UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

ACCUSEARCH TECHNOLOGIES LLC,
Patent Owner.

Case No. IPR2026-00289
Patent No. 11,971,937

DECLARATION OF BENJAMIN B. BEDERSON, PH.D.

Google Exhibit 1003
Google v. AccuSearch

TABLE OF CONTENTS (CONDENSED)

TABLE OF EXHIBITS xiv
I. Personal and Professional Background 1
II. Materials Reviewed and Considered 15
III. My Understanding of Patent Law 16
A. Anticipation 18
B. Obviousness 18
IV. Person of Ordinary Skill in the Art ("POSA") 21
V. The '937 Patent (EX1001) 23
A. Overview of the Specification 33
B. The Challenged Claims 36
C. Prosecution History of the '937 Patent 39
VI. Claim Interpretation 39
VII. Summary of Grounds for Unpatentability 40
VIII. Ground 1A: Bates in Combination with Brinson, or in Combination with Bhagat and Brinson, Renders Obvious Claims 1, 15, 29 and 39 41
A. Bates (EX1010) 41
B. Bhagat (EX1011) 49
C. Brinson (EX1007) 53
D. Bates-Brinson and Bates-Bhagat-Brinson Combinations 56
1. Adding search-term text to Bates's correlation indicators 56
2. Adding GUI elements for search-term filtering based on Brinson 76
3. Reasonable expectation of success 85
E. Mapping to Challenged Claims 86
1. Claim 1 86
2. Claim 15 113
3. Claim 29 116
4. Claim 39 119

IX. Ground 1B: The Ground 1A Combinations in View of Mehta Render Obvious Claims 2-8, 13-14, 16-22, 27-28, and 30-38 123
A. Mehta (EX1008) 123
B. The Bates-Based Mehta Combinations 125
C. Mapping to Challenged Claims 127
1. Claim 2 127
2. Claim 3 128
3. Claim 4 131
4. Claim 5 133
5. Claims 6 and 8 135
6. Claim 7 137
7. Claim 13 139
8. Claim 14 141
9. Claims 16-22, 27-28, and 30-38 142
X. Ground 1C: The Ground 1B Combinations in View of Naick Render Obvious Claims 9-12 and 23-26 143
A. Naick (EX1009) 144
B. The Bates-Brinon-Mehta-Naick and Bates-Bhagat-Brinon-Mehta-Naick Combinations 146
C. Mapping to Challenged Claims 149
1. Claims 9 and 23 149
2. Claims 10-12, and 24-26 152
XI. Ground 2A: Wang-Mills-Brinson Renders Obvious Claims 1, 15, 29, and 39 152
A. Wang (EX1005) 152
B. Mills (EX1006) 158
C. Wang-Mills-Brinson Combination 163
1. Annotating search results with search-term text based on Mills 163
2. Adding GUI elements for search-term filtering based on Brinson 175

D. Mapping to Challenged Claims 178
1. Claim 1 178
2. Claim 15 194
3. Claim 29 195
4. Claim 39 197
XII. Ground 2B: Wang-Mills-Brinson-Mehta Renders Obvious Claims 2-8, 13-14, 16-22, 27-28, and 30-38 198
A. The Wang-Mills-Brinson-Mehta Combination 198
B. Mapping to Challenged Claims 199
1. Claim 2 199
2. Claim 3 200
3. Claim 4 201
4. Claim 5 202
5. Claims 6 and 8 203
6. Claim 7 205
7. Claim 13 207
8. Claim 14 209
9. Claims 16-22, 27-28, and 30-38 210
XIII. Ground 2C: Wang-Mills-Brinson-Mehta-Naick Renders Obvious Claims 9-12 and 23-26 211
A. The Wang-Mills-Brinson-Mehta-Naick Combination 211
B. Mapping to the Challenged Claims 212
1. Claims 9 and 23 212
2. Claims 10-12, and 24-26 214
XIV. CLAIM LISTING APPENDIX 216

TABLE OF CONTENTS (FULL)

TABLE OF EXHIBITS xiv
I. Personal and Professional Background 1
II. Materials Reviewed and Considered 15
III. My Understanding of Patent Law 16
A. Anticipation 18
B. Obviousness 18
IV. Person of Ordinary Skill in the Art ("POSA") 21
V. The '937 Patent (EX1001) 23
A. Overview of the Specification 33
B. The Challenged Claims 36
C. Prosecution History of the '937 Patent 39
VI. Claim Interpretation 39
VII. Summary of Grounds for Unpatentability 40
VIII. Ground 1A: Bates in Combination with Brinson, or in Combination with Bhagat and Brinson, Renders Obvious Claims 1, 15, 29 and 39 41
A. Bates (EX1010) 41
B. Bhagat (EX1011) 49
C. Brinson (EX1007) 53
D. Bates-Brinson and Bates-Bhagat-Brinson Combinations 56
1. Adding search-term text to Bates's correlation indicators 56
a. Using color-coded text in the correlation indicators based on Bates 56
b. Using text in the correlation indicators with or without strikethrough based on Bhagat 65
2. Adding GUI elements for search-term filtering based on Brinson 76
3. Reasonable expectation of success 85
E. Mapping to Challenged Claims 86
1. Claim 1 86

a. [1PRE] A process for Internet search, annotation, and filtering for providing an enhanced interactive graphical user interface for Internet search that enables a search engine user to automatically remove one or more search results that each reference a webpage that does not contain a desired search term element, enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element, the process comprising:.....86

b. [1A] receiving a search request from a search engine user on a personal computing device having a display screen, the search request comprising one or more search term elements; 91

c. [1B] generating, by operating a search engine in response to receiving the search request, a first Internet search result that references a first webpage that is missing a first search term element and a second Internet search result that references a second webpage;.....93

d. [1C] generating and providing, for display on the personal computing device, an Internet search user interface;.....97

e. [1D] wherein the Internet search user interface comprises the first Internet search result and a first warning to the search engine user that the first webpage is missing the first search term element, wherein the first warning comprises a text representing the first search term element;.....98

f. [1E] wherein the first Internet search result is organized for display as a first search result grouping comprising a first excerpt for the first webpage, a first Internet link for the first webpage, and the first warning;.....100

g. [1F] wherein the Internet search user interface further comprises the second Internet search result; wherein the second Internet search result is organized for display as a second search result grouping that comprises a second excerpt from the second webpage and a second Internet link for the second webpage but does not comprise any warning that any of the one or more search term elements is missing from the second webpage; 103

h. [1G] wherein the first and second search result groupings are each a unique search result grouping displayed separately from each other; 104

i. [1H] wherein the Internet search user interface provides a filtering option, wherein the search engine user's selection of the filtering option causes an updated Internet search user interface to be generated and provided for display on the personal computing device, and wherein the updated Internet search user interface does not display the first Internet search result; and 105

j. [1I] wherein the process is performed on one or more servers located remotely from the personal computing device. 111

2. Claim 15 113

3. Claim 29 116

4. Claim 39 119

a. [39A] The process of claim 29, wherein the first search term element and the second search term element are a same search term element, wherein the first text and the second text are identical, and 119

b. [39B] wherein each of the first and second updated Internet search user interfaces does not display the first and second Internet search results 121

IX. Ground 1B: The Ground 1A Combinations in View of Mehta Render Obvious Claims 2-8, 13-14, 16-22, 27-28, and 30-38 123

A. Mehta (EX1008) 123

B. The Bates-Based Mehta Combinations 125

C. Mapping to Challenged Claims 127

1. Claim 2: The process of claim 1, wherein the Internet search user interface further comprises a selectable advertisement that is related to at least some of the one or more of the search term elements. 127

2. Claim 3: The process of claim 2, wherein the text representing the first search term element is shown 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. 128

3. Claim 4: The process of claim 3, wherein the first Internet search result would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element. 131
4. Claim 5: The process of claim 4, wherein the first webpage has one or more descendant webpages, wherein each of the one or more descendant webpages is also missing the first search term element, and wherein each of the one or more descendant webpages is linked directly one level from the first webpage. 133
5. Claims 6 and 8 135
    a. [6A]/[8A]: The process of claim 5/[claim 3], wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, or tablet computer's display screen, and 135
    b. [6B]/[8B]: wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search. 135
6. Claim 7: The process of claim 6, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element. 137
7. Claim 13 139
    a. [13A] The process of claim 2, wherein the selectable advertisement and the first search result grouping are simultaneously viewable on the display screen; and 139

b. [13B] wherein the first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element. 141

8. Claim 14: The process of claim 13, wherein the selectable advertisement and the first or second search result grouping are adjacent to each other. 141

9. Claims 16-22, 27-28, and 30-38 142

X. Ground 1C: The Ground 1B Combinations in View of Naick Render Obvious Claims 9-12 and 23-26 143

A. Naick (EX1009) 144

B. The Bates-Brinon-Mehta-Naick and Bates-Bhagat-Brinon-Mehta-Naick Combinations 146

C. Mapping to Challenged Claims 149

1. Claims 9 and 23 149

a. [9A]/[23A]: The process of claim 3[/claim 17], wherein the first webpage has one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first referenced webpage; and 150

b. [9B]/[23B]: wherein the second webpage is missing a second search term element, wherein the second webpage has one or more second descendant webpages, wherein the second search result grouping not comprising any warning that any of the one or more search term elements is missing from the second referenced webpage indicates that the second search term element is contained in at least one of the one or more second descendant webpages, and wherein each of the one or more second descendant webpages is linked directly one level from the second webpage 150

2. Claims 10-12, and 24-26 152

XI. Ground 2A: Wang-Mills-Brinson Renders Obvious Claims 1, 15, 29, and 39 152
A. Wang (EX1005) 152
B. Mills (EX1006) 158
C. Wang-Mills-Brinson Combination 163
1. Annotating search results with search-term text based on Mills 163
2. Adding GUI elements for search-term filtering based on Brinson 175
D. Mapping to Challenged Claims 178
1. Claim 1 178
a. [1PRE] A process for Internet search, annotation, and filtering for providing an enhanced interactive graphical user interface for Internet search that enables a search engine user to automatically remove one or more search results that each reference a webpage that does not contain a desired search term element, enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element, the process comprising: 178
b. [1A] receiving a search request from a search engine user on a personal computing device having a display screen, the search request comprising one or more search term elements; 181
c. [1B] generating, by operating a search engine in response to receiving the search request, a first Internet search result that references a first webpage that is missing a first search term element and a second Internet search result that references a second webpage; 182
d. [1C] generating and providing, for display on the personal computing device, an Internet search user interface; 186
e. [1D] wherein the Internet search user interface comprises the first Internet search result and a first warning to the search engine user that the first webpage is missing the

first search term element, wherein the first warning comprises a text representing the first search term element; 187

f. [1E] wherein the first Internet search result is organized for display as a first search result grouping comprising a first excerpt for the first webpage, a first Internet link for the first webpage, and the first warning; 189

g. [1F] wherein the Internet search user interface further comprises the second Internet search result; wherein the second Internet search result is organized for display as a second search result grouping that comprises a second excerpt from the second webpage and a second Internet link for the second webpage but does not comprise any warning that any of the one or more search term elements is missing from the second webpage; 190

h. [1G] wherein the first and second search result groupings are each a unique search result grouping displayed separately from each other; 191

i. [1H] wherein the Internet search user interface provides a filtering option, wherein the search engine user's selection of the filtering option causes an updated Internet search user interface to be generated and provided for display on the personal computing device, and wherein the updated Internet search user interface does not display the first Internet search result; and 191

j. [1I] wherein the process is performed on one or more servers located remotely from the personal computing device. 193

2. Claim 15 194

3. Claim 29 195

4. Claim 39 197

a. [39A] The process of claim 29, wherein the first search term element and the second search term element are a same search term element, wherein the first text and the second text are identical, and 197

b. [39B] wherein each of the first and second updated Internet search user interfaces does not display the first and second Internet search results.....197

XII. Ground 2B: Wang-Mills-Brinson-Mehta Renders Obvious Claims 2-8, 13-14, 16-22, 27-28, and 30-38 198

A. The Wang-Mills-Brinson-Mehta Combination 198

B. Mapping to Challenged Claims 199

1. Claim 2: The process of claim 1, wherein the Internet search user interface further comprises a selectable advertisement that is related to at least some of the one or more of the search term elements. 199

2. Claim 3: The process of claim 2, wherein the text representing the first search term element is shown 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. 200

3. Claim 4: The process of claim 3, wherein the first Internet search result would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element. 201

4. Claim 5: The process of claim 4, wherein the first webpage has one or more descendant webpages, wherein each of the one or more descendant webpages is also missing the first search term element, and wherein each of the one or more descendant webpages is linked directly one level from the first webpage. 202

5. Claims 6 and 8 203

a. [6A]/[8A]: The process of claim 5/[claim 3], wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, or tablet computer's display screen, and 203

b. [6B]/[8B]: wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each

reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.....204

6. Claim 7: The process of claim 6, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element. 205

7. Claim 13 207

a. [13A] The process of claim 2, wherein the selectable advertisement and the first search result grouping are simultaneously viewable on the display screen; and 207

b. [13B] wherein the first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element. 208

8. Claim 14: The process of claim 13, wherein the selectable advertisement and the first or second search result grouping are adjacent to each other. 209

9. Claims 16-22, 27-28, and 30-38.....210

XIII. Ground 2C: Wang-Mills-Brinson-Mehta-Naick Renders Obvious Claims 9-12 and 23-26.....211

A. The Wang-Mills-Brinson-Mehta-Naick Combination 211

B. Mapping to the Challenged Claims 212

1. Claims 9 and 23 212

a. [9A]/[23A]: The process of claim 3[/claim 17], wherein the first webpage has one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first referenced webpage; and.....212

b. [9B]/[23B]: wherein the second webpage is missing a second search term element, wherein the second webpage has one or more second descendant webpages, wherein the second search result grouping not comprising any warning that any of the one or more search term elements is missing from the second referenced webpage indicates that the second search term element is contained in at least one of the one or more second descendant webpages, and wherein each of the one or more second descendant webpages is linked directly one level from the second webpage.....213

2. Claims 10-12, and 24-26 214

XIV. CLAIM LISTING APPENDIX 216

TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 11,971,937
1002	Prosecution History of U.S. Patent No. 11,971,937
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 AccuSearch Techs. LLC v. Google LLC, 25-514-GBW (D. Del. Dec. 17, 2025)
1065	U.S. Patent Application Publication No. 2007/0100804A1
1066	Shneiderman, Designing the User Interface: Strategies for Effective Human-Computer Interaction (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 AccuSearch Techs. LLC v. Google LLC, 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 ("Stonehocker")
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 1-39 (the "challenged claims") of U.S. Patent No. 11,971,937 ("the '937 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 '937 patent.

2. For the reasons explained below (§§VIII-XIII), it is my opinion that each of claims 1-39 would have been obvious to a person of ordinary skill in the art ("POSA") (*see* §IV 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]

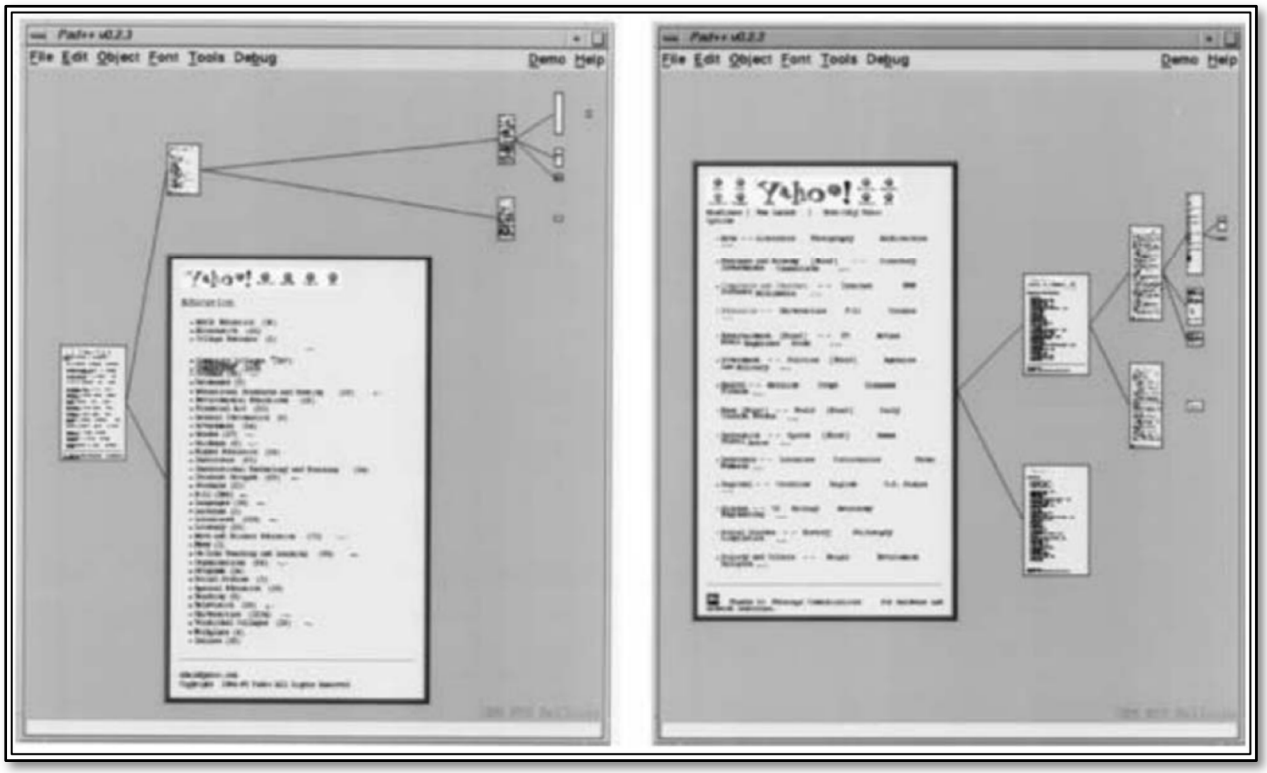


Figure 5 from "Pad++: A Zoomable Graphical Sketchpad for Exploring Alternate Interface Physics"

[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.

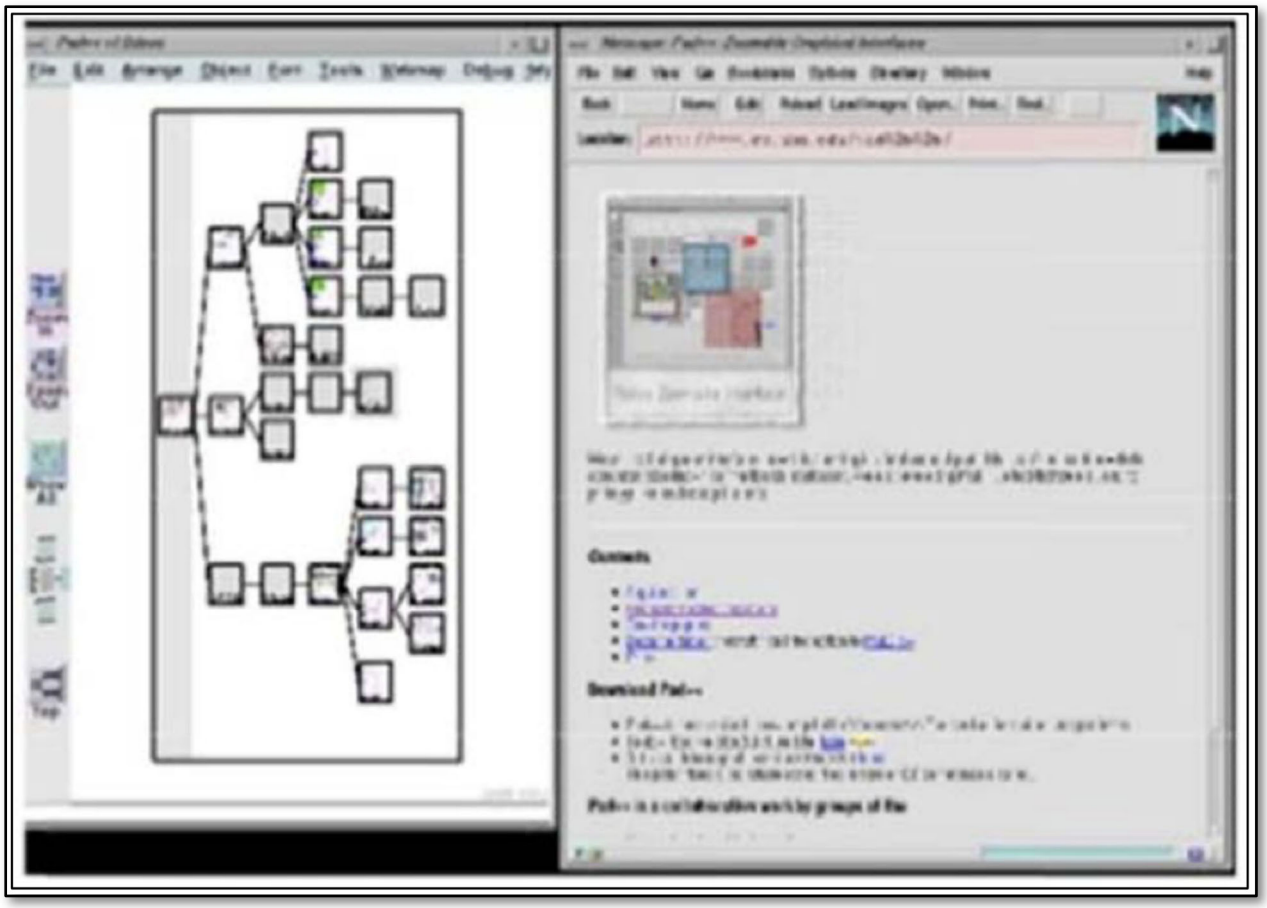


Figure 1 from PadPrints paper

11. In 2000, my team and I published a paper[4] 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 string, and DTB then displays all the domain names in the domain panel that

[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.

contain the query string. For example, if the user types 'cs', then all the domain names containing 'cs' will be displayed." (p. 3).

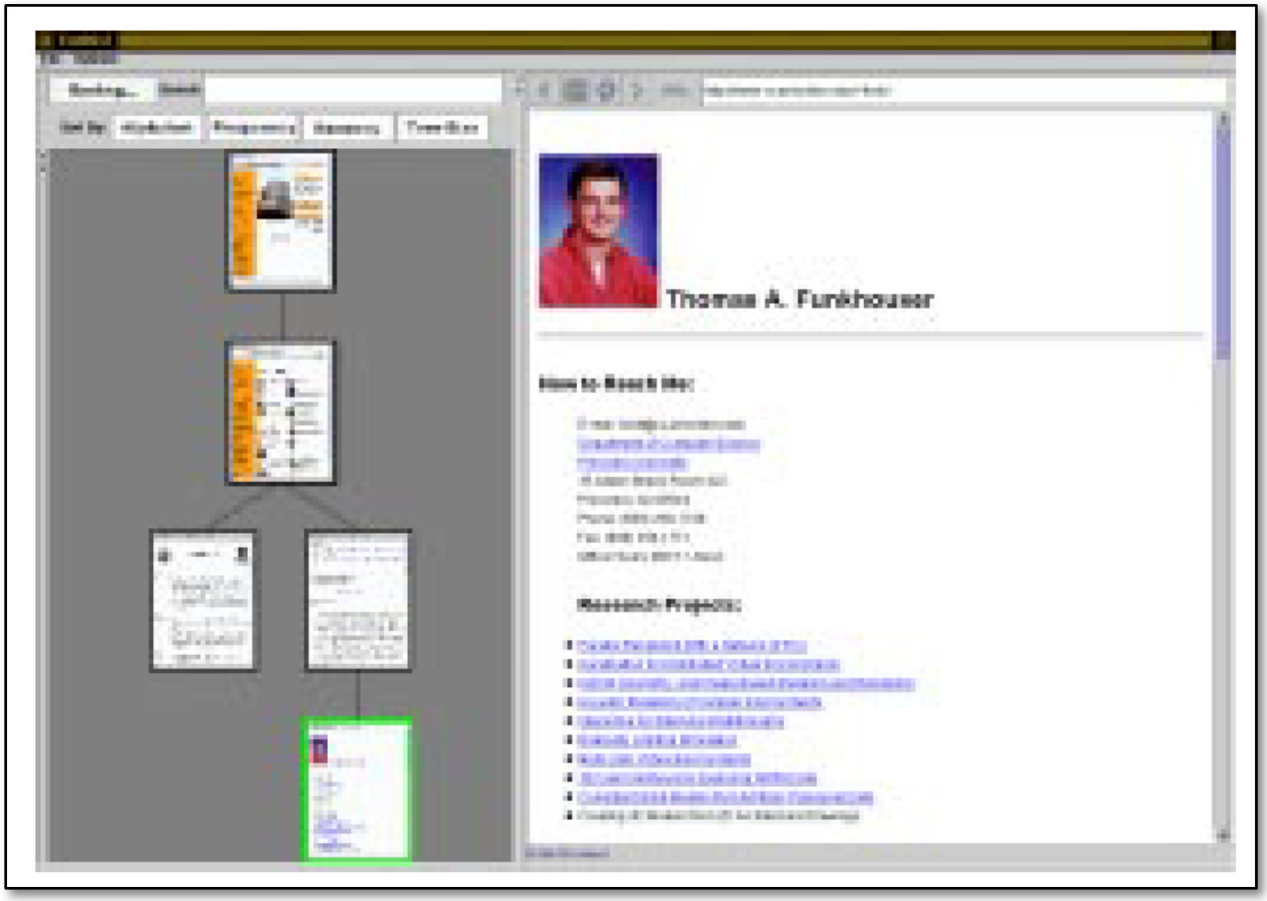


Figure 2 from Domain Name Based Visualization Paper

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.

