recited in limitations [17I], [17L]-[17N] take one of four specified formats. As I discuss below, Wang-Mills-Mehta meets claim 18 because its *annotations comprise text representing at least one search term element in at least one of the formats* recited in claim 18.

381. As shown again below, Wang-Mills’s annotation comprises text representing at least one search term element (e.g., “USA”) with a strikethrough (e.g., in the annotations for results 512, 516, and 520), which is *in at least one of the following formats: (i) a font representing the text has been altered, (ii) the text is shown with one or more lines merged with the text and/or (iii) the text is shown with one or more lines superimposed thereupon.*¹⁷

¹⁷ As I discussed above (§X.C.3, Ground 1C, **claim 18**), the ’184 patent does not explain the difference between text with “merged” lines versus “superimposed”



4. Claim 19

382. Ground 2C's Wang-Mills-Mehta builds on Ground 2A's Wang-Mills and meets claims 1, 7, and 12 for the same reasons that Wang-Mills does. *See supra* Ground 2A, §XII.D.1 (claim 1), §XII.D.4 (claim 7), §XII.D.6 (claim 12).

Independent claim 19 recites a method that largely mirrors the system recited in independent claim 7 and certain dependent claims discussed previously. As I

lines. However, POSAs understood Wang-Mills's strikethrough text meets at least one (if not both) of those formats.

indicate in the table below, Wang-Mills-Mehta meets the following limitations of claim 19 for the same reasons that I discussed above for similar limitations, as indicated in the table below.

Limitation	Addressed in Section:
[19PRE]	<p>§XII.D.4 ([7PRE])</p> <p>§XIV.B.1 (claims 5/10/15; advertisements displayed based on <i>submitted search terms</i>, independent of whether <i>some search results...do[] not contain all...terms</i>)</p> <p>§X.A (explaining that Mehta and conventional search engines identify advertisements to display related to the user's search terms, independent of whether non-sponsored results comprise all search terms)</p> <p><i>See also</i> §XII.D.1.a ([1PRE])</p>
[19A]	<p>§XII.D.4 ([7PRE]) (<i>interactive GUI</i>)</p> <p>§XII.D.4 ([7A]) (<i>server receiving search request submitted via the Internet from user-operated computing device</i>)</p>

	<p>§XII.D.4 ([7B]), §XII.D.4.a ([7B]) (<i>first search request comprising a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider</i>)</p> <p><i>See also</i> §XII.D.1.a ([1PRE]), §XII.D.1.b ([1A])</p>
[19B]	<p>§XII.D.4 ([7C]) (<i>performing an Internet search to produce a search results webpage comprising a plurality of search results</i>)</p> <p>§XII.D.4.b ([7E])’s <i>second type</i> meets [19B]’s <i>first search result</i>)</p> <p><i>See also</i> §XII.D.1.c ([1B])</p>
[19C]	<p>§XII.D.4.c ([7F]) (<i>server provides, via the Internet, the search results webpage for displaying on the user-operating computing device</i>)</p> <p><i>See also</i> §XII.D.1.e ([1E])</p>
[19D]	<p>§XII.D.4 ([7I])’s <i>second grouping</i> meets [19D]’s <i>first grouping</i>)</p>

	<i>See also</i> §XII.D.1.g ([1G])
[19E]	§XII.D.4 ([7J]) <i>See also</i> §XII.D.2.b ([2B])
[19F]	§XIV.B.1 (claims 5/10/15)
[19G]	§XII.D.4 ([7K]) <i>See also</i> §XII.D.1.h ([1H])

5. Claim 20

- a. [20A] The method of claim 19, wherein the one or more search results further includes: (i) a second search result which references a second webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the second webpage contains the at least one missing search term element; and

383. Wang-Mills-Mehta meets the limitation added by [20A] for the same reasons I discussed above (§XII.D.3.a) that Wang-Mills meets the limitation added by [6A], where [6A]’s *third type of search result* meets [20A]’s *second search result*.

- b. **[20B] (ii) a third search result which references a third webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the third webpage are also missing the at least one search term element; and further comprising:**

384. Wang-Mills-Mehta meets the limitation added by [20B] for the same reasons I discussed above (§XII.D.3.b) that Wang-Mills meets the limitation added by [6B], where [6B]’s *fourth type of search result* meets [20B]’s *third search result*.

- c. **[20C] causing the display screen to display the third search result in a same manner as the first search result grouping.**

385. Wang-Mills-Mehta meets the limitation added by [20C] for the same reasons I discussed above (§XII.D.3.c) that Wang-Mills meets the limitation added by [6C], where [6C]’s *fourth type of search result* meets [20C]’s *third search result*.

XV. GROUND 2D: WANG-MILLS-MEHTA-BRINSON RENDERS OBVIOUS CLAIMS 21-22

A. The Wang-Mills-Mehta-Brinson Combination

386. Ground 2D challenges claim 21 (and its dependent claim 22), which requires claim 19’s method to include the *selectable-filtering-function* limitation (which I defined above §XI).

387. For the same reasons that I discussed above for Ground 2B that POSAs had to incorporate such known filtering functionality into Ground 2A’s

Wang-Mills combinations (§XII.C) based on Brinson (§XIII.A), POSAs would have incorporated such known filtering functionality into Ground 2C's Wang-Mills-Mehta combinations. POSAs would have reasonably expected success in Ground 2D's Wang-Mills-Mehta-Brinson combinations (*i.e.*, adding Brinson to Ground 2C's Wang-Mills-Mehta combinations) for the same reasons that I discussed above in Ground 2B (§XIII.A) that POSAs would have reasonably expected success in adding Brinson to Ground 2A's Wang-Mills combinations because the filtering features added based on Brinson would operate largely independently of the advertising features added based on Mehta.

B. Mapping to Challenged Claims

1. Claim 21

The method of claim 19, wherein the display screen displays, in combination with the annotation within the first search result grouping, a selectable filtering function that, when selected, automatically causes the first search result grouping to be removed from the search results webpage.

388. Dependent Claim 21 depends from independent claim 19 and adds the *selectable-filtering-function* limitation (which I defined above §XI). Ground 2D's Wang-Mills-Mehta-Brinson combination builds on Ground 2C's Wang-Mills-Mehta combination, and thus Wang-Mills-Mehta-Brinson meets claim 19 for the same reasons that Wang-Mills-Mehta does. *Supra* §XIV.B.4 (Ground 2C, **claim 19**).

389. As I discussed above (§XV.A), for the same reasons POSAs would have augmented Ground 2A’s Wang-Mills combination to include, based on Brinson, user-selectable GUI elements (*e.g.*, clickable search-term text displayed within each search result grouping) for designating a search term as required, POSAs would have added that functionality to Ground 2C’s Wang-Mills-Mehta. Once augmented in that manner, Ground 2D’s Wang-Mills-Mehta-Brinson combination meets claim 21 for the same reason Ground 2B’s Wang-Mills-Brinson combination meets claim 3 (*supra* §XIII.B.1), with claim 21’s *first search result grouping* corresponding to claim 3’s *second search result grouping*. That’s because selecting a search term that is missing from *the first search result grouping* and designating that term as “required” *automatically causes* that *grouping to be removed from the search results webpage* because it is missing the now-required term.

2. Claim 22

- a. **[22A] The method of claim 21, wherein the user-operated computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer’s display screen, and**

390. Wang-Mills-Mehta-Brinson meets the limitation added by [22A] for the same reasons I discussed above (§XIII.B.2.a) that Wang-Mills-Brinson meets the limitation added by [4A].

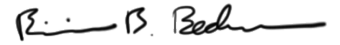
- b. **[22B] wherein the automatic removal of the first search result grouping enables the smaller display screen to display an increased number of first type of search results.**

391. Wang-Mills-Mehta-Brinson meets the limitation added by **[22B]** for the same reasons I discussed above (§XIII.B.2.b) that Wang-Mills-Brinson meets the limitation added by **[4B]**, with **[22B]**'s *first search result grouping* corresponding to **[4B]**'s *second search result grouping*.

I declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: March 13, 2026

A handwritten signature in black ink, appearing to read "B. B. Bederson", is written above a horizontal line.