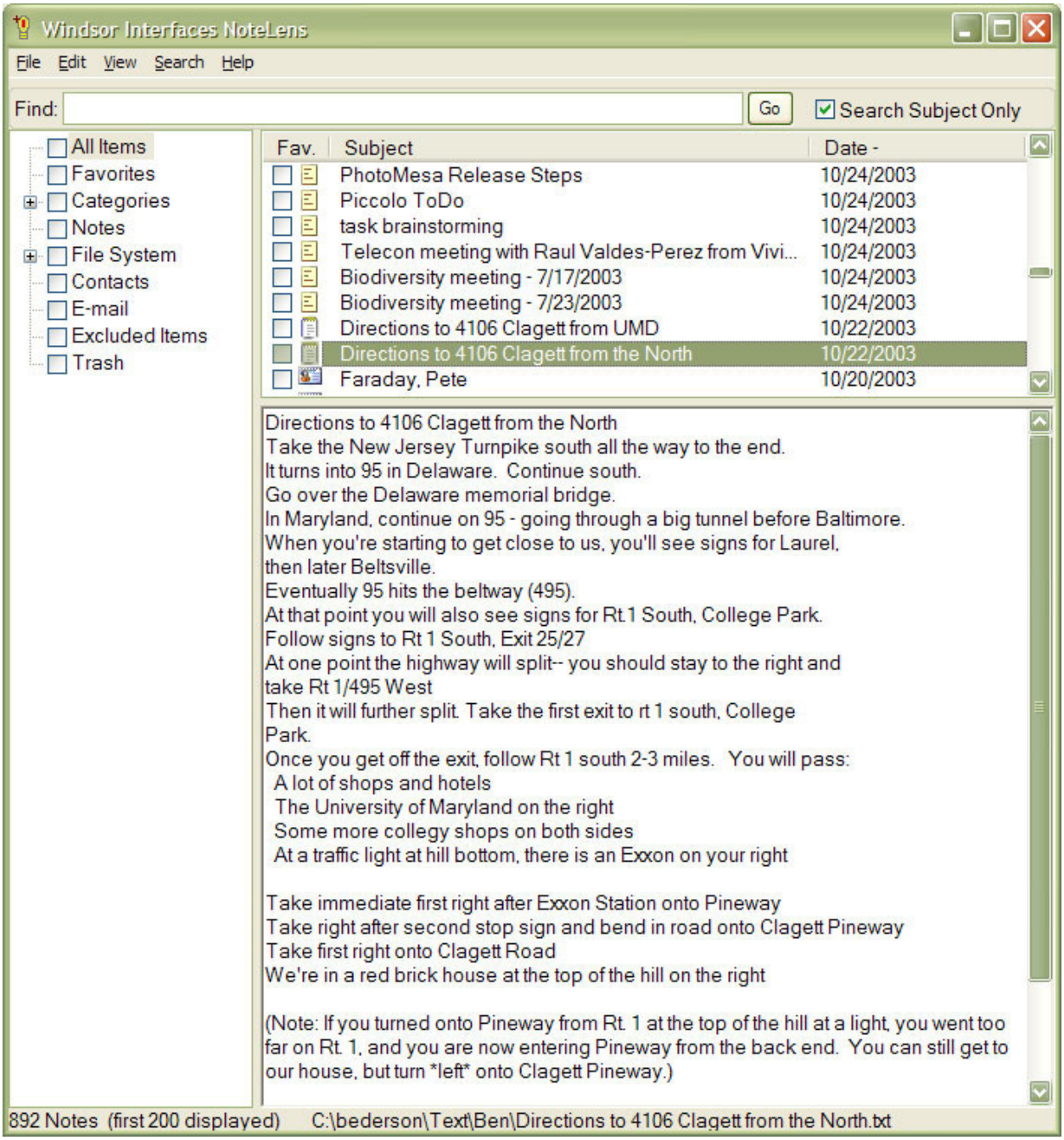


Screenshot taken February 19, 2017 by Benjamin B. Bederson from http://www.childrenslibrary.org/icdl/SimpleSearchCategory?ids=25&langid=&pnum=1&cnum=1& text=&lang=English&ilang=English

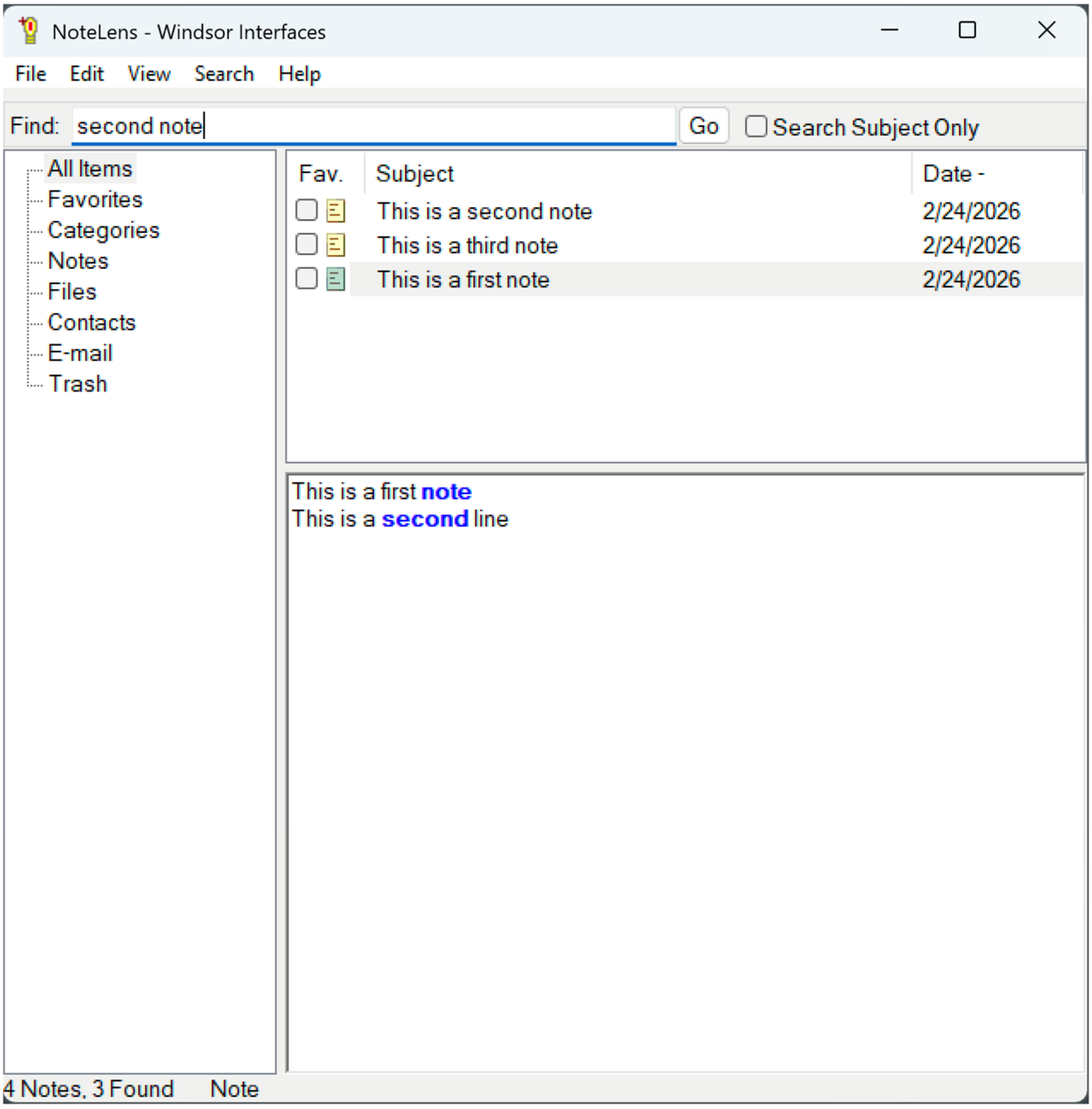
13. In 2004, I designed and wrote NoteLens, an application that supported people to write and quickly search for notes. NoteLens has been available for download at http://windsorinterfaces.com/notelens.shtml since 2004, and was described in a New York Times article at that time as well.[5] NoteLens allows 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 paper[6] 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.

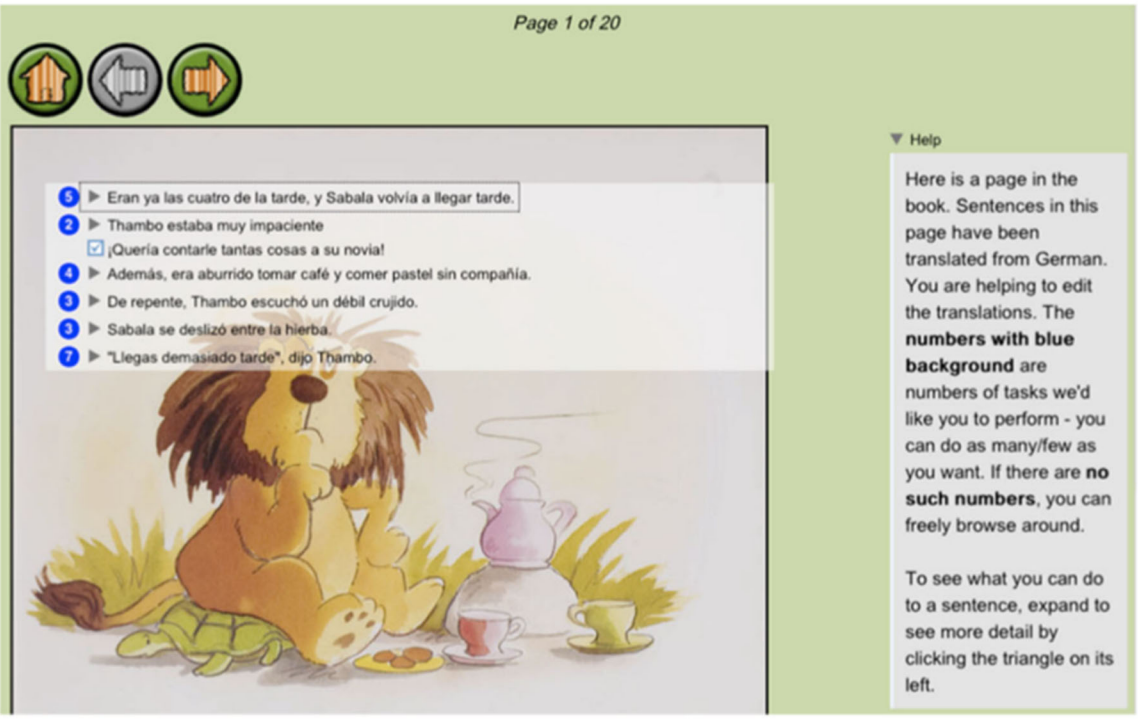


Figure 1. The MonoTrans2 UI for the target language speakers. Notice 1) the number in a blue circle indicating tasks before sentences; and 2) the contextual help on the right. The background image is a scan of the actual book (with original text removed) to provide context.

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://ieeevis.org/year/2021/info/awards/test-of-time-awards; https://ieeevis.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 '937 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 '937 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 '937 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 '937 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 '937 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 '937 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 '937 PATENT (EX1001)

38. As I discuss further below (§V.A), the '937 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.

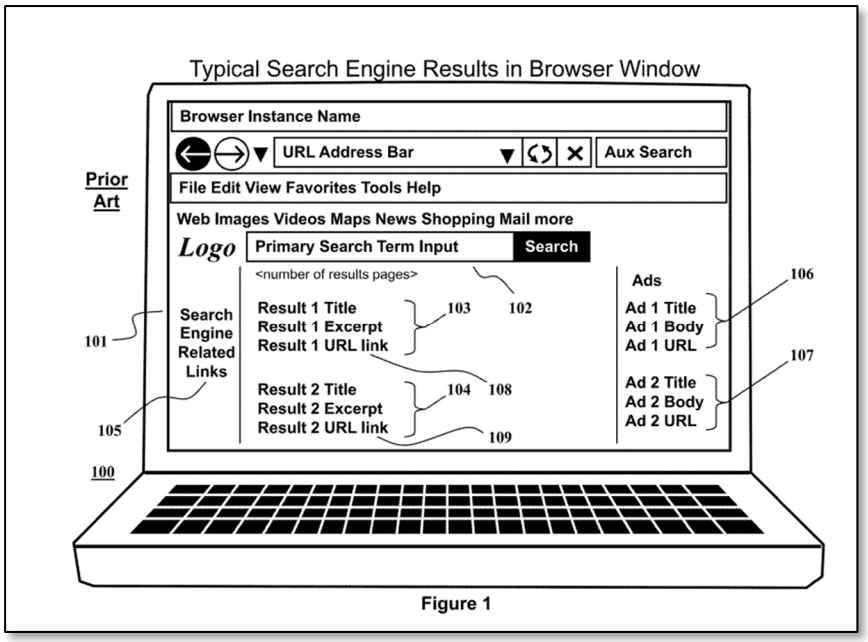


Figure 1

39. The ’937 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 ’937 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).

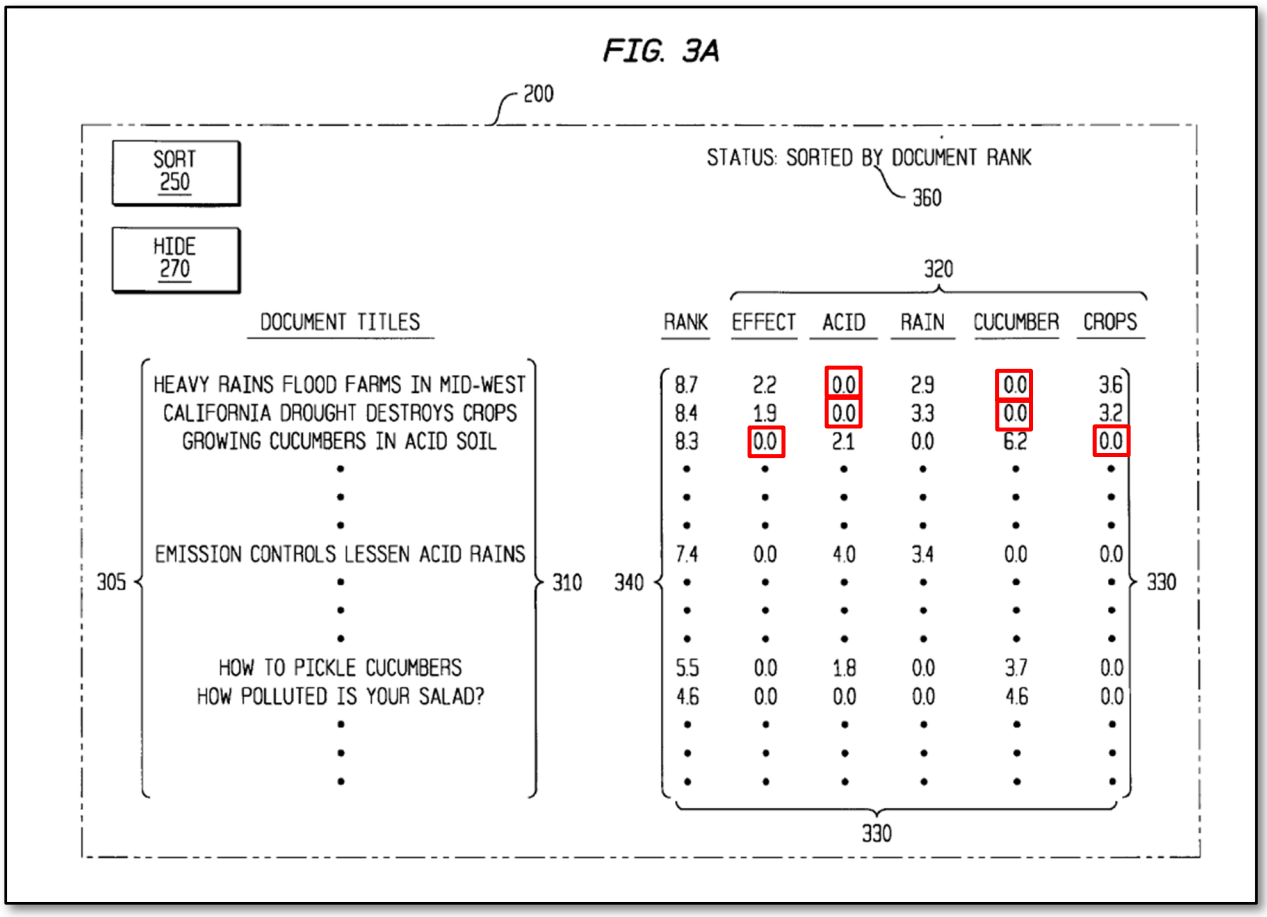
42. My opinion that it was long known in the prior art to bold search terms that are present in a search-result listing is also corroborated by EX1026. EX1026 is U.S. Patent that was filed in 2005 (cover code (22)) and issued in 2012 (cover code (45)). EX1026 "relates generally to information retrieval 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,

including indicating an **absent** term, *e.g.*, to warn the user that the term was not found in a search-result's referenced webpage. 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 '937 patent's challenged claims and those disclosed years earlier in Bates (and others) is the limitation reciting that the annotation itself "*the Internet search user interface comprises…a first warning to the search engine user that the first webpage is missing the first search term element, wherein the first warning comprises a text representing the first 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

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

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 be included and written in a particular font size (or font color or font type) to indicate its frequency in each search result, and thereby warn the user whether a search term was missing in search results.

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-XIII), 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 '937 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, 2:2-5. 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, 2:32-35. The patent says it would be beneficial if users knew "in advance which [search-result] webpages contain which search term elements." EX1001, 2:50-53. The '937 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, 2:54-56) depicted in Figure 1 below:

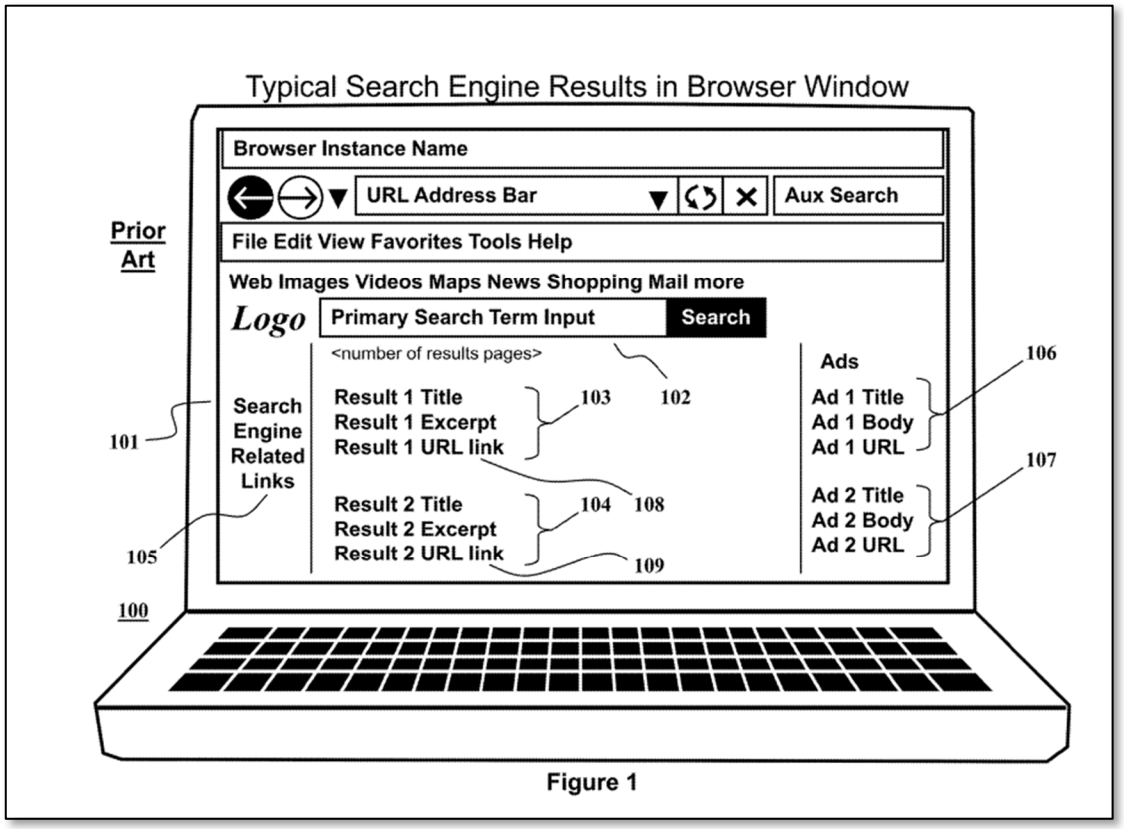


Figure 1

54. As seen above, the browser includes a "search term input bar 102" into which a user enters search terms. EX1001, 2:56-61. 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, 2:56-61.

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, 3:4-9. "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, 3:9-11.

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, 6:37-43. These "characteristics" can include the "presence or lack of presence of the search term elements…in the search results." EX1001, 6:57-59.

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, 4:46-51.

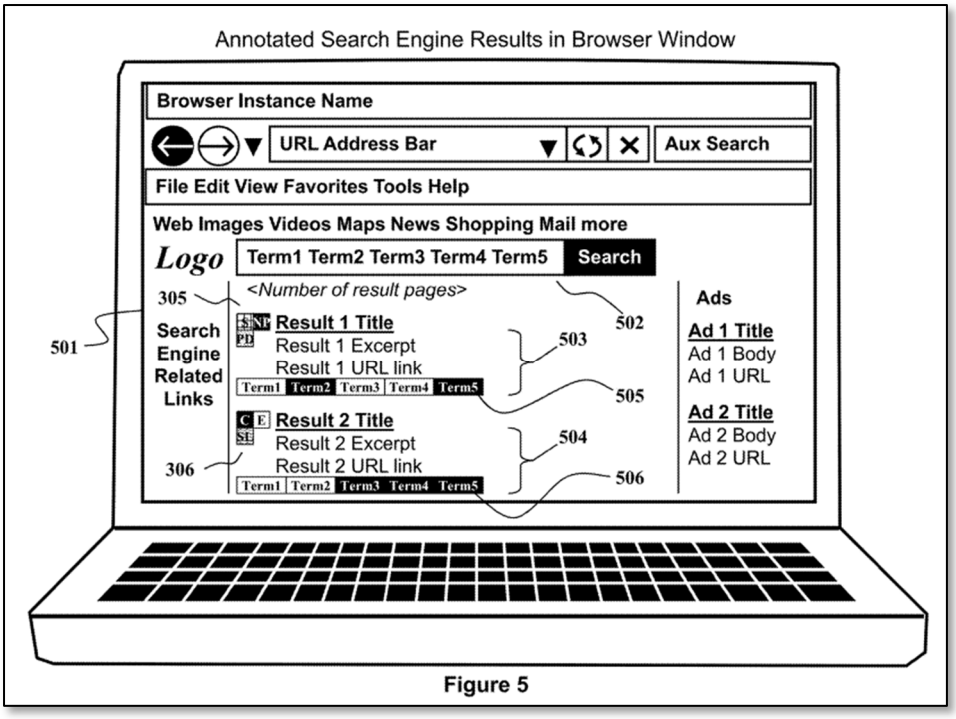


Figure 5

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, 10:30-34. 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, 10:34-37. The specific "[c]olors and shadings," however, "are arbitrary and exemplary." EX1001, 10:38.

B. The Challenged Claims

59. In the Claim Listing Appendix (§XIV below), I have reproduced the challenged claims with labels added for convenience. Independent claim 1 recites

a process that largely aligns with the embodiment depicted in Figure 5 of the '937 patent. Independent claims 15 (a system claim) and 29 (a process claim) largely mirror claim 1. Among other limitations of the independent claims, each independent claim requires a search result with a "*warning*" comprising "*a text representing*" a "*search term element*" that is "*missing*." *See, e.g.*, Claim 1, limitation [1D]. The specification does not use the term "warning" by itself, but does describe the use of "annotations" to "warn" users that a search result is missing a search term. EX1001, Abstract.

60. Certain dependent claims (*e.g.*, claim 9) require considering the absence of a search term in "*a descendant webpage*." In other words, the system identifies whether another webpage—one accessible via a link (or successive links) within the referenced webpage—includes the search term. For example, if **www.uspto.gov** is the referenced webpage, then **www.uspto.gov/patent** is a descendant webpage of the referenced webpage directly linked one level from www.uspto.gov because a direct link to www.uspto.gov/patent is found at www.uspto.gov. The patent's Figure 6 illustrates such a system that searches for search terms in descendant webpages. EX1001, 4:32-40; 10:25-44.

61. Searching descendant webpages for a search term was also known before 2011. As far back as 2001, researchers at Xerox Palo Alto Research Center were developing a model of "information scent" to help people use the "scent" of

"distal" (or descendant) webpages to decide what links to click on to find webpages that would meet their needs. EX1083, 491. The paper explains: "To calculate the distal scent of a link, we describe that link using words on the distal page (the page at the end of the link)." EX1083, 493.

62. For example, Naick (EX1009) – which I discuss further in §X.A below – discloses as background information that "a need exists for a system and method for query based searches that provide results wherein at least one of the query terms or parameters may appear on a different page of a web site or domain." Naick, [0005]. To do that, Naick's system prepares an "index" that "hold[s] and compare[s] domain information i.e. web site information rather than web page information" to identify search terms that are present in either (or both) of a webpage and another webpage that is part of the same website (e.g., a webpage linked from the homepage of a website). Naick, [0021]; *see also* Naick, FIGS. 5A & 5B, [0025].