Benjamin B. Bederson

XVI. CLAIM LISTING APPENDIX

Claim 1
[1PRE] In an Internet search system for displaying search results during an Internet search process, the search results being generated based on user-specified search term elements, where at least one search result references a webpage that is missing at least one search term element, a method for providing an interactive graphical user interface for the user to readily discern such search result without opening its referenced webpage, the method comprising:
[1A] receiving, on a server, a first search request submitted via the Internet by a user operating a computing device with a display screen, wherein the first search request is comprised of one or more search term elements;
[1B] generating a plurality of search results based at least in part on the submitted first search request, wherein the plurality of search results is comprised of:
[1C] (i) a first type of search result which references a first webpage that contains all submitted search term elements; and
[1D] (ii) a second type of search result which references a second webpage that is missing at least one submitted search term element;
[1E] causing the display screen to display the first and second types of search results on a search results webpage;
[1F] causing the display screen to display the first type of search result as a first search result grouping, wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage, and wherein the first search result grouping does not include any annotation for missing search term elements;
[1G] causing the display screen to display the second type of search result as a second search result grouping, wherein the second search result grouping is comprised of an annotation showing the at least one search term element missing in the second webpage and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage, and wherein the annotation is comprised of a text representing the at least one search term element; and

[1H] wherein the annotation enables the user to readily discern, without opening the second webpage and navigating away from the search results webpage, that the second webpage is missing the at least one search term element, and by not opening the second webpage a faster execution is enabled for the Internet search process.

Claim 2

[2A] The method of claim 1, wherein the annotation is displayed as one or more standalone lines in the second search result grouping; and

[2B] wherein the annotation is displayed at the bottom of the second search result grouping.

Claim 3

The method of claim 1 further comprising: causing the display screen to display, in combination with the annotation within the second search result grouping, a selectable filtering function that, when selected, automatically causes the second search result grouping to be removed from the search results webpage.

Claim 4

[4A] The method of claim 3, wherein the user's computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and

[4B] wherein the automatic removal of the second search result grouping enables the smaller display screen to display an increased number of first type of search results.

Claim 5

The method of claim 1 further comprising: causing the display screen to display one or more selectable advertisements on the search results webpage, wherein the one or more selectable advertisements are related to one or more of the search term elements.

Claim 6

[6A] The method of claim 1, wherein the plurality of search results is further comprised of: (i) a third type of search result which references a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and

[6B] (ii) a fourth type of search result which references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and
[6C] further comprising: causing the display screen to display the fourth type of search result in a same manner as the second search result grouping.
Claim 7
[7PRE] A system for an Internet search engine provider to provide an interactive graphical user interface for a user during an Internet search process to readily discern a search result that references a webpage that is missing a search term element, without requiring the user to open the search result's referenced webpage, the system comprising:
[7A] one or more servers, wherein the one or more servers receive a first search request via the Internet from a user-operated computing device,
[7B] wherein the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider;
[7C] wherein in response to the first search request, the one or more servers perform an Internet search to produce a search results webpage comprising a plurality of search results, wherein the plurality of search results is comprised of:
[7D] (i) a first type of search result which references a first webpage that contains all search term elements; and
[7E] (ii) a second type of search result which references a second webpage that is, contrary to the search logic guidelines for AND operations published by the search engine provider, missing at least one search term element;
[7F] wherein the one or more servers provide the search results webpage via the Internet for displaying the plurality of search results on a display screen of the user-operated computing device;
[7G] wherein the first type of search result is displayed as a first search result grouping and the second type of search result is displayed as a second search result grouping;
[7H] wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage; and wherein the first search result grouping does not include an annotation indicating one or more missing search term elements in the first webpage;

[7I] wherein the second search result grouping is comprised of a missing search term annotation and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage; wherein the missing search term annotation is comprised of a text representing at least one search term element missing in the second webpage;

[7J] wherein the missing search term annotation is placed on the display screen at the bottom of the second search result grouping; and

[7K] wherein the missing search term annotation warns the user that the second webpage is missing the at least one search term element, and wherein the missing search term annotation enables the user to readily discern that the second webpage is missing the at least one search term element without opening the second webpage, thereby saving time and enabling a faster execution of the Internet search process.

Claim 8

The system of claim 7, wherein the display screen displays, in combination with the annotation within the second search result grouping, a selectable filtering function that, when selected, automatically causes the second search result grouping to be removed from the search results webpage.