63. As another example, EX1041 (a US patent that issued in 2004, *see* cover code (45)), "relates to techniques for determining the relationship between pages on the" Internet, "and more particular to methods of determining if pages belong to the same Web site." EX1041, 1:5-8. EX1041 discloses that a "specialized program" (e.g., "a Web robot or Web crawler") (EX1041, 10:65-67) "may wish to treat two Web pages which are part of a single site as a single unit in

adding entries to inverted term lists" (EX1041, 11:12-17), which POSAs understand means that a Boolean search would consider the presence of search terms in a webpage and also, for example, a descendent webpage linked to that webpage.

64. As another example, EX1042 (an International Application published March 2011, *see* cover code (43)), relates "to providing search results based upon weighing and scoring a search of web pages in a sub-domain that takes into account the content of web pages in other sub-domains." EX1042, p. 1.

65. The remaining dependent claims recite other functionality that was also common in prior-art search engines, like advertisements related to the search terms (*e.g.*, claim 2) and searching with a smartphone (*e.g.*, claim 6). These dependent claims would have also been obvious to a person of ordinary skill, as I discuss further in §§VIII-XIII below.

C. Prosecution History of the '937 Patent

66. In the first office action, the Examiner rejected all originally filed claims for non-statutory double-patenting, which the applicants overcame by filing a so-called terminal disclaimer. EX1002, 124-130, 207-214.

VI. CLAIM INTERPRETATION

67. In accordance with the standards for interpreting patent claim terms that I discussed above in Section III.A, 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

68. I understand that Google requests cancellation of claims 1-38 as follows:

Ground	Reference(s)	Claim(s)	Basis
1A	Bates, Bhagat, Brinson	1, 15, 29, 39	Obviousness
1B	Bates, Bhagat, Brinson, Mehta	2-8, 13-14, 16-22, 27-28, 30-38	
1C	Bates, Bhagat, Brinson, Mehta, Naick	9-12, 23-26	
2A	Wang, Mills, Brinson	1, 15, 29, 39	
2B	Wang, Mills, Brinson, Mehta	2-8, 13-14, 16-22, 27-28, 30-38	
2C	Wang, Mills, Brinson, Mehta, Naick	9-12, 23-26	

69. I understand that each of the references listed above is prior art to the '959 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 IN COMBINATION WITH BRINSON, OR IN COMBINATION WITH BHAGAT AND BRINSON, RENDERS OBVIOUS CLAIMS 1, 15, 29 AND 39

A. Bates (EX1010)

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

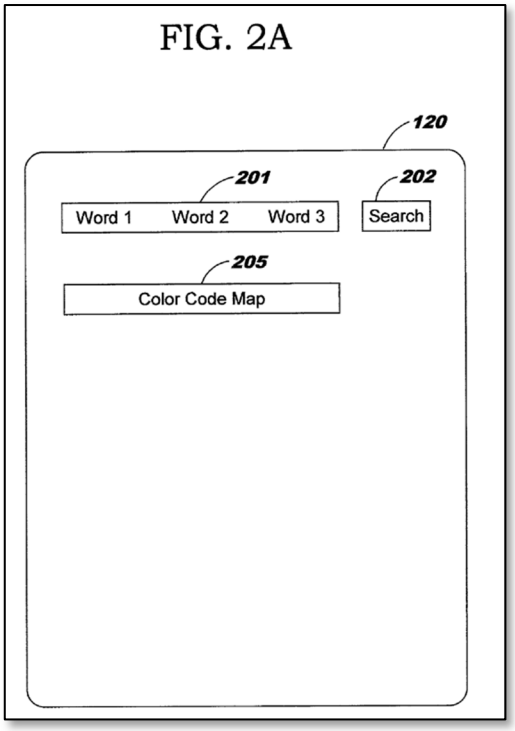
71. Bates discloses an example of a search-engine interface that uses color to indicate the "occurrence of each keyword" (*i.e.*, a search term) in each search result that the search engine returns and displays in response to a user's search. Bates, Abstract. Bates teaches that "color coding search results" allows users to conveniently "interpret[] search output." Bates, [0001].

72. 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].

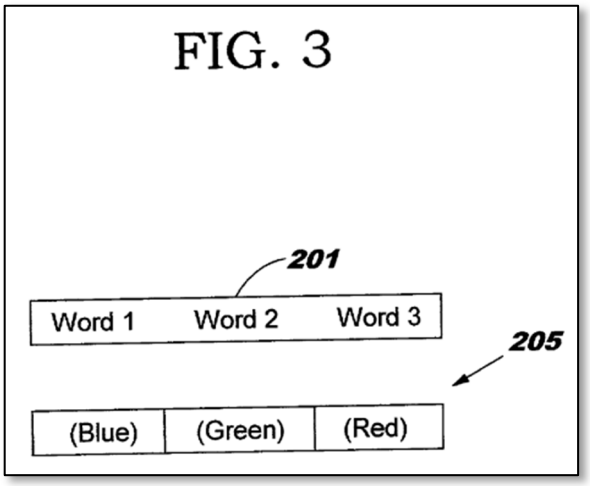
That is, the Boolean OR operator broadens the search results compared to the Boolean AND operator, which narrows the search results. Bates says that the searcher (*i.e.*, user), however, may only "judge[]" a source to be "relevant to the search" if it matches "at least two of the keywords," *i.e*., the 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].

73. 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].

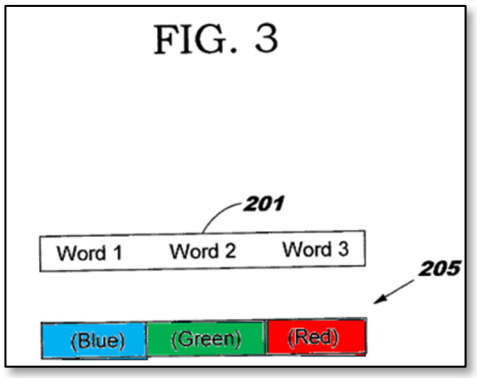
74. Bates's Figure 2A (below) depicts an interface displayed to a searcher, *e.g.*, on a computer screen (e.g., via a web browser). Bates, [0018], [0026]. As seen below, the interface presents a searcher with "an input line 201, wherein keywords may appear as they are entered." Bates, [0026]. In Figure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



75. 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].



76. 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 colorized version of Figure 3 below:

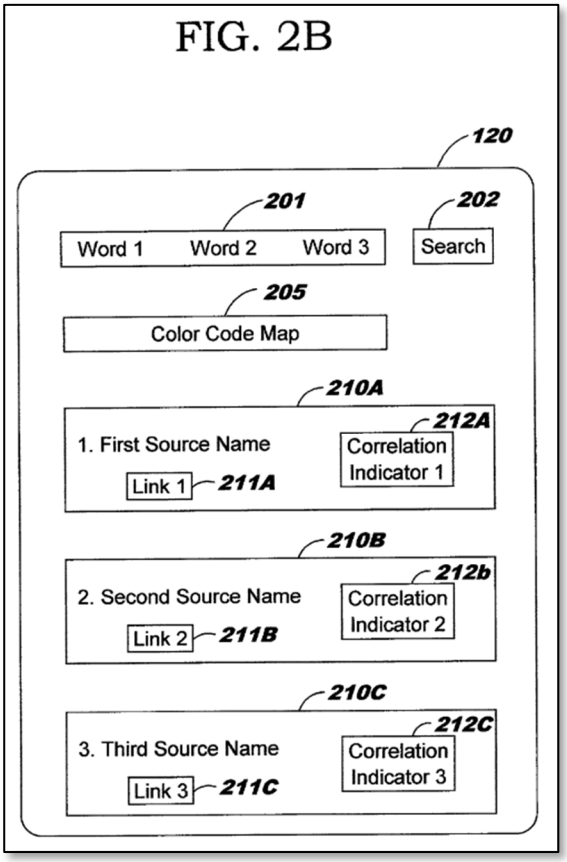


77. In one embodiment, Bates does not use a separate color-code map (like color bar 205 depicted in Figures 2A-2B and 3) but instead changes the font color of each search term as it is typed into input line 201. For example, "word1 might appear in blue characters in the input line 201, word2 might appear 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:



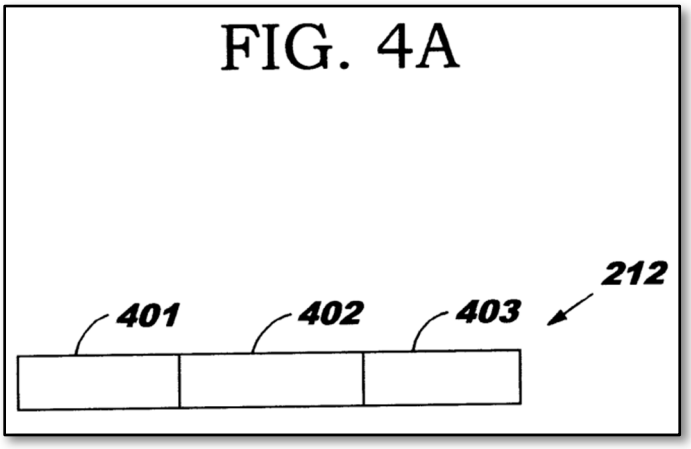
78. Similar to Figure 2A, Bates's Figure 2B (below) depicts an interface for Bates's system. Bates, [0018]. As seen below, the input line 201 and color code map 205 are displayed with an "exemplary presentation of search results," which includes information about webpages 210A-210C that were "found by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

FIG. 2B



79. 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:



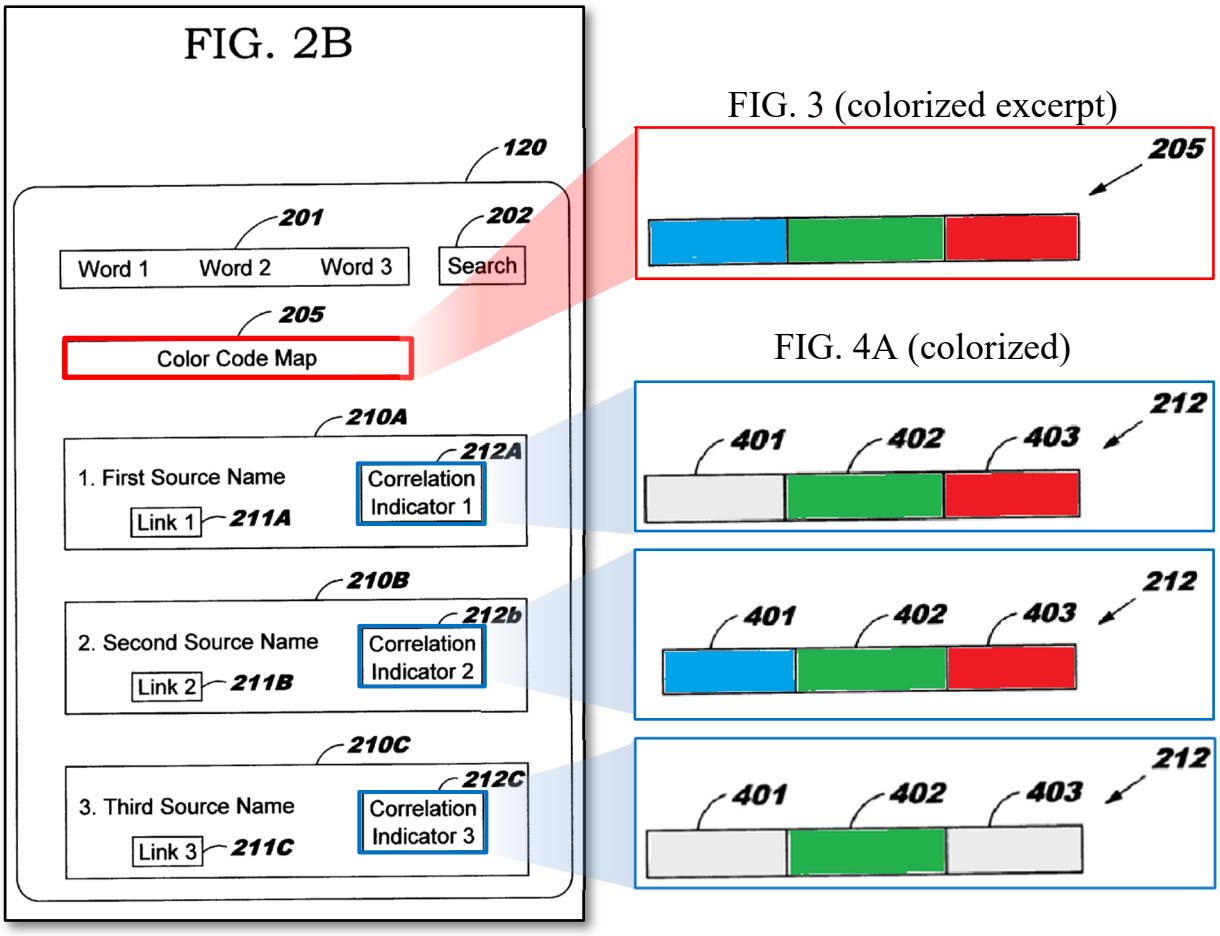
80. Bates explains how this embodiment of its system works as follows:

> 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].

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



82. 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.

83. 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.D.a.

B. Bhagat (EX1011)

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

85. 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.

86. 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.

87. 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.

88. 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.

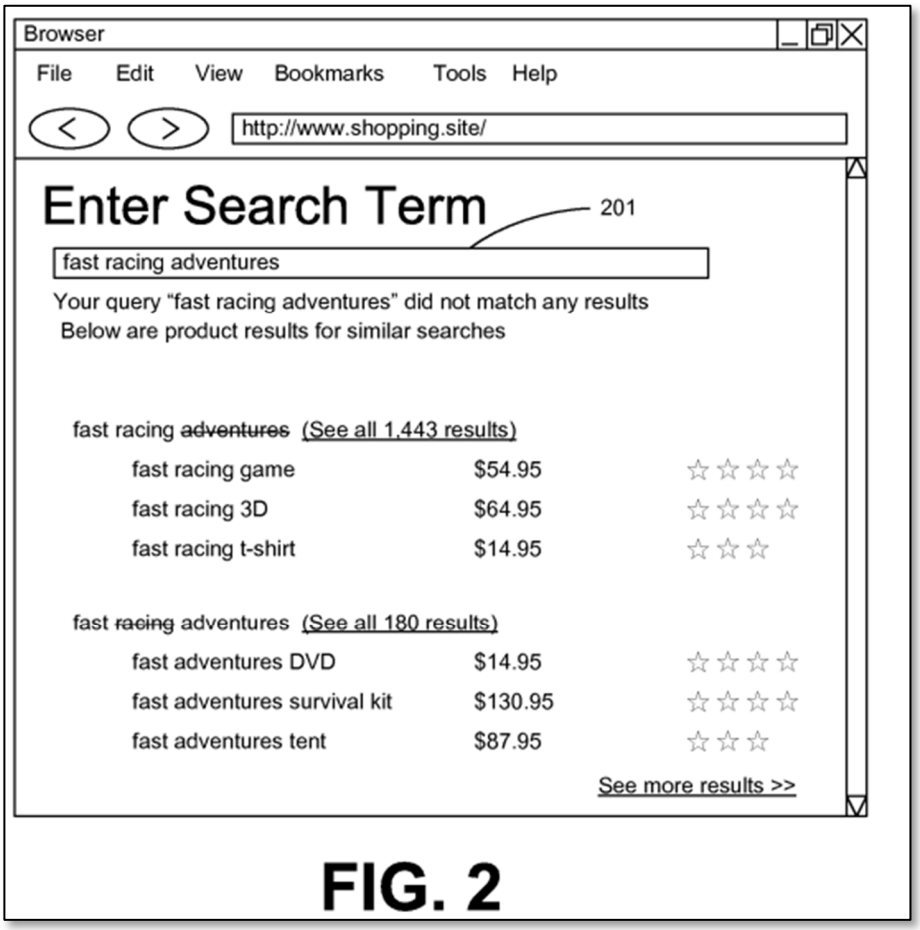


FIG. 2

89. 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).

90. Thus, Bhagat taught POSAs that one way to visually warn 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. Brinson (EX1007)

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

92. 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].

93. 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]-[0070].

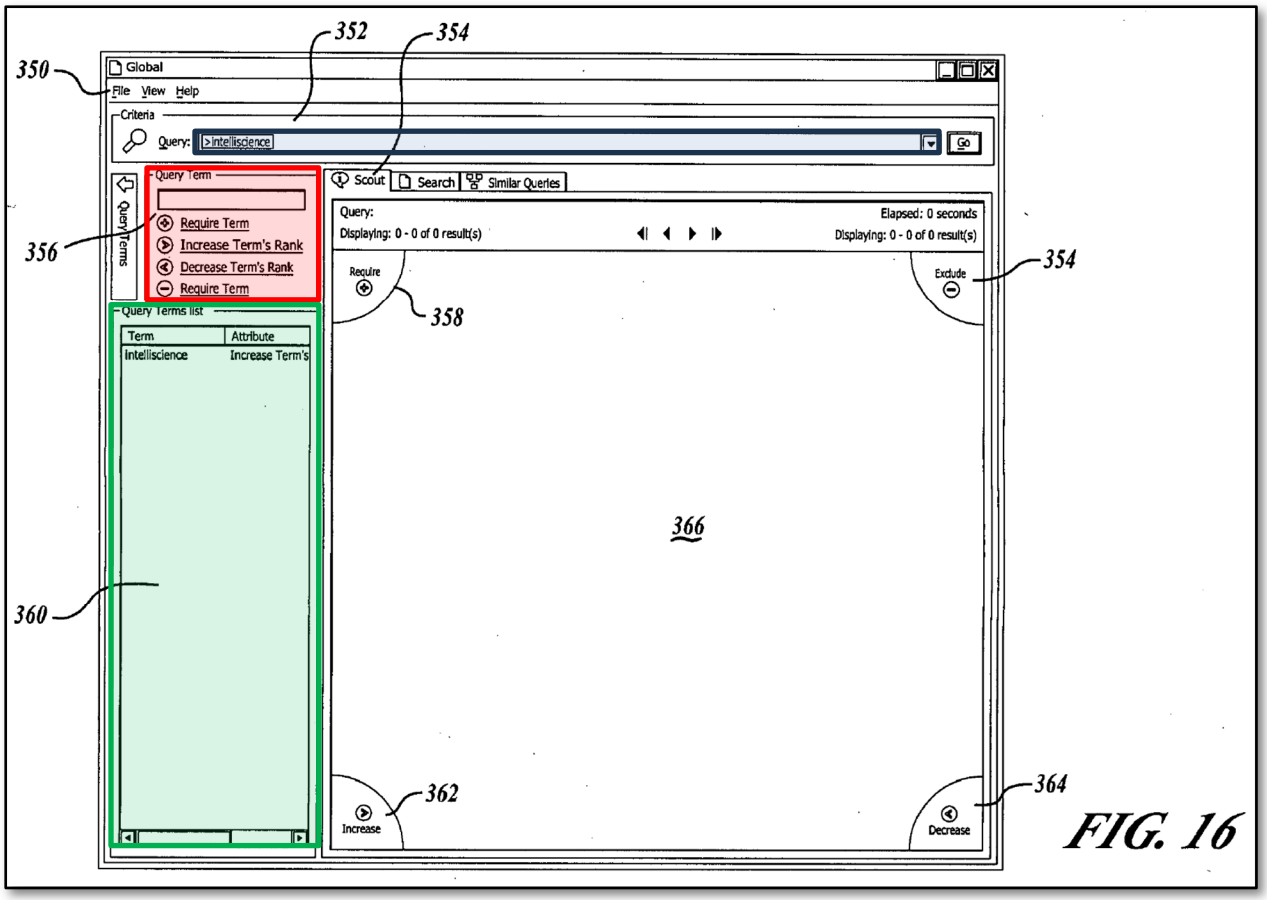


FIG. 16

94. 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 designate the term as a "Require[d] Term"). Brinson, [0071], [0075]; *see also id.*, claims 7, 24.

95. 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 designate it as 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.").

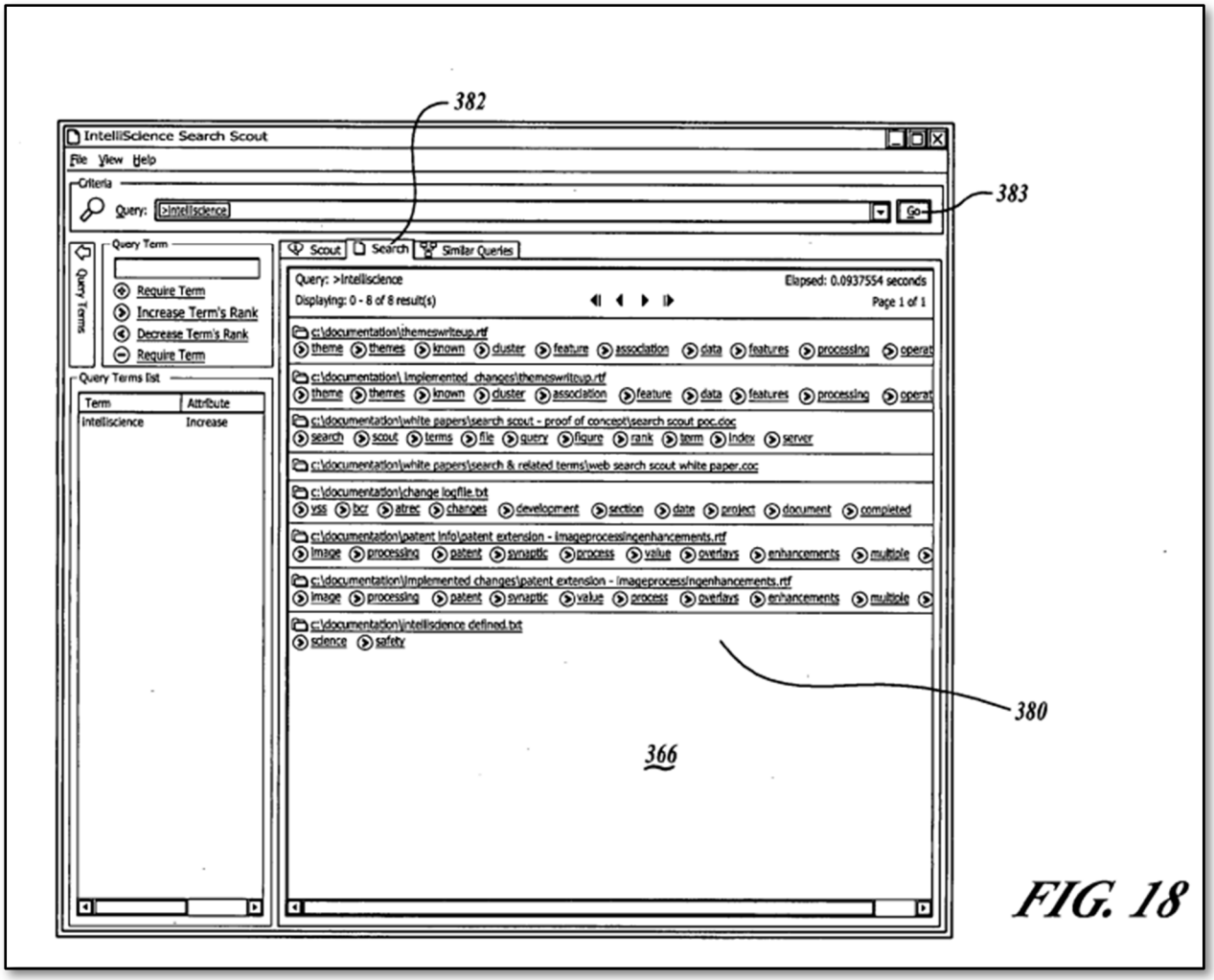


FIG. 18

D. Bates-Brinson and Bates-Bhagat-Brinson Combinations

1. Adding search-term text to Bates's correlation indicators

96. 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.D.1.a below); Bhagat discloses another alternative technique (*i.e.*, strikethrough text of missing terms, *see* §VIII.D.1.b 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.

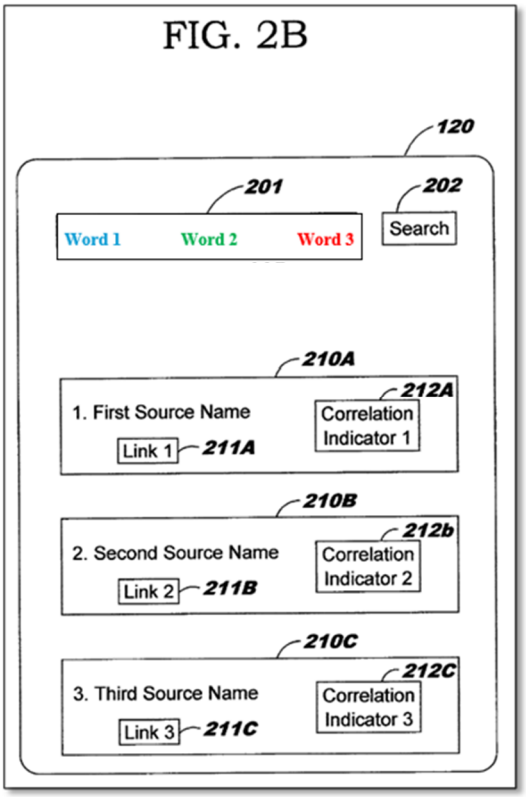
a. Using color-coded text in the correlation indicators based on Bates

97. 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.

98. 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.

99. The demonstrative below uses Bates's FIG. 2B to illustrate an implementation of Bates's "implicit"-color-code embodiment:



Bates FIG. 2B (modified)

100. 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 each correlation indicator corresponding to a search result 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.

101. 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.

102. 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.

103. 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.

104. 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.

105. 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.

106. 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].

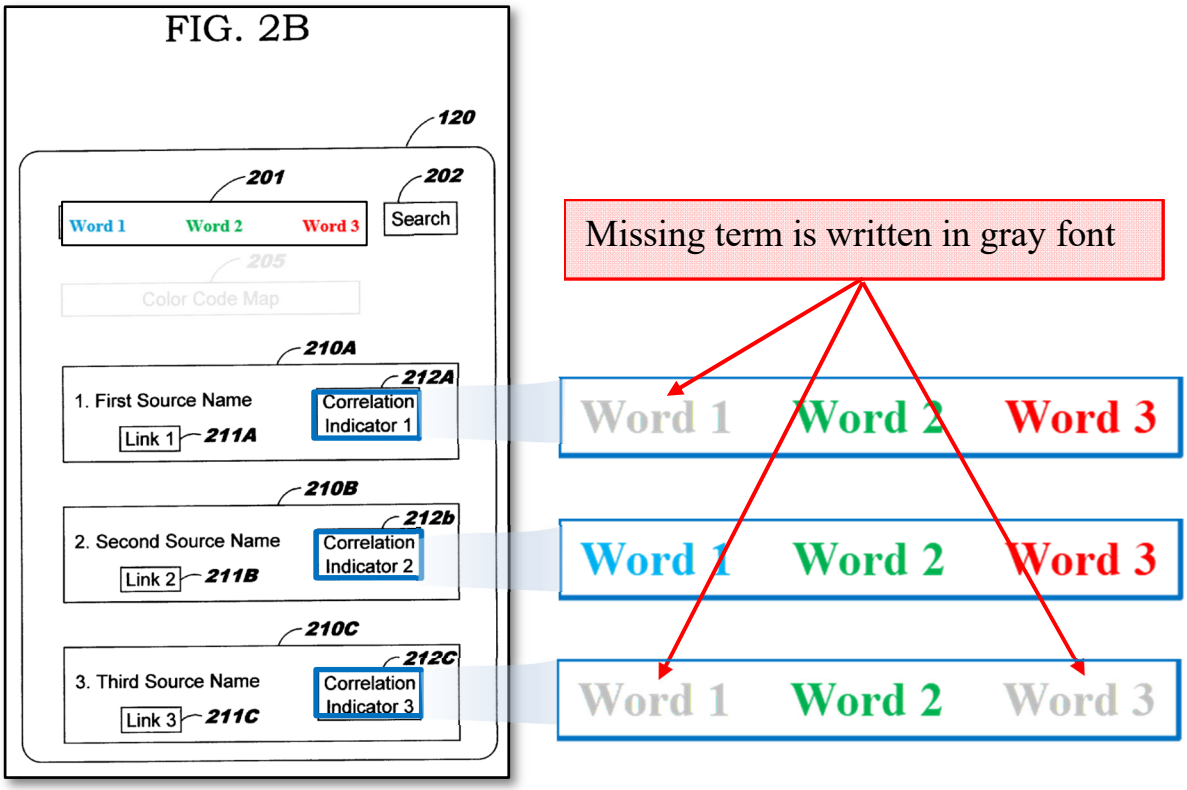
107. POSAs would have found that using a gray / muted-gray font to indicate the absence of search terms in search results would have been a known, beneficial, and easily understood way to indicate the absence of search terms in search results. My opinion in this regard is corroborated by EX1046, which "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].

108. 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).

109. 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.

110. 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):



111. 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).

b. Using text in the correlation indicators with or without strikethrough based on Bhagat

112. 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.

113. First, as I explained in the section above (§VIII.D.1.a), 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.

114. 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 blindless" "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].

115. My opinion in 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].

116. 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**."

117. 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.

118. 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]).

119. 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.

120. 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.

121. 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.

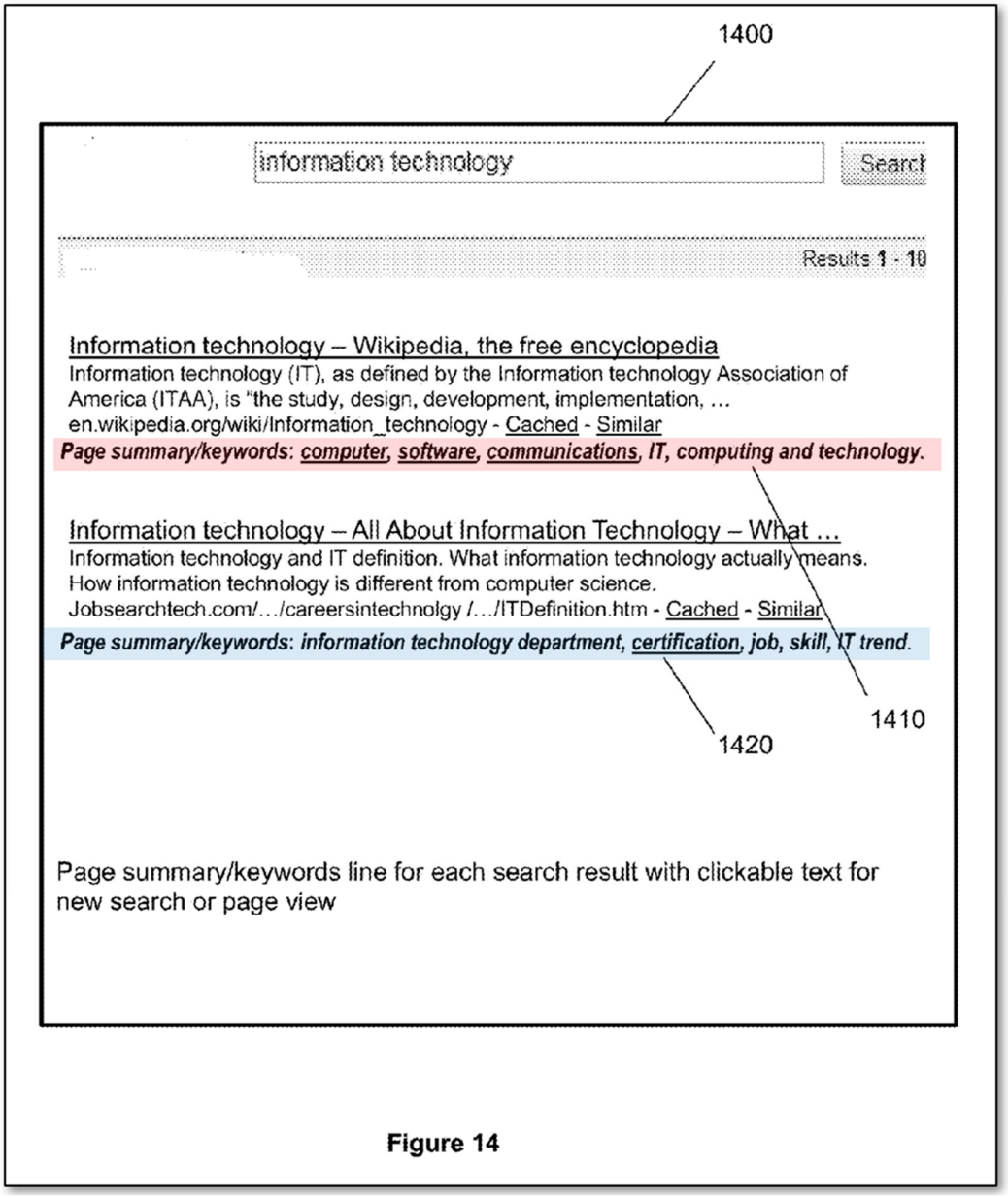


Figure 14

122. 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].

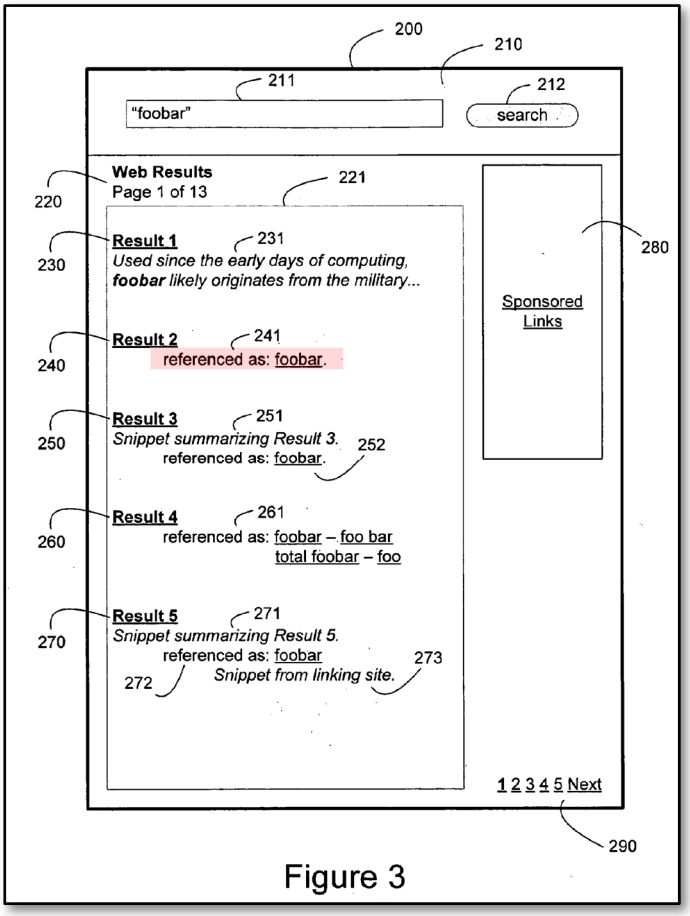


Figure 3

123. "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.

124. 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.

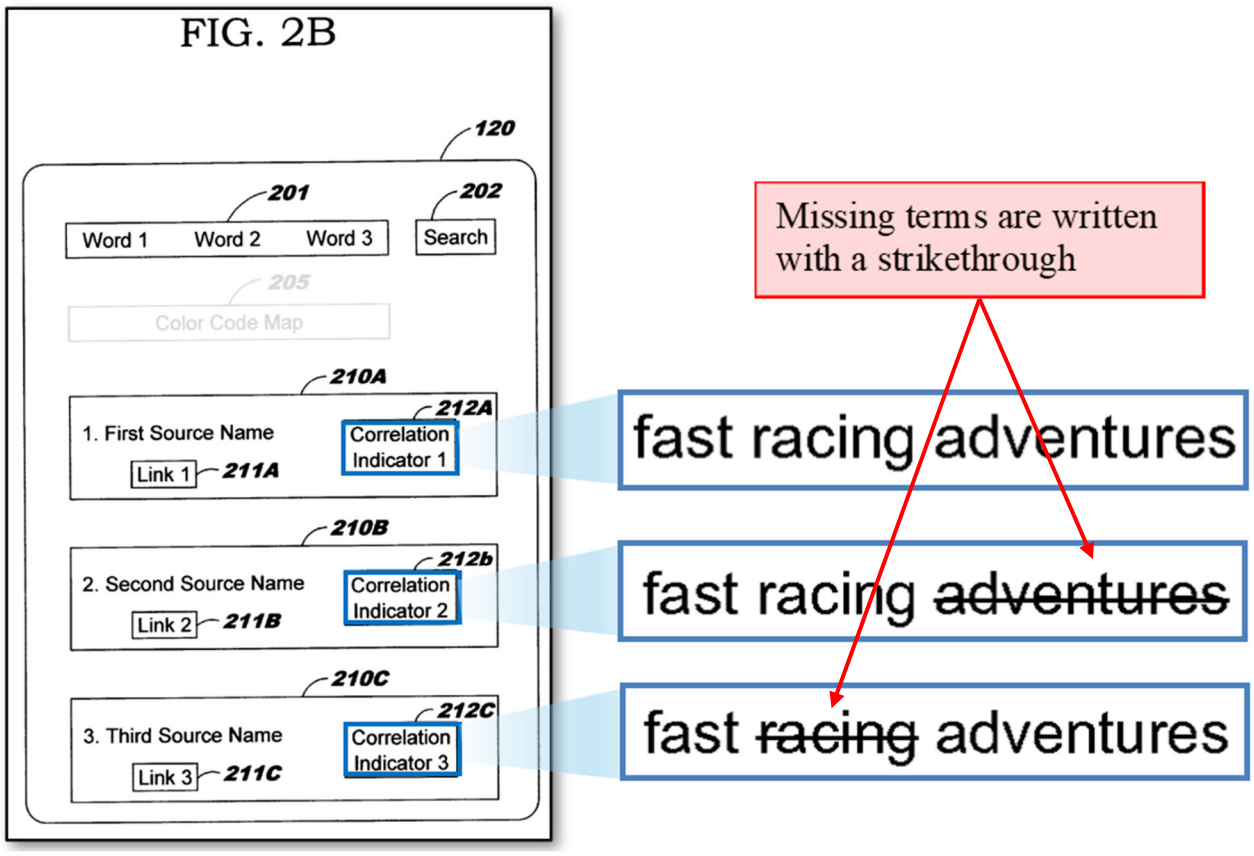
125. Finally, while Bates may express a preference for color-coded correlation indicators to indicate the presence or absence of search terms (Bates, [0036]), POSAs would not have been discouraged from pursuing known alternative techniques for indicating the same information, like Bhagat's text-based 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.

126. 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.

127. In the combination of Bates and Bhagat (and Brinson, as discussed below) 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-Brinson 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 of "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.



2. Adding GUI elements for search-term filtering based on Brinson

128. As discussed above in the overview of Bates (§VIII.A), Bates's search engine may return search results missing one or more 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 document includes that word." EX1035, [0009]; *see also* EX1036, [0024].

129. As I discussed above in the overview of Brinson (§VIII.C), 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].

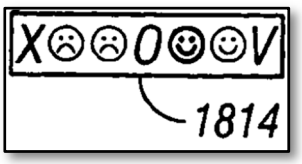
130. In view of Brinson and their background knowledge that it was conventional to allow users to make search terms mandatory, POSAs had reason to augment the two implementations of Bates-based search-engine interfaces that I discussed above (§§VIII.D.1.a-b) to include aspects of Brinson's GUI discussed 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 sources found by the search engine" (Bates, [0009]), by allowing users to refine their searches to eliminate irrelevant results.

131. 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.").

132. 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).

133. 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).



134. 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].

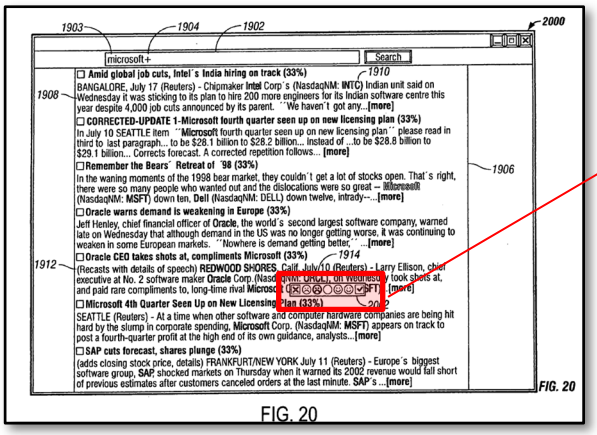


FIG. 20

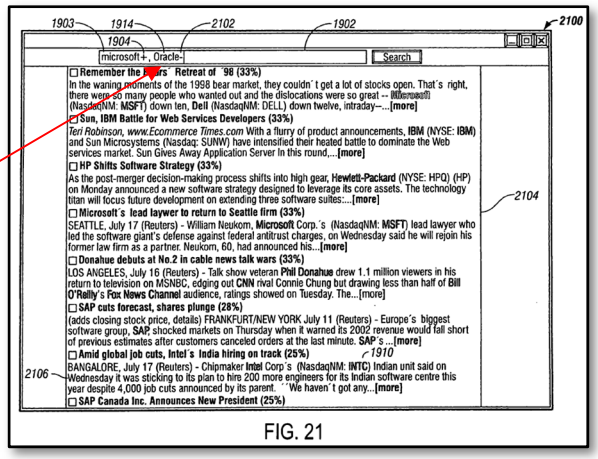


FIG. 21

135. 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 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.

136. 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")).

137. 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.

138. 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.

139. 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).

140. My opinion in this regard is further corroborated by EX1082 ("Stonehocker"). Stonehocker 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." Stonehocker, [0005]. Similar to the search results that would be displayed after applying Brinson's "required" designation to a search term, Stonehocker's "second list of results excludes results having content related to the user-selected term." Stonehocker, [0005]. As shown in Stonehocker's FIG. 6, the second list of web pages is presented to the user (610) without performing the search again (602). *See* Stonehocker, [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").

141. In Ground 1A's Bates-Brinson and Bates-Bhagat-Brinson combinations, Bates's search engine user-interface—as implemented in the manners I discussed above (§§VIII.D.1.a-b)—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. That is, the same Bates-alone (§VIII.D.1.a) and Bates-Bhagat (§VIII.D.1.b) graphical user interfaces that I illustrated previously would have been used, 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.

3. Reasonable expectation of success

142. In my opinion, POSAs would have reasonably expected success in Ground 1A's Bates-Brinson and Bates-Bhagat-Brinson combinations that I discussed above. This is 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 (like clickable text that open a pop-up menu) for Bates's search engine. Moreover, for Bates-Brinson (§VIII.D.1.a, §VIII.D.2), Bates explicitly teaches how to replace color-bar coding with text-color coding (Bates, [0033]) and, for Bates-Bhagat-Brinson (§VIII.D.1.b, §VIII.D.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). Bates and Bhagat also both 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-Brinson and Bates-Bhagat-Brinson 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.

E. Mapping to Challenged Claims

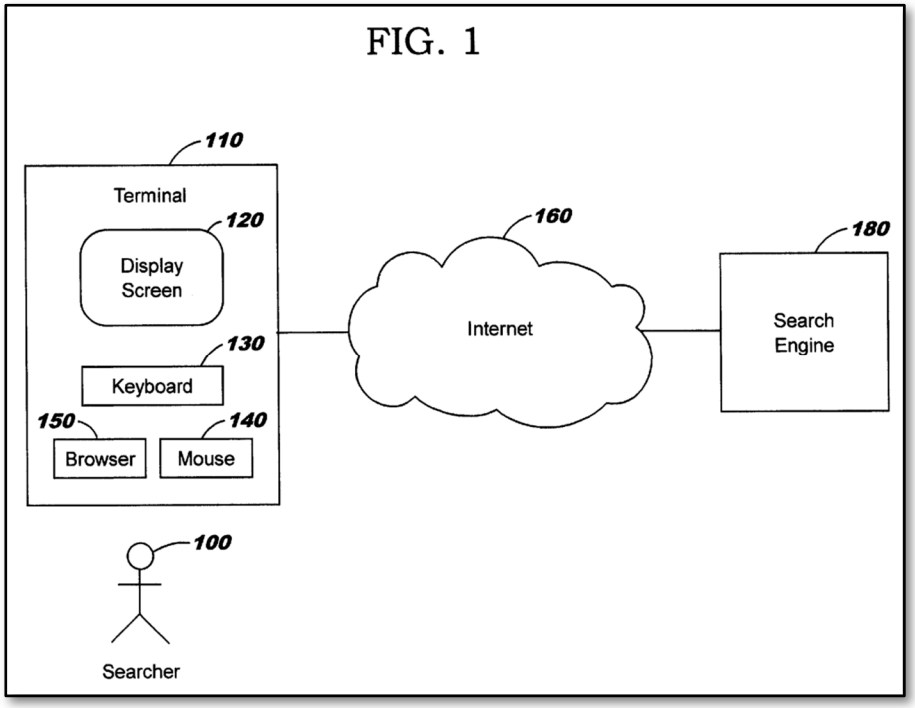
1. Claim 1

a. [1PRE] A process for Internet search, annotation, and filtering for providing an enhanced interactive graphical user interface for Internet search that enables a search engine user to automatically remove one or more search results that each reference a webpage that does not contain a desired search term element, enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element, the process comprising:

143. Bates discloses "a method [*process*] and computer program product for color coding search results" (Bates, [0001]) when "*Internet* users conduct *searches* to find pages on the Word World Web" (Bates, [0002]). As I discussed above (§§VIII.D.1.a-b) and further below, the *processes for* an *Internet search* in Bates-Brinson and Bates-Bhagat-Brinson include *annotation* (based on Bates's correlation indicators) and *filtering* (based on Brinson's required-term

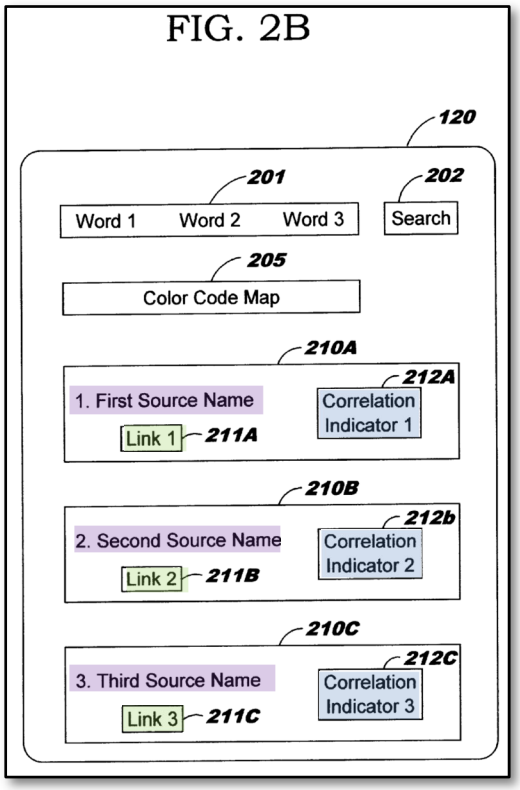
designation), which *provide an enhanced interactive graphical user interface* (GUI). *See also infra* [1C] & [1H] (discussing additional details of Bates-Brinson's and Bates-Bhagat-Brinson's GUIs).

144. As illustrated below in Bates's FIG. 1, "a searcher [*user*] employs a terminal 110" with "a visual display screen 120" and "a browser 150 for accessing and viewing pages on the World Wide Web (web pages)." Bates, [0023]. "The browser 150" "displays on the display 120 links to the sources [*webpages*] and, conveniently near each link, the associated correlation indicator." 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….").



145. Bates's Figure 2B (which I have highlighted below) shows Bates's *enhanced interactive graphical user interface* (which is further enhanced in the manners I discussed above §§VIII.C.1.a-b and further below §§VIII.E.1.e-h). In Figure 2B below, each *search result* (210A-210C) *references a webpage* via a Source Name (purple) and Link 211 (green) and includes a correlation indicator 212 (blue). Bates, [0026]-[0027]. For example, "[t]he information about the first web page 210A includes a link to a first URL 211A that identifies the first web page, and a first correlation indicator 212A," and similarly for other search results. Bates, [0028].

FIG. 2B



146. Each correlation indicator (*annotation*) allows "the searcher" to "readily grasp the relevance of the URL to the search." Bates, [0033], [0015], [0009] ("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"). For example, when "the web page that is identified by the URL…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]. Thus, Bates's correlation indicator indicates *webpages* that *do[] not contain a desired search term element*. *See also infra* §VIII.E.1.e ([**1D**]: where I discuss the specific annotation formats in Bates-Brinson and Bates-Bhagat-Brinson).

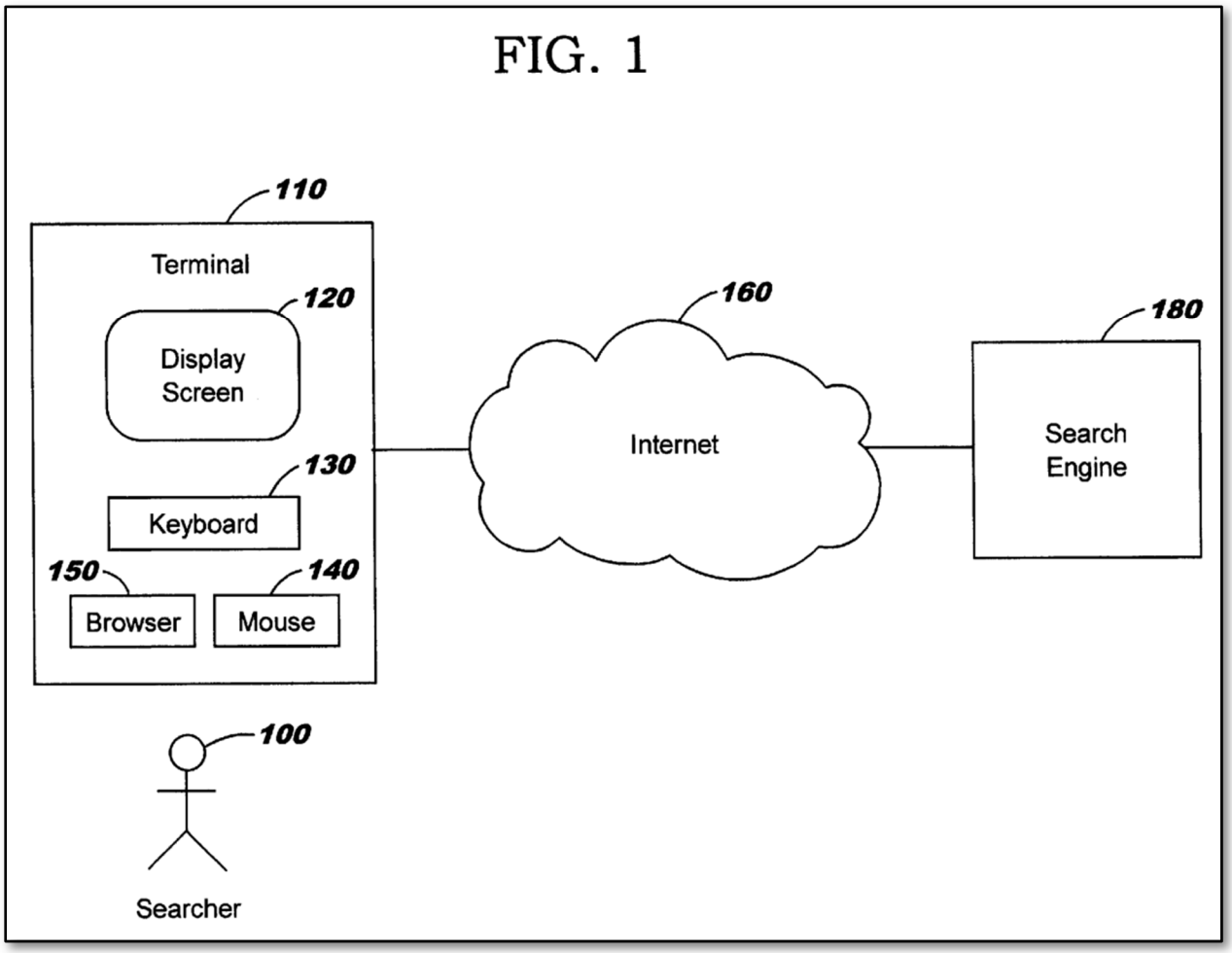
147. As I discussed above (§VIII.D.2), based on Brinson, the GUIs in Bates-Brinson and Bates-Bhagat-Brinson would have included user-selectable GUI elements (*e.g.*, clickable buttons or text) that allow users to designate a search term as "required" (*i.e.*, mandatory). Applying that selection to a term that is missing from one or more search results provides *filtering* so that the *GUI enables a search engine user to automatically remove search results that each reference a webpage that does not contain a desired search term element* (*i.e.*, the term the user

designated as mandatory) because those webpages are missing the now-mandatory term.