Claim 9

[9A] The system of claim 8, wherein the user-operated computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and

[9B] wherein the automatic removal of the second search result grouping enables the smaller display screen to display an increased number of first type of search results.

Claim 10

The system of claim 7, wherein the display screen displays one or more selectable advertisements on the search results webpage, where the one or more selectable advertisements are related to one or more of the search term elements.

Claim 11

[11A] The system of claim 7, wherein the plurality of search results is further comprised of: (i) a third type of search result referencing a third webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element; and

[11B] (ii) a fourth type of search result references a fourth webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and

[11C] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.

Claim 12

[12PRE] A system for operating an interactive graphical user interface during an Internet search process that enables a user to readily discern a search result that references a webpage that is missing a search term element without requiring the user to open the search result's referenced webpage, the system comprising:

[12A] a user-operated computing device capable of sending information to and receiving information from a search engine provider via the Internet, and also capable of operating an interactive graphical user interface for interacting with the search engine, wherein the device is any one of: a desktop computer, a laptop computer, or a notebook computer; a smart phone; or a tablet computer;

[12B] wherein the interactive graphical user interface interacts with, and enables, the user to submit a first search request via the Internet to the search engine provider, the first search request comprising a plurality of search term elements for performing AND operations according to published search logic guidelines;

[12C] wherein in response to the first search request, the device receives from the search engine provider a search results webpage comprising a plurality of search results, wherein the plurality of search results is comprised of:

[12D] (i) a first type of search result which references a first webpage that contains all search term elements; and

[12E] (ii) a second type of search result which references a second webpage that is, contrary to the published search logic guidelines for AND operations, missing at least one search term element;

[12F] wherein the first type of Internet search result is displayed on a display screen of the device as a first search result grouping and the second type of search result is displayed on the display screen as a second search result grouping;

[12G] wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage; and wherein each first search result grouping does not include an annotation indicating one or more missing search term elements in the first webpage;

[12H] wherein the second search result grouping is comprised of a missing search term annotation and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage; wherein the missing search term annotation is comprised of a text representing at least one search term element missing in the second webpage, and

[12I] wherein the missing search term annotation is placed on the display at the bottom of the second search result grouping; and

[12J] wherein the missing search term annotation enables the user to readily discern that the second type of search result is missing a desired search term element without opening the second webpage, and that by warning the user with respect to such search result, less time is wasted thereby enabling faster execution of the Internet search process.

Claim 13

The system of claim 12, wherein the display screen displays, in combination with the annotation within the second search result grouping, a selectable filtering function that, when selected, automatically causes the second search result grouping to be removed from the search results webpage.

Claim 14

[14A] The system of claim 13, wherein the user-operated computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and

[14B] wherein the automatic removal of the second search result grouping enables the smaller display screen to display an increased number of first type of search results.

Claim 15

The system of claim 12, wherein the display screen displays one or more selectable advertisements on the search results webpage, where the one or more selectable advertisements are related to one or more of the search term elements.

Claim 16

[16A] The system of claim 12, wherein: a third type of search result references a third webpage that is missing at least one search term element, and a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element;

[16A] a fourth type of search result references a fourth webpage that is missing at least one search term element, and all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element; and

[16B] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping.

Claim 17

[17PRE] A system for an Internet search engine provider to provide an interactive graphical user interface for a user during an Internet search process to readily discern a search result that references a webpage that is missing a search term element, without requiring the user to open the search result's referenced webpage, the system comprising:

[17A] one or more servers operated by a search engine provider, wherein the one or more servers receive a first search request via the Internet from a user-operated computing device;

[17B] wherein the first search request is comprised of a plurality of search term elements for performing AND operations according to search logic guidelines published by the search engine provider;

[17C] wherein in response to the first search request, the one or more servers perform an Internet search to produce a search results webpage comprising a plurality of search results, wherein the plurality of search results is comprised of:

[17D] (i) a first type of search result which references a first webpage that contains all search term elements; and

[17E] (ii) a second type of search result which references a second webpage that is, contrary to the search logic guidelines for AND operations published by the search engine provider, missing at least one search term element;

[17F] wherein the one or more servers provide the search results webpage via the Internet for displaying the plurality of search results on a display screen of the user-operated computing device;