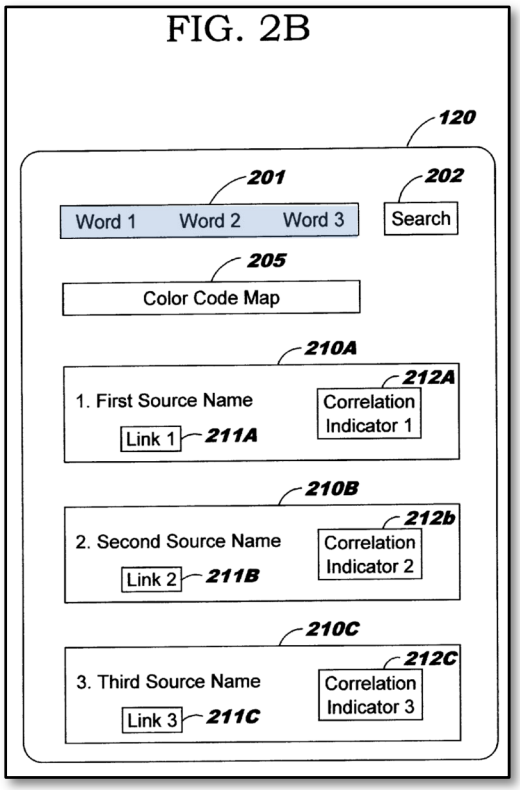
148. Thus, Bates-Brinson and Bates-Bhagat-Brinson each *enable[e] a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element*. This is because the correlation indicators (annotations) allow the user to "readily grasp" (Bates, [0033]), and the mandatory-term filtering allows the user to remove from being displayed, search results that are missing a search term element, thereby allowing a user to avoid having to click on and visit each website in the search results to ascertain that information. *See also* Bates, [0009] (correlation indicators designed to address "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**").

b. [1A] receiving a search request from a search engine user on a personal computing device having a display screen, the search request comprising one or more search term elements;

149. In Bates's FIG. 1 (below), "a searcher [*user*] employs a terminal 110" (*a personal computing device*) *having* a "*display screen 120*" and "browser 150" (Bates, [0023]-[0024]), where the browser "displays on the display 120 links to the sources" returned by "*search engine* 180" (Bates, [0039]).



150. "To conduct a search, the searcher [*user*] 100 may enter keywords into the browser," which are "sen[t]…over the Internet 160 to the search engine." Bates, [0024], FIG. 1. Bates's Figure 2B example (highlighted below) shows three "keywords word1, word2, and word3" (blue)—*i.e.*, three *search term elements*—that are *received* in *a search request from a search engine user on a personal computing device*. Bates, [0026]-[0027].

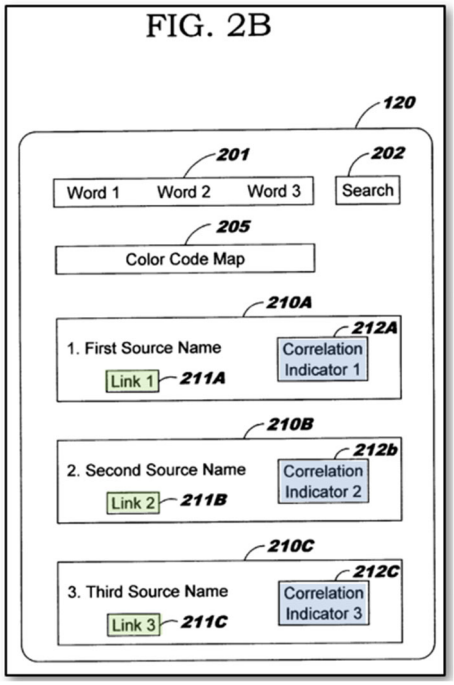


c. [1B] generating, by operating a search engine in response to receiving the search request, a first Internet search result that references a first webpage that is missing a first search term element and a second Internet search result that references a second webpage;

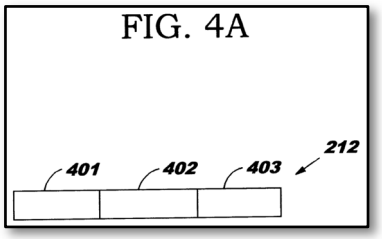
151. *In response to receiving the search request* ([**1A**], §VIII.E.1.a), Bates's "*search engine* executes [the] search, and sends to the browser a set of uniform resource locators (URLs) that identify *web pages* purportedly relevant to the search, along with occurrence data that report…whether each keyword is present or absent in each web page." Bates, [0011]; Bates, FIG. 1.

152. As shown in FIG. 2B (which I have highlighted below), "[f]or each URL," the *Internet search result* 210 that is *generated* with "a correlation indicator" (blue) and "links to the URLs [green]" that each *reference a webpage*. Bates, [0012].

FIG. 2B



153. "For example, if there are three keywords the horizontal bar correlation indicator [blue above] may have three segments 401, 402, and 403 as shown in FIG. 4A [below], associated respectively with the keywords and their colors." Bates, [0033].



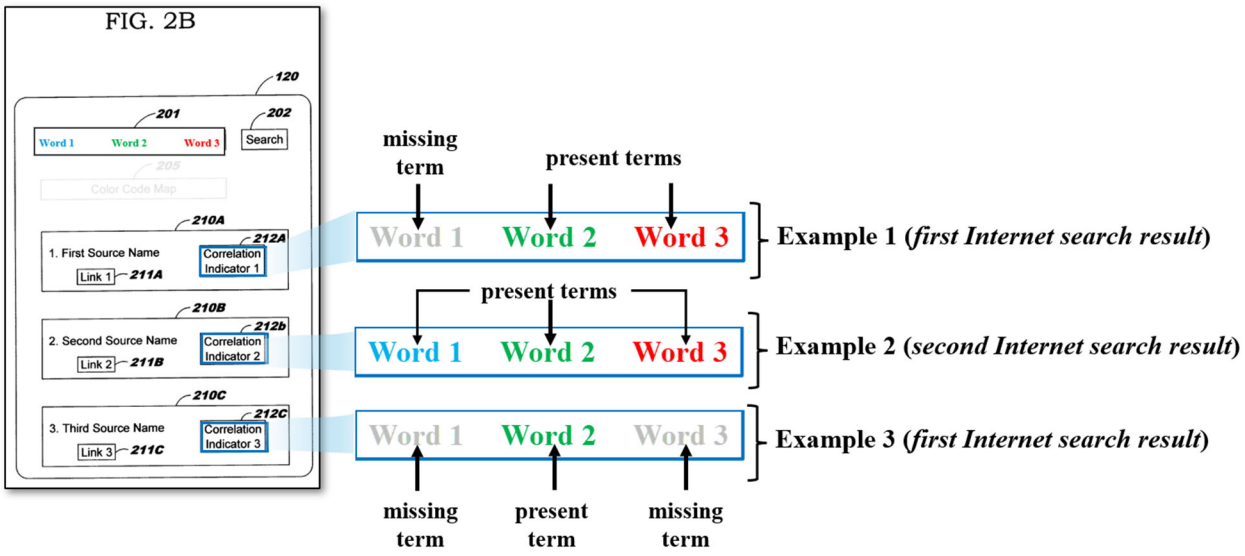
When a search-result webpage "contains keyword word1, for example, the first segment 401 of the horizontal bar correlation indicator may be colored blue," but when the webpage "does not contain keyword word1, then the first segment 401 of the horizontal bar may be left uncolored, or colored according to a background color not associated with any keyword by the color code map 205." Bates, [0033]. Thus, Bates's correlation indicators will identify a search term that is missing from a search result.

154. As I discussed above (§§VIII.D.1.a-b) and depict below, the correlation indicators in Bates-Brinson and Bates-Bhagat-Brinson include the text of each *search term element*, where a missing search term is written in grayed-out font (Bates-Brinson) and/or in a strikethrough format (Bates-Bhagat-Brinson).[10]

[10] As I discussed above (§VIII.D.2) and further below ([**1H**], §VIII.E.1.i), based on Brinson, the GUIs would also include aspects of Brinson's (or other) known GUI

155. In the illustration of Bates-Brinson below, three different annotations are shown. Here, either the first or third search result (Example 1 or 3) meets *a first Internet search result that references a first webpage* (at links 211A and 211C, respectively) *that is missing a first search term element* (terms in grayed-out font) and the second search result (Example 2) meets *a second Internet search result that references a second webpage* (at link 211B).

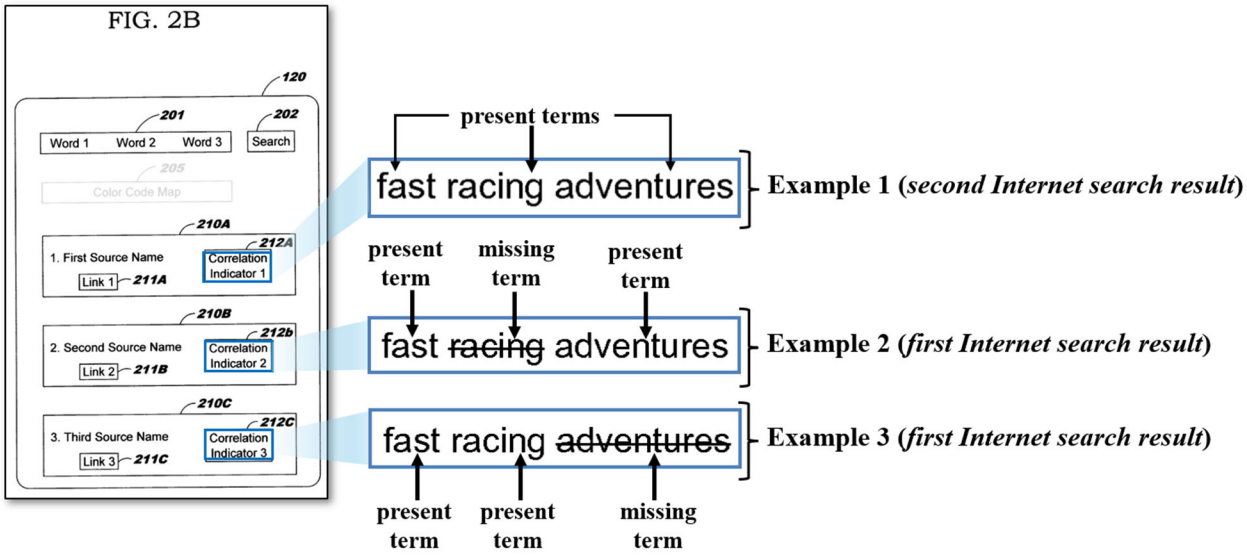
Bates-Brinson



elements for making a search term mandatory (*e.g.*, the search term text in the annotations could be clickable text to make a search-term mandatory).

156. Likewise, in the illustration of Bates-Bhagat-Brinson below, three different annotations are shown. Here, the second or third search results (Examples 2 or 3) meet *a first Internet search result that references a first webpage that is missing a first search term element* (terms with strikethrough) and the first search result (Example 1) meets *a second Internet search result that references a second webpage*.

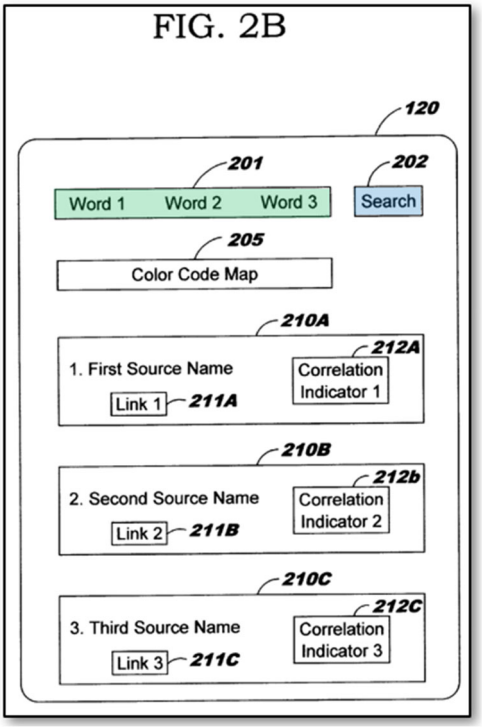
Bates-Bhagat-Brinson



d. [1C] generating and providing, for display on the personal computing device, an Internet search user interface;

157. Bates's "terminal 110" (*the personal computing device*) includes a "browser 150," which *generates and provides for display* on the terminal's "display screen 120" (Bates, [0024]) the "exemplary search environment" illustrated in Bates's Figure 2B (which I have highlighted below). The search environment includes an "input line 201" (green) for entering keywords (search terms) and a "search button 202" (blue) for sending keywords to the search engine. Bates, [0026]-[0027]. "The search engine [] conducts an Internet search to locate web pages that contain the keywords…." Bates, [0024]. Thus, the browser *provides for display an Internet search user interface*. *See also* EX1001, 5:28-30 ("The user interface…appears…in a browser window….").

FIG. 2B



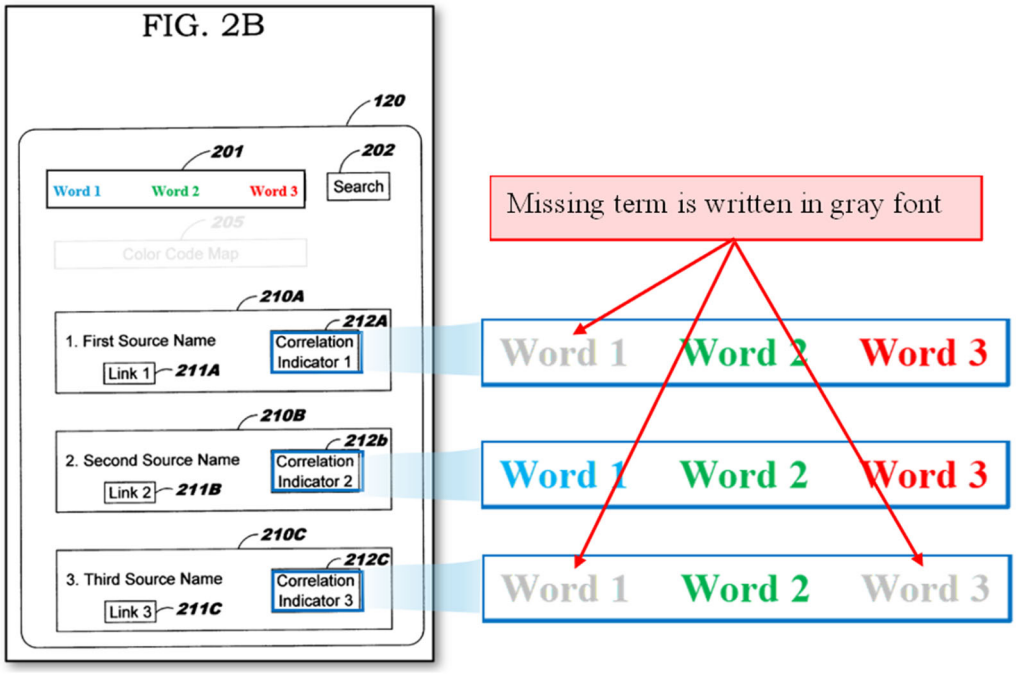
158. The correlation indicators would be displayed in one of the formats I discussed above (§§VIII.D.1.a-b). As I discussed above (§VIII.D.2), based on Brinson, the *Internet search user interface* in Bates-Brinson and Bates-Bhagat-Brinson would further include user-selectable GUI elements to designate search term(s) as mandatory. *See also infra* [**1H**] (§VIII.E.1.i).

e. [1D] wherein the Internet search user interface comprises the first Internet search result and a first warning to the search engine user that the first webpage is missing the first search term element, wherein the first warning comprises a text representing the first search term element;

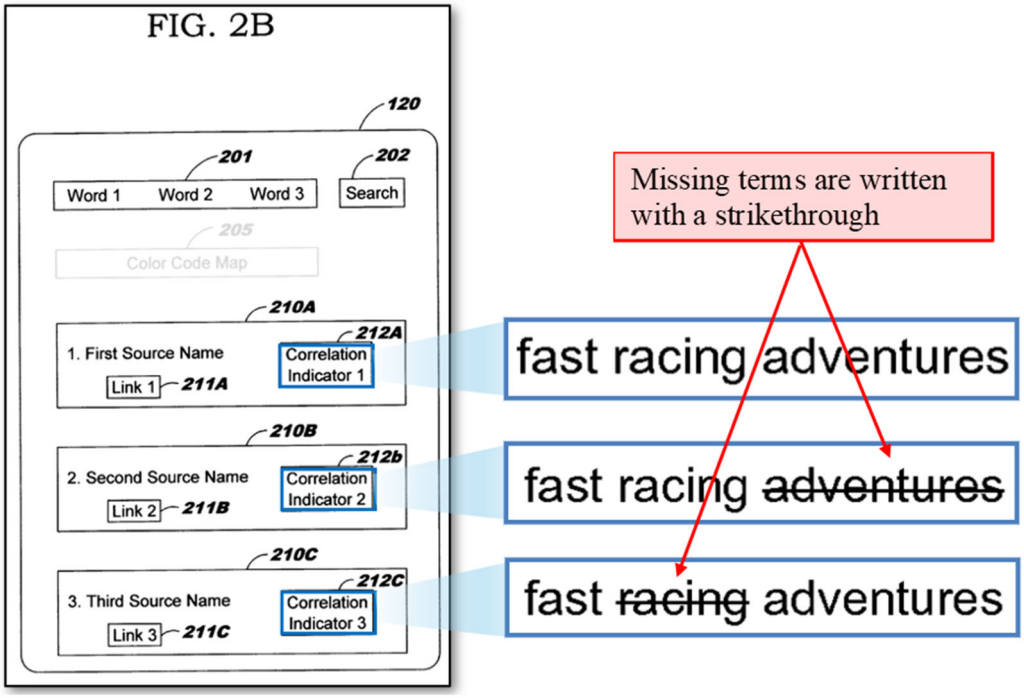
159. As I discussed above (§VIII.E.1.c, [**1B**]), Bates's *Internet search user interface comprises the first Internet search result* alongside a correlation indicator that provides *a first warning to the search engine user that the first webpage is missing the first search term element*. Bates, [0033] (*e.g.* "[i]f 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"), [0015], [0009].

160. As I discussed above (§VIII.D.1.a-b) and depict again below, the *warning* for missing terms in Bates-Brinson and Bates-Bhagat-Brinson *comprises a text representing the first* (missing) *search term element* in a grayed-out font (Bates-Brinson) or in a strikethrough format (Bates-Bhagat-Brinson).

Bates-Brinson



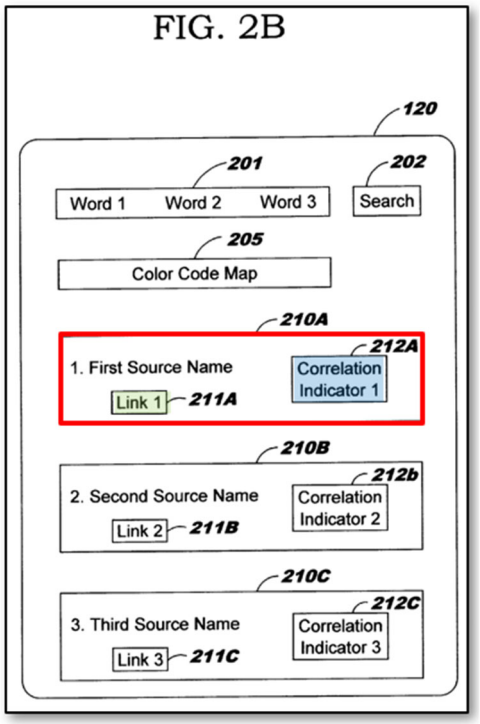
Bates-Bhagat-Brinson



f. [1E] wherein the first Internet search result is organized for display as a first search result grouping comprising a first excerpt for the first webpage, a first Internet link for the first webpage, and the first warning;

161. Bates's FIG. 2B (which I have highlighted below) shows "an image…on the display screen" for the search-results webpage. Bates, [0027]. For each *first Internet search result* that I discussed above (§VIII.E.1.c, [**1B**]), "[t]he exemplary presentation includes information about" each "web page," where that information is *organized* as a *search result grouping* (*e.g.*, the one red-boxed below) *comprising* an *Internet* "link to a [] URL 211[] that identifies the [] web page" (green) and a correlation indicator (blue), which, for *the first Internet search result* is *the first warning* that I discussed above §VIII.E.1.e ([**1D**]). Bates, [0027]-[0028].

FIG. 2B



162. In my opinion POSAs had reason and would have found it obvious also to include in each search result grouping an *excerpt for* each *webpage*. As noted above, Bates discloses that the search results webpage includes "information about" each webpage returned by the search engine. Bates, [0028]. By 2011 (and years before then) POSAs would have known as part of their background knowledge that additional information about each webpage in a search result webpage often included an *excerpt* of each webpage in a search result grouping was additional information about each webpage that was conventionally included for each search result. The '937 patent itself admits that including such excerpts were "typical" in the prior art. EX1001, FIG. 1, 2:54-61.

163. My opinion in this regard is corroborated by EX1045, which discloses as background information that "a search engine can also provide **a short excerpt from the web page**, illustrating to the user how the search string is used in the web page." EX1045, [0004].

164. My opinion in this regard is further corroborated by EX1012, which discloses as background information that in a "conventional" search engine, the "web search engine generally returns an ordered list of search result documents," which include "a title, a universal resource locator (URL) link, **and an abstract**." EX1012, [0002]. "The abstract gives a concise summary to the user that indicates

something about why the associated search result document is relevant for the particular query." EX1012, [0003].

165. My opinion is this regard is also corroborated by EX1030, which discloses that "[c]onventional Internet searches usually display **a portion of the content of the web pages in the search results**." EX1030, 18:16-19. EX1030's FIG. 14, for example, shows example search results with "brief content provided [by] the conventional search engines (known as the 'teaser text') [that] is from a small part of the page that has the best match with the query." EX1030, 18:20-43.

166. My opinion is this regard is further corroborated by EX1055, which discloses as background information that "[o]ftentimes, the search results include three pieces of information, such as a title, **a snippet**, and a link." EX1055, [0006]. "The snippet includes a small portion of the web page that often contains one or more of the search terms of the search query. Typically, the snippet includes no more than a sentence worth of text and might include one or more partial sentences." EX1055, [0006].

167. In addition to being conventional and often expected by search engine users in the prior art, POSAs had motivation to include an excerpt in Bates-Brinson and Bates-Bhagat-Brinson because an excerpt beneficially provided "some context information without clicking on each result." EX1045, [0004]. Thus, "[u]sers often use the snippets in determining which search result(s) to select." EX1055,

[0007]. Thus, POSAs had motivation to include an excerpt of each webpage in each search result grouping in Bates-Brinson and Bates-Bhagat-Brinson and would have reasonably expected success because, as I demonstrated above, including such excerpts was conventional in the prior art.

g. [1F] wherein the Internet search user interface further comprises the second Internet search result; wherein the second Internet search result is organized for display as a second search result grouping that comprises a second excerpt from the second webpage and a second Internet link for the second webpage but does not comprise any warning that any of the one or more search term elements is missing from the second webpage;

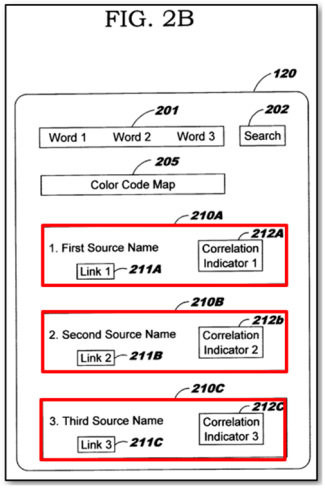
168. The *Internet search user interface comprises the second Internet search result* as I discussed above (§VIII.E.1.c, [**1B**] – Bates-Brinson Example 2, Bates-Bhagat-Brinson Example 1). Every search result displayed by *the Internet search user interface* in Bates-Brinson and Bates-Bhagat-Brinson would have been *organized for display as a search result grouping* in the same way that I discussed above for the *first Internet search result* (§VIII.E.1.f, [**1E**]). Thus, the *user interface further comprises the second Internet search result* that I discussed above (§VIII.E.1.c, [**1B**]), which would have been *organized for display as a second search result grouping that comprises a second excerpt from the second webpage and a second Internet link for the second webpage*, for the same reasons I explained above for the first Internet search result. Bates, FIG. 2B, [0027]-[0028].

169. As I discussed above (§VIII.E.1.c, [**1B**]), each example *second Internet search result* is **not** missing any search term and, thus, the search result grouping for a *second Internet search result* will **not** *comprise any warning that any of the search term elements is missing from the second webpage*—rather, its correlation indicator will display each search term element in its assigned-color font (Bates-Brinson) and/or without strikethrough (Bates-Bhagat-Brinson).

h. [1G] wherein the first and second search result groupings are each a unique search result grouping displayed separately from each other;

170. As illustrated in Bates's FIG. 2B (which I have highlighted below), each *search result grouping* (red) – including *the first and second search result groupings* that I discussed above in [**1E**]-[**1F**] (§§VIII.E.1.f-g) – is *a unique search grouping displayed separately from each other*. Bates, [0027] ("The exemplary presentation includes information about a first web page 210A, information about a second web page 210B, and information about a third web page 210C found by the search.").

FIG. 2B

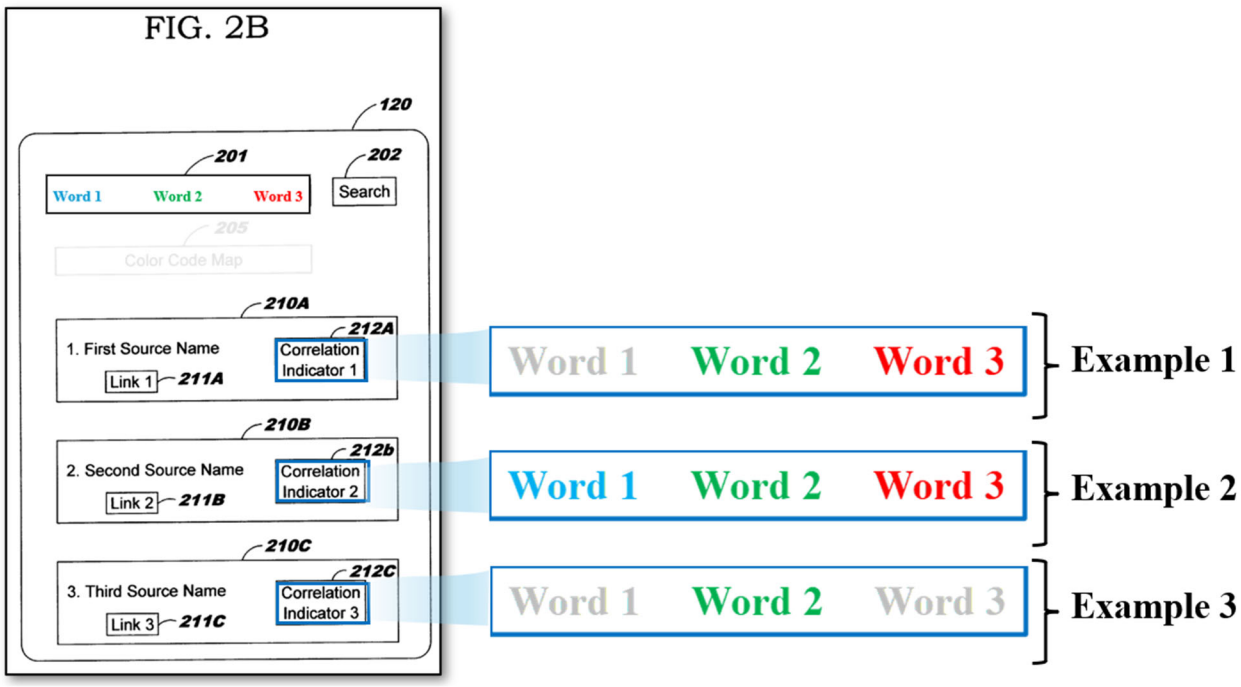


i. [1H] wherein the Internet search user interface provides a filtering option, wherein the search engine user's selection of the filtering option causes an updated Internet search user interface to be generated and provided for display on the personal computing device, and wherein the updated Internet search user interface does not display the first Internet search result; and

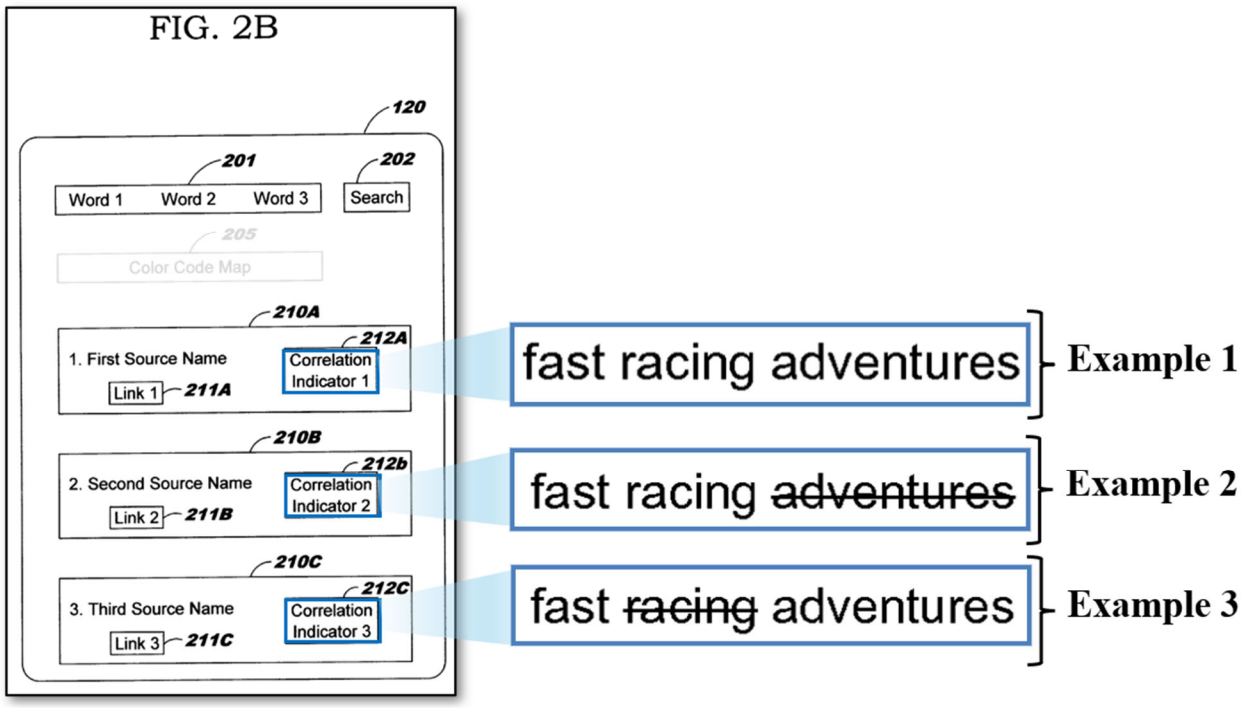
171. As I discussed above (§VIII.D.2), *the Internet search user Interfaces* in Bates-Brinson and Bates-Bhagat-Brinson would have included user-selectable GUI elements (*e.g.*, clickable buttons, text, and/or pop-up windows) that allow users to designate a search term as "required" (*i.e.*, mandatory), based on Brinson. *See also supra* §VIII.E.1.a ([**1PRE**]). As I also discussed above (§VIII.D.2; 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.

172. Thus, Brinson's functionality to designate a search term as required *provides a filtering option* that, when the user selects it, *causes an updated Internet search user interface to be generated and provided for display on the* terminal (*personal computing device*) because all search-result webpages missing the now-mandatory term will be removed from being displayed.

173. In the Bates-Brinson example below (§VIII.D.1.a), *the updated user interface* will *not display the first Internet search result* (Example 1 or 3 below) if the user selects "Word 1" as mandatory because those results are missing that term (as indicated by the term being written in a faded-gray font).



174. Likewise, in the Bates-Bhagat-Brinson example below (§VIII.D.1.b), *the updated user interface* will *not display the first Internet search result* (Example 2 below) if the user selects "adventures" as mandatory or will not display *the first Internet search result* (Example 3) if the user selects "racing" as mandatory because that result is missing that term (as indicated by the term being written in a strikethrough font).



175. 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 (§VIII.D.2), where the user selects filtering criteria that is then applied to a subsequent search executed by the user. But if claim 1 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 would have provided additional user convenience (*e.g.*, the added convenience of not requiring the user to select multiple filter buttons before the system updates the search results to reflect the user's selection of a mandatory term).

176. 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 (§VIII.D.2), 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].

177. 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, 9:1-15. 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 I discussed above (§VIII.B), the search results related to each historical search query in Bhagat 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 with a strikethrough) *to be removed from being displayed on the search results webpage on the computing device*.

178. 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 (§XI.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").

179. 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 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.

180. 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].

181. 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].

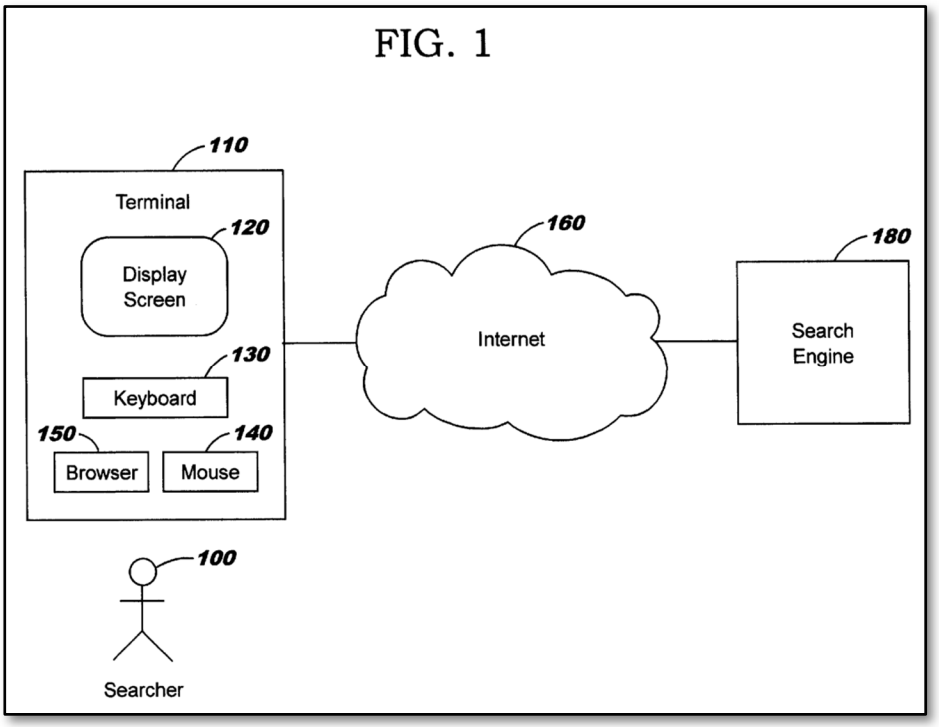
182. Thus, claim 1 would have also been obvious over Bates-Brinson and Bates-Bhagat-Brinson if the *selectable-filter-function* limitation requires the search results to be updated in response to a single click identifying a search term as a mandatory term.

j. [1I] wherein the process is performed on one or more servers located remotely from the personal computing device.

183. As Bates's FIG. 1 (below) shows, the search engine is *located remotely from the* terminal (*personal computing device*) because they connect via "the Internet." Bates, [0024]. Because Bates's search engine processes search

terms received over the Internet to "execute[] a search" (Bates, [0011]), it would have been conventional, beneficial, and obvious to implement the search engine as *one or more servers*.

184. 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.



2. Claim 15

185. Independent claim 15 recites a system whose actions largely mirror the process recited in independent claim 1. Bates-Brinson and Bates-Bhagat-Brinson meet the following limitations of claim 15 for the reasons discussed in the corresponding sections above that are identified below.

Limitation	**Addressed in Section:**
[**15PRE**]	§VIII.E.1.a ([**1PRE**]; Bates, FIG. 1 (illustrating system))
[**15A**]	§VIII.E.1.b ([**1A**]; discussing the *personal computing device*); §VIII.E.1.j ([**1I**]; discussing the *server*(*s*))
[**15B**]	§VIII.E.1.b ([**1A**]; discussing the *search request*)
[**15C**]	§VIII.E.1.c ([**1B**])
[**15D**]	§VIII.E.1.d ([**1C**]); *see also discussion below*
[**15E**]	§VIII.E.1.e ([**1D**]); *see also discussion below*
[**15F**]	§VIII.E.1.f ([**1E**])
[**15G**]	§VIII.E.1.g ([**1F**])
[**15H**]	§VIII.E.1.h ([**1G**])
[**15I**]	§VIII.E.1.i ([**1H**])

186. If limitations [**15D**]-[**15E**] requires that the *first warning* (correlation indicator) itself must be within the page transmitted to the computing device from search engine (*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 implementation of the correlation indicators in Bates-Brinson (§VIII.D.1.a) and Bates-Bhagat-Brinson (§VIII.D.1.b) 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).

187. 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].

188. 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.

189. 136. 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].

3. Claim 29

190. Independent claim 29 recites a process that largely mirrors the process recited in independent claim 1, but claim 29 requires two results (*first* and *second*) both having respective missing-term warnings and filtering options. Bates-Brinson and Bates-Bhagat-Brinson meet the following limitations of claim 29 for the reasons discussed in the corresponding sections above that are identified below.

Limitation	**Addressed in Section:**
[**29PRE**]	§VIII.E.1.a ([**1PRE**])
[**29A**]	§VIII.E.1.b ([**1A**])
[**29B**]	§VIII.E.1.c ([**1B**]; **Bates-Brinson**: Example 1 that I discussed in [**1B**] meets [**29B**]'s *a first Internet search result…missing a first search term*

	element ("Word 1"); Example 3 that I discussed in [**1B**] meets [**29B**]'s *a second Internet search result…missing a second search term element* ("Word 1" or "Word 3"); *see also infra* claim 39 (*first* and *second search term elements* can be the *same*); **Bates-Bhagat-Brinson**: Example 2 that I discussed in [**1B**] meets [**29B**]'s *a first Internet search result…missing a first search term element* ("racing"); Example 3 that I discussed in [**1B**] meets [**29B**]'s *a second Internet search result…missing a second search term element* ("adventures"))
[**29C**]	§VIII.E.1.d ([**1C**])
[**29D**]	§VIII.E.1.e ([**1D**])
[**29E**]	§VIII.E.1.f ([**1E**])
[**29F**]	§VIII.E.1.g ([**1F**]; **Bates-Brinson**: Example 3's correlation indicator that I discussed in [**1F**] provides [**29F**]'s *a second warning*;

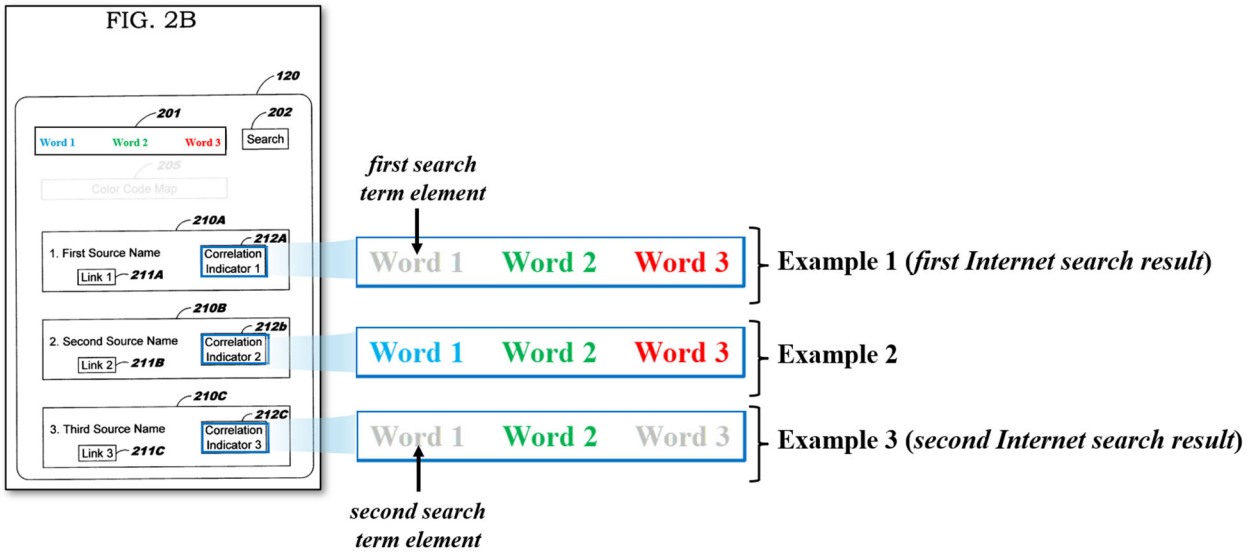
	Bates-Bhagat-Brinson: Example 3's correlation indicator that I discussed in [**1F**] provides [**29F**]'s *a second warning*)
[**29G**]	§VIII.E.1.f ([**1E**])
[**29H**]	§VIII.E.1.h ([**1G**])
[**29I**]	§VIII.E.1.i ([**1H**]; where, as I discussed above §VIII.D.2, a search term in a correlation indicator could be designated mandatory by, *e.g.*, clicking the term and selecting its weight) **Bates-Brinson**: designating "Word 1" as mandatory meets [**29I**]'s *a first filtering option* that *causes a first updated Internet search user interface* to *not display* Example 1 or Example 3 in [**1H**]; designating "Word 3" as mandatory meets [**29I**]'s *a second filtering option* that *causes a second updated Internet search user interface* to *not display* Example 3 in [**1H**]; **Bates-Bhagat-Brinson**: designating "racing" as mandatory meets [**29I**]'s *a first filtering option* that *causes a first updated Internet search user interface* to *not display* Example 2 in [**1H**]; designating "adventures" as mandatory meets [**29I**]'s *a second*

	filtering option that *causes a second updated Internet search user interface* to *not display* Example 3 in [**1H**])
[**29J**]	§VIII.E.1.j ([**1I**])

4. Claim 39

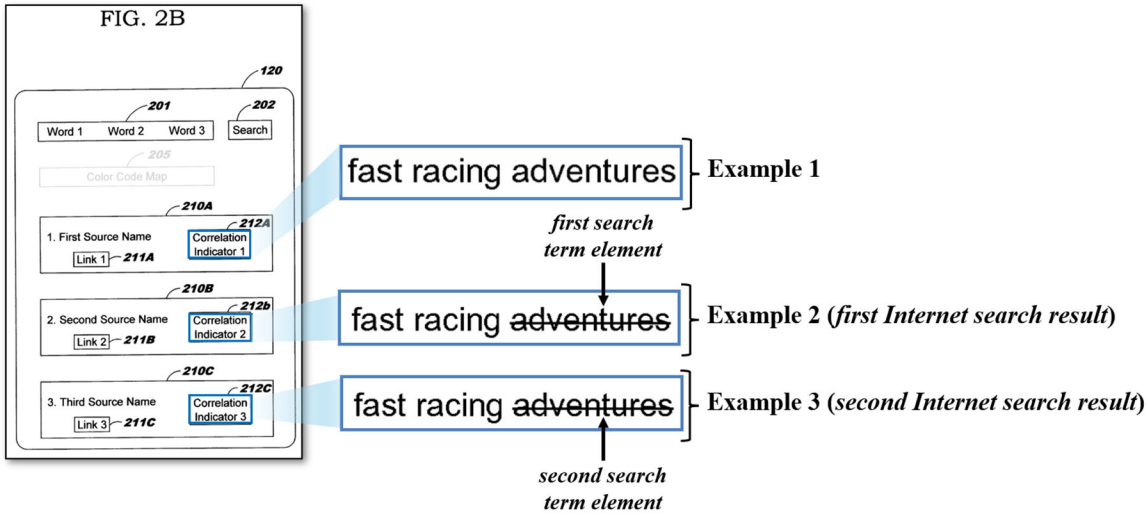
a. [39A] The process of claim 29, wherein the first search term element and the second search term element are a same search term element, wherein the first text and the second text are identical, and

191. Starting with Bates-Brinson, in the example I discussed above ([**1B**], §VIII.E.1.c) and illustrate again below, *the first search term element and the second search term element* in Examples 1 and 3 below is "Word 1," which is *the same search term element* and their respective warning *text* ("Word 1" in gray font) *are identical*.



192. For Bates-Bhagat-Brinson, though the example I discussed above for limitation [**1D**] (§VIII.E.1.e) illustrated having different *first* and *second search term elements* that are missing ("racing" in Example 2 and "adventures" in Example 3), POSAs understood it would have been obvious for *the same search term element* (with *identical* warning *text*) to be missing in two results. For example, Bhagat's example in its Figure 2 illustrates multiple search results that are missing the search term "adventures" (and multiple search results that are missing the term "racing). *See also supra* §VIII.B (explaining how POSAs would understand the strikethroughs in Bhagat's FIG. 2 to indicate that the corresponding results are missing the term in strikethrough).

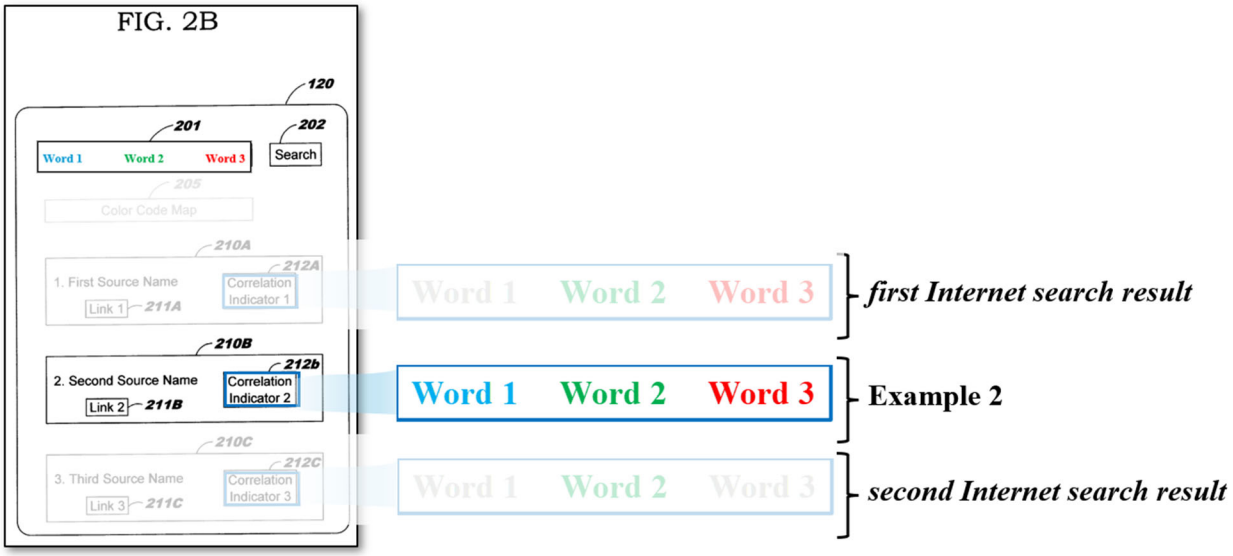
193. Thus, as illustrated below, it would have been obvious for the search term "adventures" to be missing in alternative *first* and *second* search results below (Examples 2 and 3 of the new example demonstrative below), where their respective warning text ("adventures" written in a strikethrough font) *are identical*.



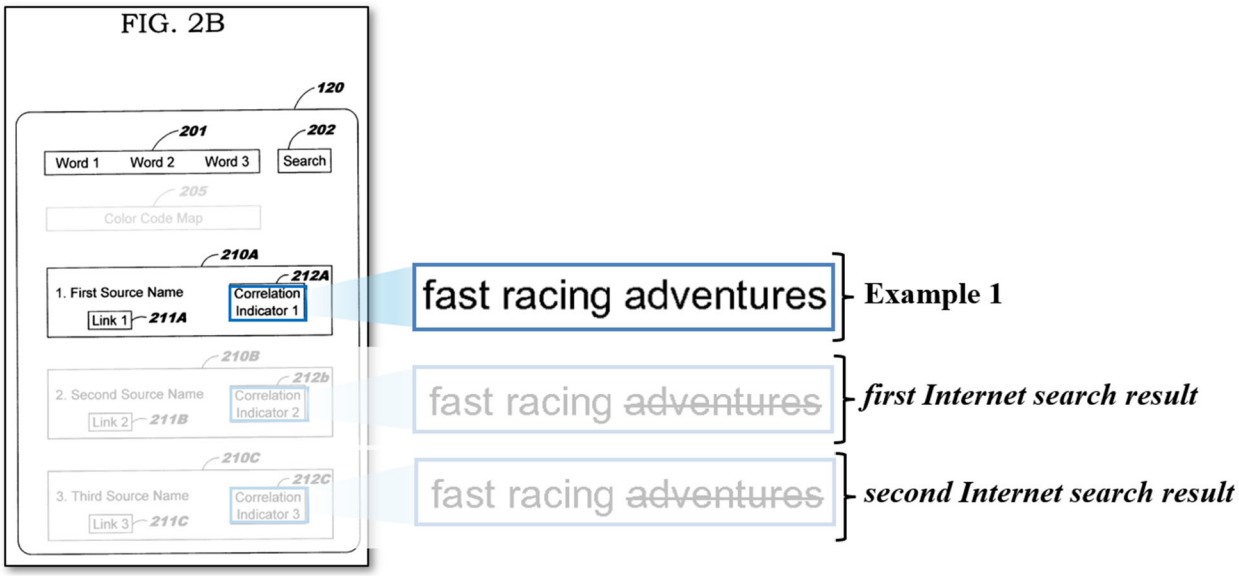
b. [39B] wherein each of the first and second updated Internet search user interfaces does not display the first and second Internet search results.