[17G] wherein the first type of search result is displayed as a first search result grouping and the second type of search result is displayed as a second search result grouping;
[17H] wherein the first search result grouping is comprised of one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage; and wherein each first search result grouping does not include an annotation indicating one or more missing search term elements in the first webpage;
[17I] wherein the second search result grouping is comprised of a missing search term annotation and one or more of: a title for the second webpage, an Internet link for the second webpage, an excerpt of the second webpage, or a URL for the second webpage; wherein the missing search term annotation is comprised of a text representing at least one search term element missing in the second webpage;
[17J] wherein the missing search term annotation is placed on the display screen at the bottom of the second search result grouping;
[17K] wherein the display screen displays one or more selectable advertisements on the search results webpage, where the one or more selectable advertisements are related to one or more of the search term elements;
[17L] wherein a third type of search result references a third webpage that is missing at least one search term element, and wherein a descendant webpage linked directly one level from the third webpage contains the at least one missing search term element;
[17M] wherein a fourth type of search result references a fourth webpage that is missing at least one search term element, and wherein all descendant webpages linked directly one level from the fourth webpage are also missing the at least one search term element;
[17N] wherein the display screen displays the fourth type of search result in a same manner as the second search result grouping; and
[17O] wherein any missing search term annotation enables the user to readily discern, without opening its associated referenced webpage and navigating away from the search results webpage, that the associated referenced webpage is missing the at least one search term element, and by not opening the respective referenced webpage a faster execution is enabled for the Internet search process.

Claim 18

The system of claim 17 wherein each missing search term annotation comprises text representing at least one search term element in at least one of the following formats: (i) a font representing the text has been altered; (ii) the text is shown with one or more lines merged with the text; (iii) the text is shown with one or more lines superimposed thereupon; (iv) the text is shown within a shaded area; and (v) the text is shown with a reversed format.

Claim 19

[19PRE] A method for advertising in conjunction with Internet search, wherein one or more advertisements related to submitted search term elements are placed on a search results webpage even though some search results displayed on that webpage reference a corresponding webpage that does not contain all the submitted search term elements, the method comprising:

[19A] receiving at a server at a first location, a first search request submitted via the Internet from an interactive graphical user interface on a user-operated computing device at a second location, the first search request comprising one or more search term elements for performing AND operations according to search logic guidelines published by the search engine provider;

[19B] performing an Internet search to produce one or more search results, each search result referencing a webpage, wherein the one or more search results includes a first search result referencing a first webpage that is, contrary to the guidelines for AND operations published by the search engine provider, missing one or more of the search term elements in the first webpage;

[19C] transmitting to the computing device via the Internet, a first search results webpage comprising the one or more search results, the first search results webpage being displayed on the interactive graphical user interface on the computing device's display screen;

[19D] wherein the first search result is displayed as a first search result grouping; wherein the first search result grouping is comprised of a missing search term annotation and one or more of: a title for the first webpage, an Internet link for the first webpage, an excerpt of the first webpage, or a URL for the first webpage; wherein the missing search term annotation is comprised of a text representing at least one search term element missing in the first webpage;

[19E] wherein the annotation is located on the display at the bottom of the first search result grouping;

[19F] wherein the first search results webpage also comprises one or more selectable advertisements related to one or more of the search term elements; and

[19G] wherein the annotation warns the user that one or more search term elements are missing on the first webpage, and that not selecting the first search result will speed the Internet search process by reducing wasted time.

Claim 20

[20A] The method of claim 19, wherein the one or more search results further includes: (i) a second search result which references a second webpage that is missing at least one search term element, wherein a descendant webpage linked directly one level from the second webpage contains the at least one missing search term element; and

[20B] (ii) a third search result which references a third webpage that is missing at least one search term element, wherein all descendant webpages linked directly one level from the third webpage are also missing the at least one search term element; and further comprising:

[20C] causing the display screen to display the third search result in a same manner as the first search result grouping.

Claim 21

The method of claim 19, wherein the display screen displays, in combination with the annotation within the first search result grouping, a selectable filtering function that, when selected, automatically causes the first search result grouping to be removed from the search results webpage.

Claim 22

[22A] The method of claim 21, wherein the user-operated computing device is a smart phone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and

[22B] wherein the automatic removal of the first search result grouping enables the smaller display screen to display an increased number of first type of search results.