194. As I discussed above (§VIII.E.1.i, [**1H**]), *the updated Internet search user interface* removes from display *search result(s)* missing *the first search term element* because the example filter process designates that term as mandatory. Thus, in limitations [**39A**]'s examples *the first* ***and*** *second Internet search results* would ***not*** be *displayed* in *the first and second updated user interfaces* because they are missing the designated search term. For example, in the example Bates-Brinson discussed above ([**39A**]), "Word 1" is missing from search results Example 1 and Example 3 and thus, as illustrated below, those search results would not be displayed in the *updated Internet search user interface*. Similarly, in the example Bates-Bhagat-Brinson discussed above ([**39A**], §VIII.E.4.a), "adventures" is missing from search results Example 2 and Example 3 and thus, as illustrated below, those search results would not be displayed in the *updated Internet search user interface*.

Bates-Brinson:



Bates-Bhagat-Brinson:



IX. GROUND 1B: THE GROUND 1A COMBINATIONS IN VIEW OF MEHTA RENDER OBVIOUS CLAIMS 2-8, 13-14, 16-22, 27-28, AND 30-38

195. Ground 1B challenges dependent claims 2, 16, and 30 (and their dependent claims 3-8, 13-14, 17-22, 27-28, and 30-38), which require *a selectable advertisement that is related to at least some of the one or more of the search term elements* (hereinafter "the *selectable-advertisement* limitation"). As the '937 patent concedes (and POSAs would have independently understood), including such selectable advertisements was "common" in the art. EX1001, 2:66-3:3, FIG. 1.

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

A. Mehta (EX1008)

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

198. 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].

199. 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.

200. 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.*

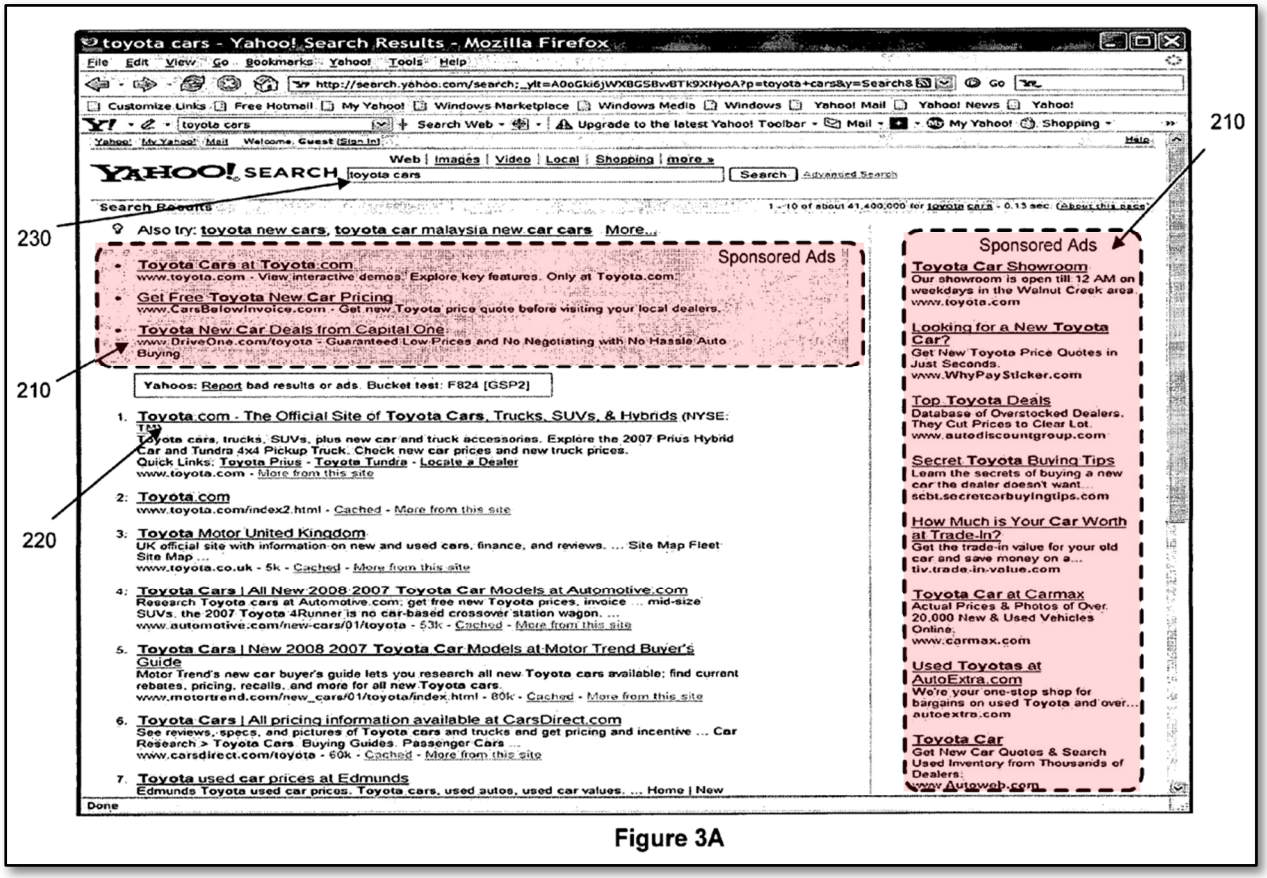


Figure 3A

B. The Bates-Based Mehta Combinations

201. Mehta demonstrates that displaying "relevant advertisement[s]" alongside search results was known. Mehta, [0005]. The '937 patent itself recognizes this fact too. EX1001, 2:66-3:3, 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 advertises 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").

202. 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-Brinson and Bates-Bhagat-Brinson)—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 the search-engine interfaces in Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta. Mehta, [0005]-[0006]; *see also* EX1017, [0006]; EX1018, 1:25-30 ("[T]he user can be presented with **advertisements related to the search query**.").

203. 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.

C. Mapping to Challenged Claims

1. Claim 2: The process of claim 1, wherein the Internet search user interface further comprises a selectable advertisement that is related to at least some of the one or more of the search term elements.

204. Claim 2 depends from independent claim 1, which I addressed above in Ground 1A (§VIII.E.1). Ground 1B's combinations (*i.e.*, Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta) build on Ground 1A's combinations (*i.e.*, Bates-Brinson and Bates-Bhagat-Brinson) and meet independent claim 1 for the same reasons that the Ground 1A's combinations do. *See supra* §VIII.E.1 (Ground 1A, **claim 1**).

205. Dependent claim 2 adds to claim 1 the *selectable-advertisement* limitation (which I defined above in §IX). 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 selectable "[s]ponsored *advertisements*" *related to at least* one *search term* with *selectable* links (*e.g.*, users "click[]" a link to open an advertised webpage). Mehta, [0005]-[0006]. Once augmented in this manner, the Ground 1B

combinations meet the *selectable-advertisement* limitation and render claim 2 obvious.

2. Claim 3: The process of claim 2, wherein the text representing the first search term element is shown 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.

206. As I discuss below, both Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta meet claim 3 because each of their correlation indicators *comprise text representing at least one search term element in at least one of* the *formats* recited in claim 3.[11]

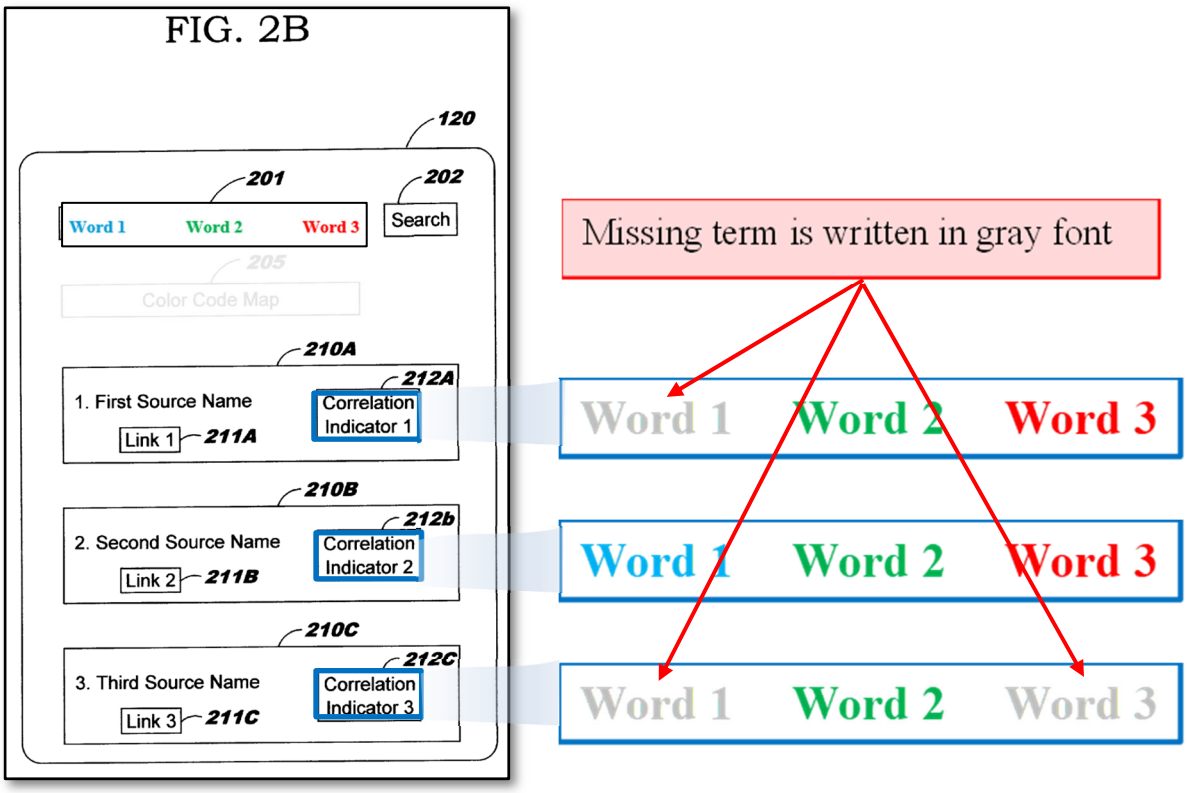
207. Starting with Bates-Brinson-Mehta, as I discussed above (§VIII.D.1.a) and illustrate again below, each missing *search term element* is written in a font "color not associated with any keyword by the color code map 205" (Bates, [0033]) (*e.g.*, muted-gray), which meets *(i) a font representing the text has been*

[11] As I discussed above, though not illustrated in these demonstratives, the GUIs below would have also included (1) (based on Brinson; §VIII.C) aspects of Brinson's (or other) known GUI elements for making a search term mandatory and (2) (based on Mehta; §IX.A) selectable advertisements related to one or more search terms.

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).

208. As I discussed above (§VIII.D.1.a), 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].

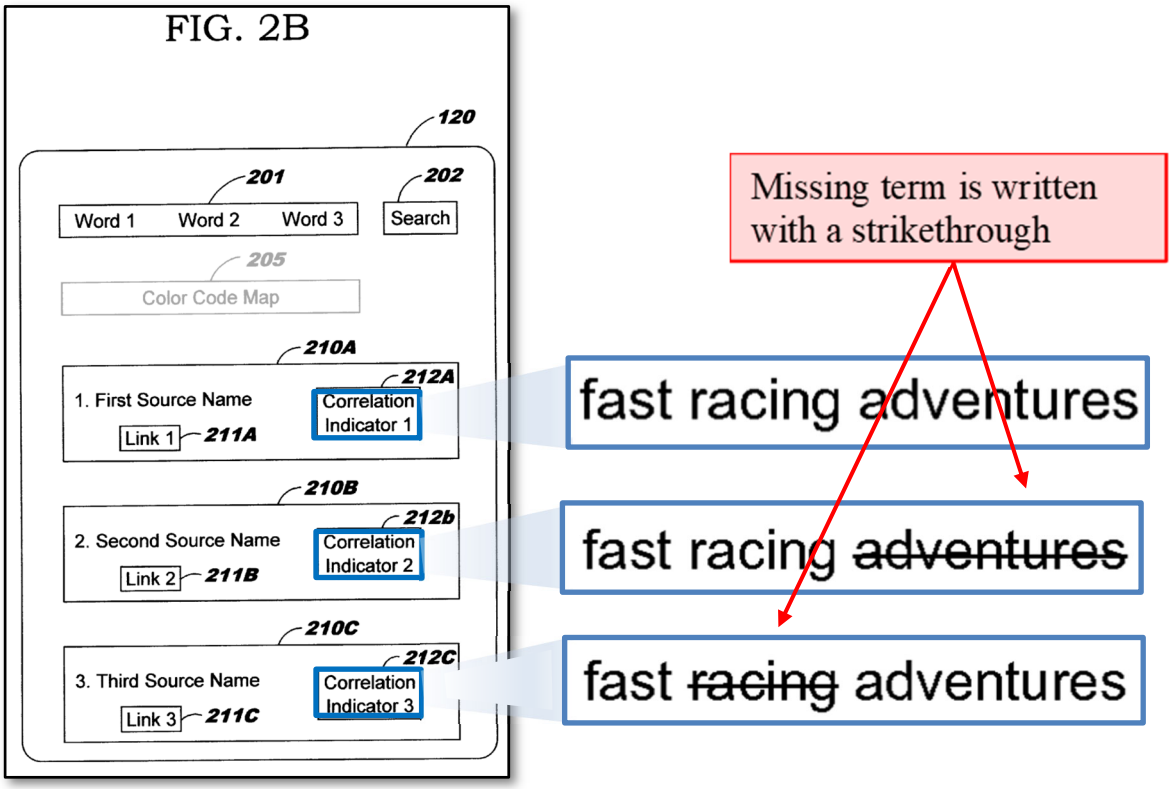
Bates-Brinson-Mehta



209. As for Bates-Bhagat-Brinson-Mehta, as I discussed above (§VIII.D.1.b) 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*.[12]

Bates-Bhagat-Brinson-Mehta



[12] The '937 patent does not explain or illustrate distinct *formats* for text having *lines merged* versus *lines superimposed thereupon*; however, POSAs understand Bate-Bhagat-Brinson-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.

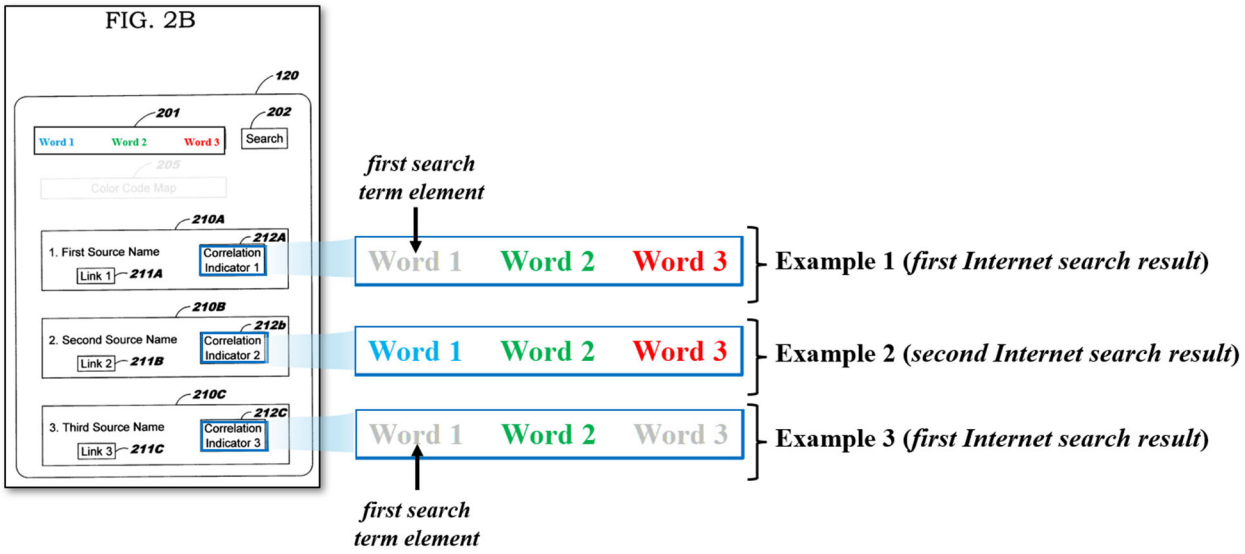
3. Claim 4: The process of claim 3, wherein the first Internet search result would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.

210. As I discussed above (§VIII.E.1.c, Ground 1A, [**1B**]), the example *first Internet search results* in Bates-Brinson and Bates-Bhagat-Brinson are missing a *first search term element*, which is displayed in gray font (Bates-Brinson-Mehta) and/or with a strikethrough format (Bates-Bhagat-Brinson-Mehta). Those results *would not have been displayed if…the search engine was operated by using an "AND" logical operation that includes the first search term element* because that search term is missing in those results and including that missing term in an "AND" logical operation would require that term to be present (a condition that those results do not satisfy). *See, e.g.*, Wang, [0002] (searches that require the search terms "is typically referred to as 'and-based searching'").

211. In the Bates-Brinson-Mehta example below, three different annotations are shown. As I discussed above (§VIII.E.1.f, Ground 1A, [**1E**]), either the first or third *search result* (Example 1 or 3 below) meets *the first Internet search result*. Both of those results are missing "Word 1" (*first search term element*) and thus neither would be displayed if "Word 1" were searched in an "AND" logical operation, as I explained above. (Alternatively, Example 3 also meets the *first Internet search result* for missing an alternative *first search term*

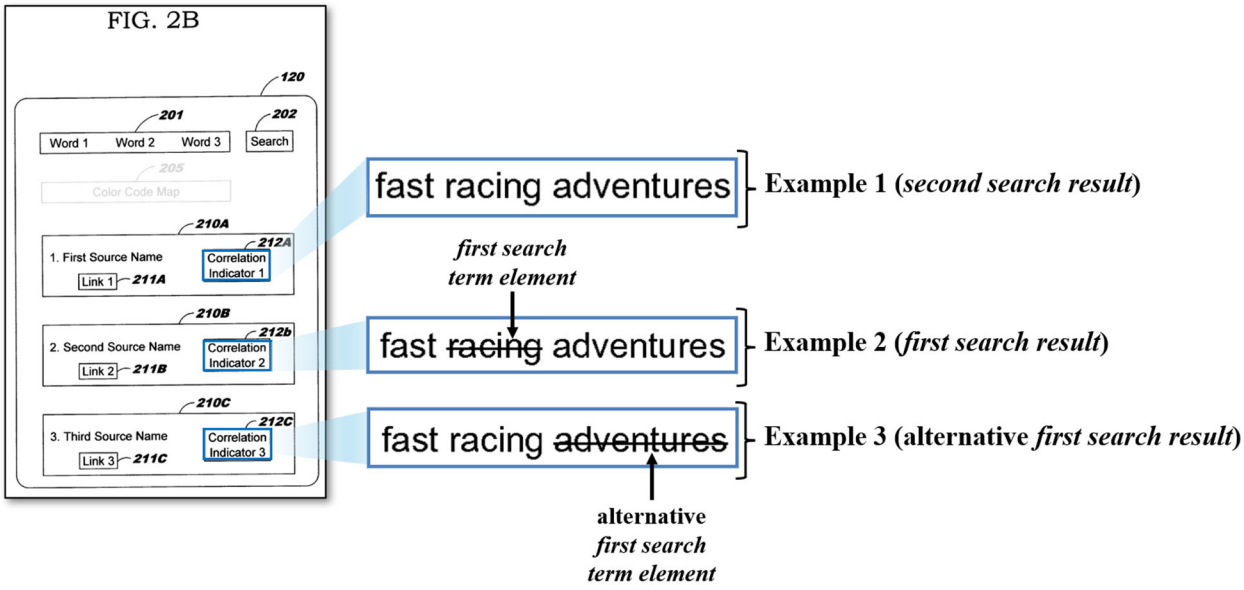
element "Word 3," and thus joining "Word 3" in an AND logical operation would also cause Example 3 not to be displayed.)

Bates-Brinson-Mehta



212. In the Bates-Bhagat-Brinson-Mehta example below, three different annotations are shown. As I discussed above (§VIII.E.1.f, Ground 1A, [**1E**]), either the second or third *search result* (Example 1 or 3 below) meets *the first Internet search result*. Those search results are missing "racing" and "adventures," respectively (their respective *first search term element*) and thus (at least) one would not be displayed if "racing" or "adventures" were searched in an "AND" logical operation. (I say "at least" one because if "racing" and "adventures" were both required by an AND operation then both Example 2 and Example 3 below would not be displayed.)

Bates-Bhagat-Brinson-Mehta



4. Claim 5: The process of claim 4, wherein the first webpage has one or more descendant webpages, wherein each of the one or more descendant webpages is also missing the first search term element, and wherein each of the one or more descendant webpages is linked directly one level from the first webpage.

213. Claim 5 recites *descendant webpages*. Per the claim language, a "*descendant webpage*" is a webpage to which a search-result webpage links; for example, if www.uspto.gov is the search-result webpage, then **www.uspto.gov/patents** is a "*descendant webpage*" because a link to this webpage is found at **www.uspto.gov**. *See also* EX1001, 10:48-11:38, FIGS. 6-7.

214. Though Claim 5 recites *descendant webpages* that are *also missing the first search term element* (*i.e.*, is missing the same term that is missing from the *first Internet search result* in [**1D**], §VIII.E.1.e) the claim does not require the process to treat the *first Internet search result* any differently when a *descendant*

webpage is also missing the search term element. For example, the claim does **not** require that the first search term's absence in the *descendant webpage(s)* impacts how *the search result that references the first webpage* is displayed.

215. POSAs understood it would have been obvious and commonplace for each *first webpage* that I discussed above (§VIII.E.1.c, Ground 1A, [**1B**]); *e.g.*, a website's homepage) to *have one or more descendant webpages* that is each *linked directly one level from the first webpage* (*e.g.*, an "about" webpage), and that each *descendant webpage is missing the* same (*e.g.*, *first*) *search term element* as *the first webpage* (*e.g.*, the term "USA" could be missing from a website's homepage **and** its *descendant webpages linked directly* therefrom). 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. As I discuss further below (§X.A), 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].

5. Claims 6 and 8

a. [6A]/[8A]: The process of claim 5/[claim 3], wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, or tablet computer's display screen, and

216. 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 includes (or at least suggests and renders obvious) *a smart phone with a smaller display screen than* the other devices recited in [**6A**]/[**8A**]–*a laptop, desktop, or tablet computer's display screen*.

217. 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. [6B]/[8B]: wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.

218. As I discussed above (§VIII.E.1.i, Ground 1A, [**1H**]), *the updated Internet search user interface* removes from display *search result(s)* missing *the first search term element* because the filtering designates that term as a mandatory term. Once that one or more result is removed from the display, a POSA would

understand that the search engine will be able to display or will cause to be displayed (from the original set of results) additional search results that are **not** missing the *first search term element*, in the display space now vacated by the removed search result(s). 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 one or more results from being displayed, additional results that satisfy the search query (and that are not missing *the first search term element*) will fill-in the space left by the removed result(s).

219. Thus, the *updated Interface user interface* will *enable the smaller display screen to display an increased number of Internet search results that each reference a webpage containing* (*i.e.*, not missing) *the first search term element 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 other results. Doing so *further speeds the search engine user's operation of Internet search* because the user can see additional relevant results in the interface, without spending time requiring scrolling and/or viewing less relevant results.

220. Thus, Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta render obvious claims 6 and 8.

6. Claim 7: The process of claim 6, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element.

221. As I discussed above (§VIII.A), in Bates's method (as implemented in Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta) *a search term element is considered present if the webpage contains the search term element* itself. For example, Bates discloses that the prior art search methods that Bates improves upon found "sources that **include**" one or more of the keywords entered by the user (*i.e.*, the webpage contains the **search term element** itself). Bates, [0006]. *See also* Bates, [0024].

222. In my opinion, POSAs had reason (and it would have been obvious) also to *consider* a search-term element to be *present if the webpage contains a synonym or a misspelled version of the search term element*. POSAs would have

recognized that considering *synonyms* and *misspelled versions* of search terms in webpages was conventional in prior-art search techniques.

223. My opinion in this regard is corroborated by EX1059, which discloses "**a search tool provides the user with the ability to search for one or both of synonyms**" of "search terms" entered by users. EX1059, [0014]-[0015]. My opinion in this regard is further corroborated by EX1060, which discloses "indexing…a webpage that includes **one or more misspelled words**" and "automatically correcting a spelling" in the index that is being searched. EX1060, [0005].

224. Thus, considering synonyms and misspelled versions would have been obvious to a POSA as the use of a known technique to improve Bates-Brinson-Mehta's and Bates-Bhagat-Brinson-Mehta's similar search-term engine in the same way as was known in POSAs' background knowledge, by beneficially ensuring that webpages were not excluded because of a spelling error and/or missing a user's keyword but including another word with the same/similar meaning. *See* EX1060, [0002] (background information that "it is desirable…to better index…webpages according to the **meaning intended by the author of the web page when**…words are **not spelled correctly** in the webpage), [0005]; EX1059, [0014]-[0015]).

7. Claim 13

a. [13A] The process of claim 2, wherein the selectable advertisement and the first search result grouping are simultaneously viewable on the display screen; and

225. Based on Mehta's Figure 3A (which I have highlighted below) and conventional search-engine interface design, Ground 1B's combinations would include "sponsored [*selectable*] *advertisements* 210 [red] rendered along with [*simultaneously viewable on the display screen* as] a plurality of *search results* 220 [blue]." Mehta, [0033].

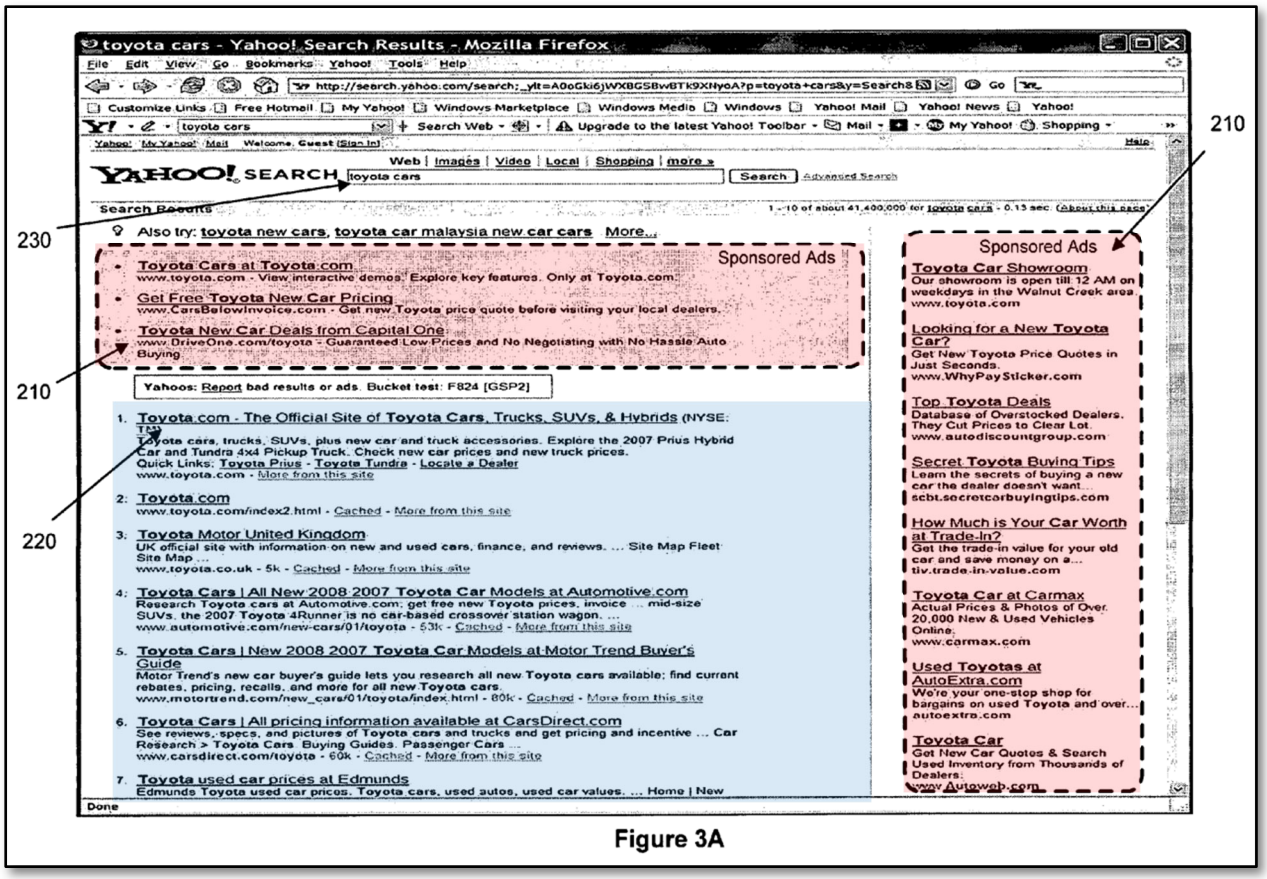


Figure 3A

226. As another example demonstrating a conventional way to display selectable advertisements in the prior art, EX1015's FIG. 3 (which I have highlighted below), shows (highlighted red below) "a first sponsored search ad area 308, [and] a second sponsored search ad area 310…in the web search results page" on the same display screen as the search results section 306 (blue). EX1015, [0032].

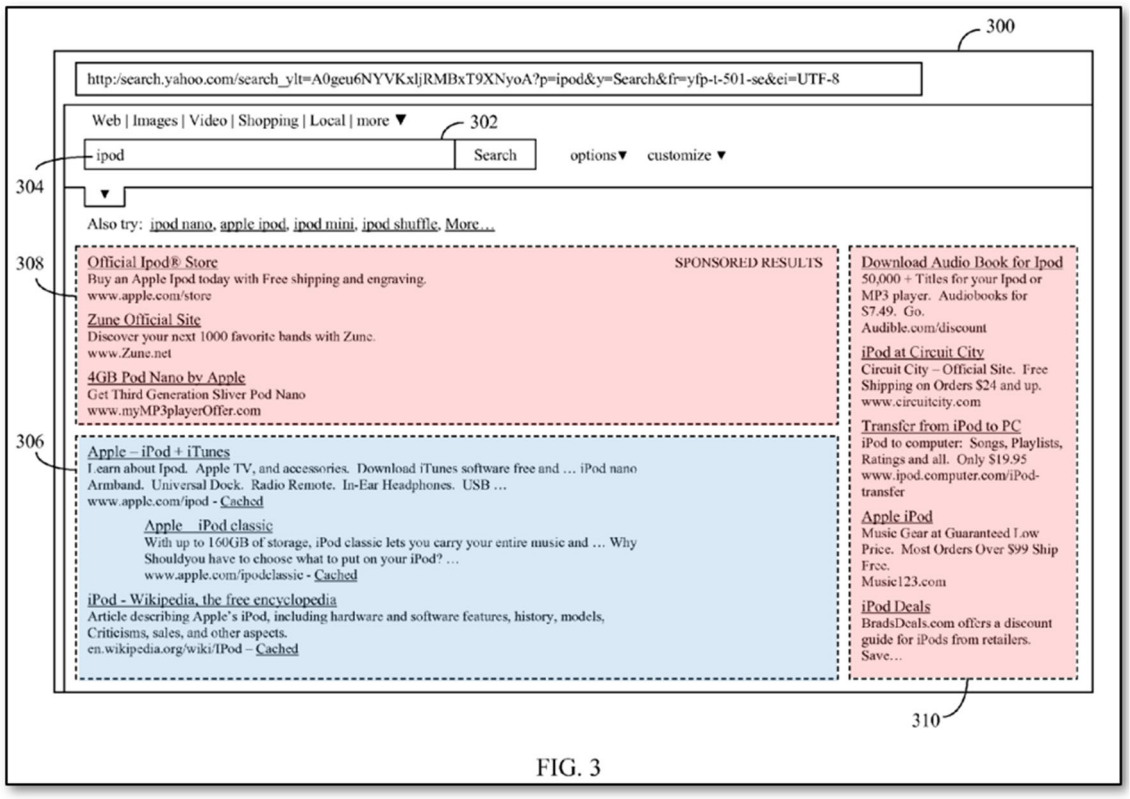


FIG. 3

227. In Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta, the search results shown on the display screen alongside the selectable advertisements would have included *the first search result groupings* that I discussed above (§VIII.E.1.e, Ground 1A, [**1D**]).

b. [13B] wherein the first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.

228. As I discussed above for **claim 4** (§IX.C.3), each example *first Internet search result grouping* in Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta are missing *the first search term element* and, thus, each example *first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element*.

8. Claim 14: The process of claim 13, wherein the selectable advertisement and the first or second search result grouping are adjacent to each other.

229. As I discussed above ([**13A**], §IX.7.a), based on Mehta and conventional search result GUI design, it would have been obvious to display *the selectable advertisement and* search results (including *the first and/or second search results*) *adjacent to each other* (*e.g.*, advertisements above and/or alongside search results as illustrated in Mehta's FIG. 3A and EX1015's FIG. 3). *See also* EX1001, FIG. 1, 2:66-3:3 (describing FIG. 1 as illustrating a "common" search-result webpage GUI where advertisements 106 and 107 are displayed adjacent the search results).

9. Claims 16-22, 27-28, and 30-38

230. Bates-Brinson-Mehta (§IX.B) and Bates-Bhagat-Brinson-Mehta (§IX.B) meet the limitations added by the claims below for the reasons that I discussed in the corresponding sections above that are identified below.

Claims	Addressed in Section:
16/30	§IX.C.1 ([**claim 2**])
17/31	§IX.C.2 ([**claim 3**])
18/32	§IX.C.3 ([**claim 4**]; for claim 32 see also §VIII.E.3 ([**29B**] (where I identified a *second Internet search result* that is missing *the second search term element*))
19/33	§IX.C.4 ([**claim 5**])
20/22/34/36	§IX.C.5 ([**claim 6**])
21/35	§IX.C.6 ([**claim 7**])
27/37	§IX.C.7 ([**claim 13**]; for claim 37 see also §VIII.E.3 ([**29B**] (where I identified a *second Internet search results* that is missing *the second search term element*))
28/38	§IX.C.8 ([**claim 14**])

X. GROUND 1C: THE GROUND 1B COMBINATIONS IN VIEW OF NAICK RENDER OBVIOUS CLAIMS 9-12 AND 23-26

231. Ground 1C challenges dependent claims 9 and 23 (and their dependent claims 10-12 and 24-26), each of which directly (or via dependency) require that that the **absence** *of a warning that a search term element[] is missing…indicates that the…search term is contained in…the descendant webpages…linked directly one level from the second webpage* (which I will refer to as "the *descendant-webpage* limitation"). In other words, the *warning* that indicates a search term is missing is not generated if the search term is present in a *descendant webpage linked directly one level from* the referenced webpage.

232. As I discussed above in claim 5 (§IX.C.4), per the claim language, a "*descendant webpage*" is a webpage to which a search-result webpage directly links; for example, if www.uspto.gov is the search-result webpage, then www.uspto.gov/patent is a "descendant webpage" because a direct link to this webpage is found at www.uspto.gov. *See* EX1001, 10:48-11:38, FIGS. 6-7.

233. Searching descendant webpages based on a user's keyword search was known by 2011, as I discussed above in §V.B, discussing EX1041 and EX1042. *See, e.g.*, EX1041, 3:14-32; EX1042, p. 9. Furthermore, I searched descendant webpages myself as I described in the section on my qualifications regarding my 2000 publicly available paper describing visualization of web histories. In that paper, we described a visualization of a person's history of

browsing the web. It generated a visual tree showing pages that were visited by following links from other pages (*i.e.*, descendant webpages). Then the system supported searching not only the current page but also the descendant webpages in the visualization.

234. As I discuss below (§X.B), POSAs would have had reason to incorporate such known functionality into Ground 1B's combinations (Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta), thereby rendering claims 9-12 and 23-26 obvious to a POSA (*see* §X.C).

A. Naick (EX1009)

235. Naick is a US patent application publication that published in 2006 (cover code (43)) from an application filed in 2004 (cover code (22)).

236. Naick concerns "query based Internet searching." Naick, [0001]. Naick teaches that some "conventional search systems fail to return web sites that may contain the requested information" because the website "do[es] not have all search terms located on **a single page** of the site." Naick, [0004]. A website may be relevant to the user's query, but because no single page on the website includes all the search terms, it is not returned as a search result, which prevents the user "from receiving possibl[y] relevant information." Naick, [0004]; [0023].

237. Naick addresses this potential deficiency by disclosing "query based searches that provide results wherein at least one of the query terms…may appear

on a different page of a web site or domain." Naick, [0005], [0018] ("A web site…is generally assigned a domain name, such as 'www.ibm.com.'"). With Naick's search, "grouped pages may be evaluated as a single searchable entity, and search results may be grouped according to domain." Naick, [0006]. Naick's search technique evaluates a keyword index that "hold[s] and compare[s] domain information *i.e.* web site information rather than web page information." Naick, [0021]. Thus, rather than indexing search terms only for individual webpages, Naick indexes search terms based on their presence in at least one of multiple, related webpages from the same website.

238. As shown in Naick's Figure 5A (highlighted below left), search results initially display only the relevant website's homepage/top-level domain (*e.g.*, "http://www.a+painters.com" highlighted red). Naick, [0025]-[0026], [0018]-[0019] (explaining that "other pages within a web site" are identified by "follow[ing] links to other pages on a home page"). Clicking the "+/– icon" (green) shows descendant webpages (highlighted blue in Figure 5B below right) that contributed to the top-level website being identified in the results, *i.e.*, Naick can display the descendant webpages that contained one or more of the search terms. Naick, [0002].

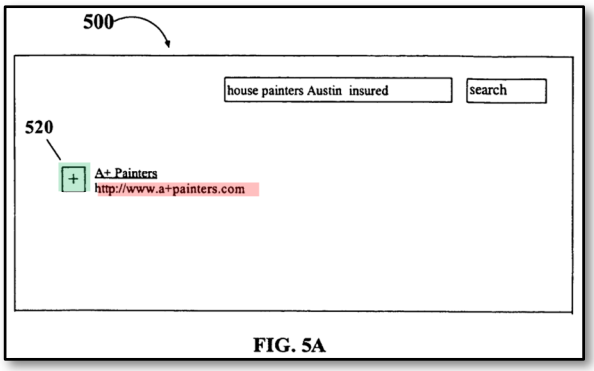


FIG. 5A

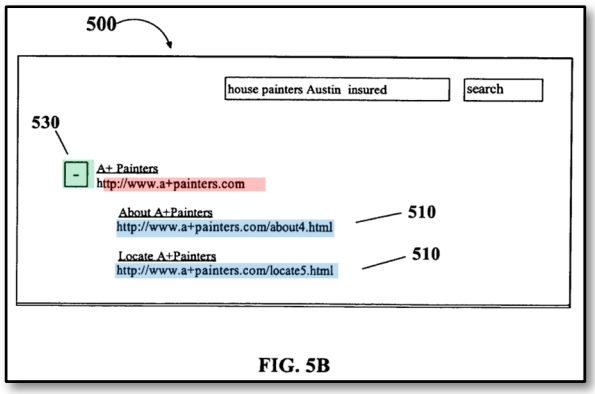


FIG. 5B

B. The Bates-Brinon-Mehta-Naick and Bates-Bhagat-Brinon-Mehta-Naick Combinations

239. Naick teaches that providing search results based only on matching keywords for individual webpages, rather than considering related webpages within the same website, may fail to provide the user and miss "possibl[y] relevant information." Naick, [0004]-[0005]. Thus, POSAs would have had motivation to include in Ground 1B's Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta systems the ability to identify potentially relevant results based on whether search terms are found on the webpage itself or a related webpage (*e.g.*, a website's homepage and descendant webpages). In these Ground 1C combinations (which I will refer to as "Bates-Brinson-Mehta-Naick," "Bates-Bhagat-Brinson-Mehta-Naick," or "Ground 1C Naick combinations"), based on Naick's teaching, Bates's search engine would have identified a webpage as relevant based on the presence of keywords in the webpage itself and/***or*** in its descendant webpage(s).

240. Naick says "domains with all or most search terms located on a homepage or root node of a web site may be returned first" and "[d]omains with

terms located a distance apart may be returned further down the result list." Naick, [0027]. Because Naick is contrasting sites with all search terms on a single page with sites where search terms are "located a distance apart," POSAs understood that "distance" in this context refers to the number of link "hops" required to travel between webpages of the web site to find the search terms.

241. Naick also teaches that "[a] user may set search parameters to include or discard results based on distance between search terms within a domain." Naick, [0027]. POSAs understood that means that the number of descendant-webpage levels to search for a term missing from the initial page (*i.e.*, the "distance between search terms") was a design option (*e.g.*, searching just descendant webpages one link away from the parent page versus including multiple descendant levels).

242. In Ground 1C's Naick combinations, POSAs would have been motivated to provide implementations in which the search engine searches only one descendant level, as POSAs knew this would have been a reasonable design tradeoff that may be desirable in situations where speed (*i.e.*, reducing the number of levels to aggregate and search across) was prioritized over finding all potentially relevant websites (*e.g.*, by searching all possible descendant levels). Making a tradeoff between speed and breadth of search would have been a well-understood design tradeoff to POSAs. POSAs understood that a line would have to be drawn

somewhere for how many descendent levels to search and that searching one descendent level would have been a reasonable design choice.

243. My opinion that POSAs would have found the number of descendant webpage levels to search to be a well-understood design choice is corroborated by EX1058. EX1058 is a publication of a U.S. patent application that published in 2006 (cover code (43)) from an application filed in 2005 (cover code (22)). EX1058 relates "to a method of retrieving information." EX1058, [0006]. EX1058's "process retrieves data and data structures" that "concern the URL's which should form the basis of the retrieval and the key words which should be search for once the page referenced by the URL has been retrieved." EX1058, [0056]. EX1058 searches for keywords in a URL (*e.g.*, a webpage) and URLs at "hyperlinks from the URL." EX1058, [0056]. The "depth to which hyperlinks from the URL should be followed" (and "whether hyperlinks should be followed if they are outside the domain of the starting URL") is a configurable parameter. EX1058, [0056]; *see* FIG. 8, [0067] ("An interface 706 is for inputting the depths to which hyperlinks in the URL should be followed by the fetch node 1024."), [0059]-[0060] (describing "the logic for retrieving one page of data from a network" and "the process" for how "the list of key words to be searched within the extracted text is retrieved").

244. Searching webpages that are only one level away from a starting webpage would have also been consistent with Naick's Figure 5B, which only depicts descendant webpages (*e.g.*, "http://www.a+painters.com/about4.html") that are one level away from the referenced webpage ("http://www.a+painters.com/"), which teaches or at least suggests that they are linked one level away from the homepage. Naick, [0024]-[0025].

245. In my opinion, POSAs would have reasonably expected success in Bates-Brinson-Mehta-Naick and Bates-Bhagat-Brinson-Mehta-Naick because Naick says its "[s]earch logic may be substantially similar to that of conventional search systems" (Naick, [0026]) and only requires a "search engine," like Bates's, with "conventional components" (Naick, [0028]-[0029]).

C. Mapping to Challenged Claims

1. Claims 9 and 23

246. Claims 9 and 23 depend, respectively, from dependent claims 3 and 17, which were claims that I discussed above in Ground 1B (§§IX.C.2, .9). Ground 1C's combinations build on Ground 1B's combinations (*i.e.*, Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta) and meet claims 3 and 17 for the same reasons Ground 1B's combinations do. *Supra* Ground 1B (§§IX.C.2, .9).

a. [9A]/[23A]: The process of claim 3[/claim 17], wherein the first webpage has one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first referenced webpage; and

247. As I discussed above for Ground 1B, **claim 5** (§IX.C.4 above; citing corroboration), POSAs understood it would have been obvious and commonplace for each example *first webpage* to *ha[ve] one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first referenced webpage* (*e.g.*, all webpages from the same multi-webpage website missing the same search term).

b. [9B]/[23B]: wherein the second webpage is missing a second search term element, wherein the second webpage has one or more second descendant webpages, wherein the second search result grouping not comprising any warning that any of the one or more search term elements is missing from the second referenced webpage indicates that the second search term element is contained in at least one of the one or more second descendant webpages, and wherein each of the one or more second descendant webpages is linked directly one level from the second webpage.

248. For the same reason that it would have been obvious and commonplace for the first webpage to have descendant webpages, it would have

been obvious and commonplace for each example *second webpage* to have *descendant webpages*.

249. Ground 1C's Naick combinations build on Ground 1B's combinations (*i.e.*, Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta), and therefore includes the *annotations* used in either the Bates-Brinson or Bates-Bhagat-Brinson combination, respectively. *See supra* §VIII.E.1.e. Ground 1A, [**1D**] (discussing the annotations in each combination). Based on Naick, these *annotations* for a webpage also consider the presence or absence of search-term elements in the webpage's descendant webpage(s). Naick, [0004]-[0006], [0022]-[0023]. As I also discussed above in §X.B, POSAs would have had reason to limit the search to only search descendant webpages that are linked directly one level from the referenced webpage. Thus, when *the second webpage is missing a second search term element*, the absence of *any warning* would *indicate that the second search term element is contained in at least one…descendant webpage[]…linked directly one level* therefrom.

250. Therefore, the Ground 1C's Naick combinations meet and render obvious claims 9 and 23.

2. Claims 10-12, and 24-26

251. Ground 1C's Bates-Brinson-Mehta-Naick and Bates-Bhagat-Brinson-Mehta-Naick combinations meet the limitations added by the claims below for the reasons discussed in the corresponding sections above that are identified below.

Claim(s)	Addressed in Section(s):
10/24	§IX.C.5 ([**claim 6**])
11/25	§IX.C.6 ([**claim 7**])
12/26	§VIII.E.4.a ([**39A**])

XI. GROUND 2A: WANG-MILLS-BRINSON RENDERS OBVIOUS CLAIMS 1, 15, 29, AND 39

A. Wang (EX1005)

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

253. 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.

254. 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.[13] Wang, [0001]-[0002].

255. 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

[13] In Wang, "documents" include Internet webpages. Wang, [0030].

any three of the above words to be included on the results list." Wang, [0014], [0031].

256. Wang's Figure 5 (below) illustrates "a search-results list from a search engine performing relaxed searching." Wang, [0053].[14] In the Figure 5 example, a 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

[14] 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 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."

result's title, URL, or summary text. Wang, [0053]. POSAs would have understood that it was conventional in prior art search engines to bold 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").

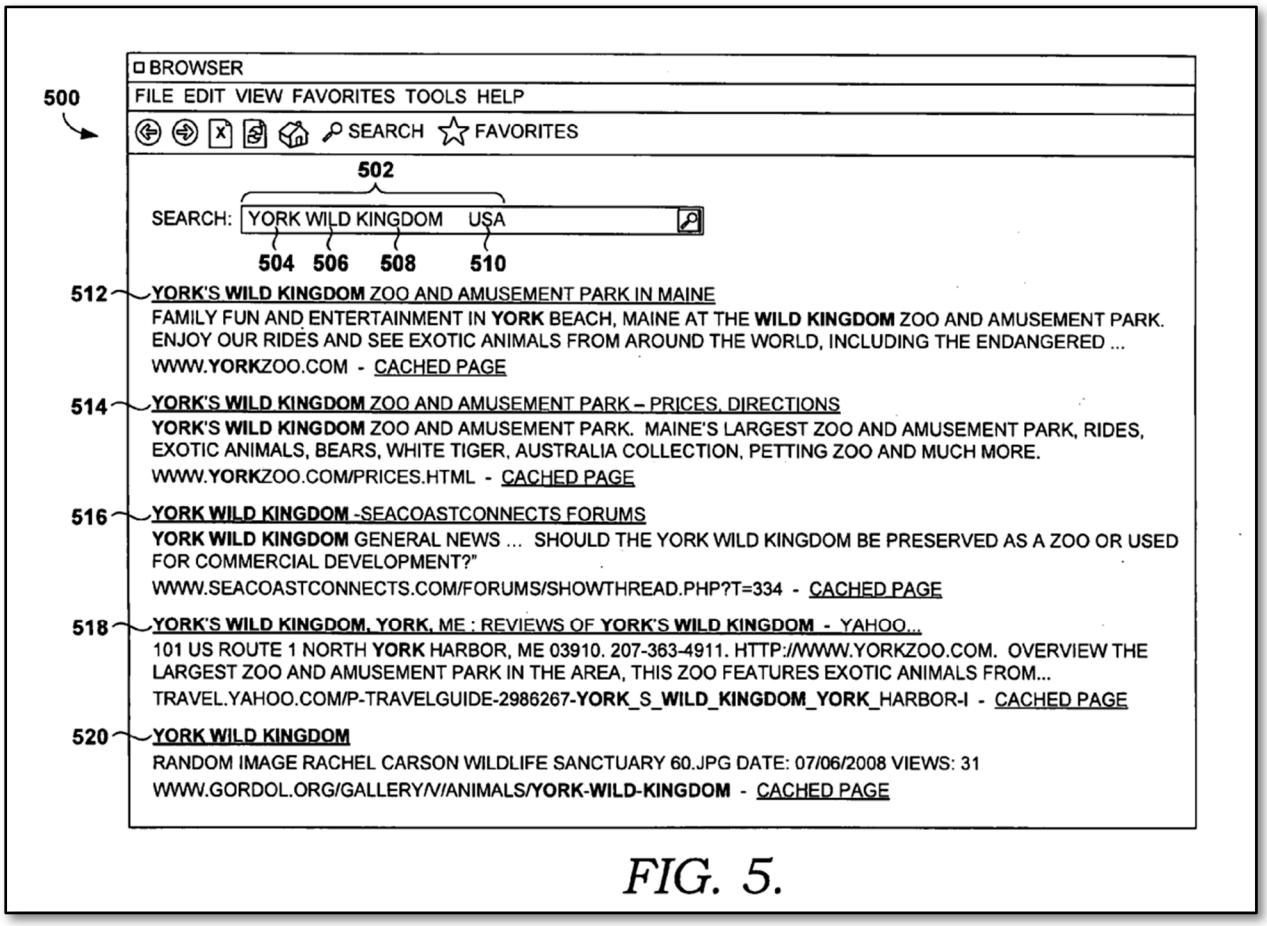


FIG. 5.

257. 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).

258. 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.

259. 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.

260. 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.

261. As I discuss further below (§XI.C.1), 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)

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

263. 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.

264. 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.

265. 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.

266. 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."

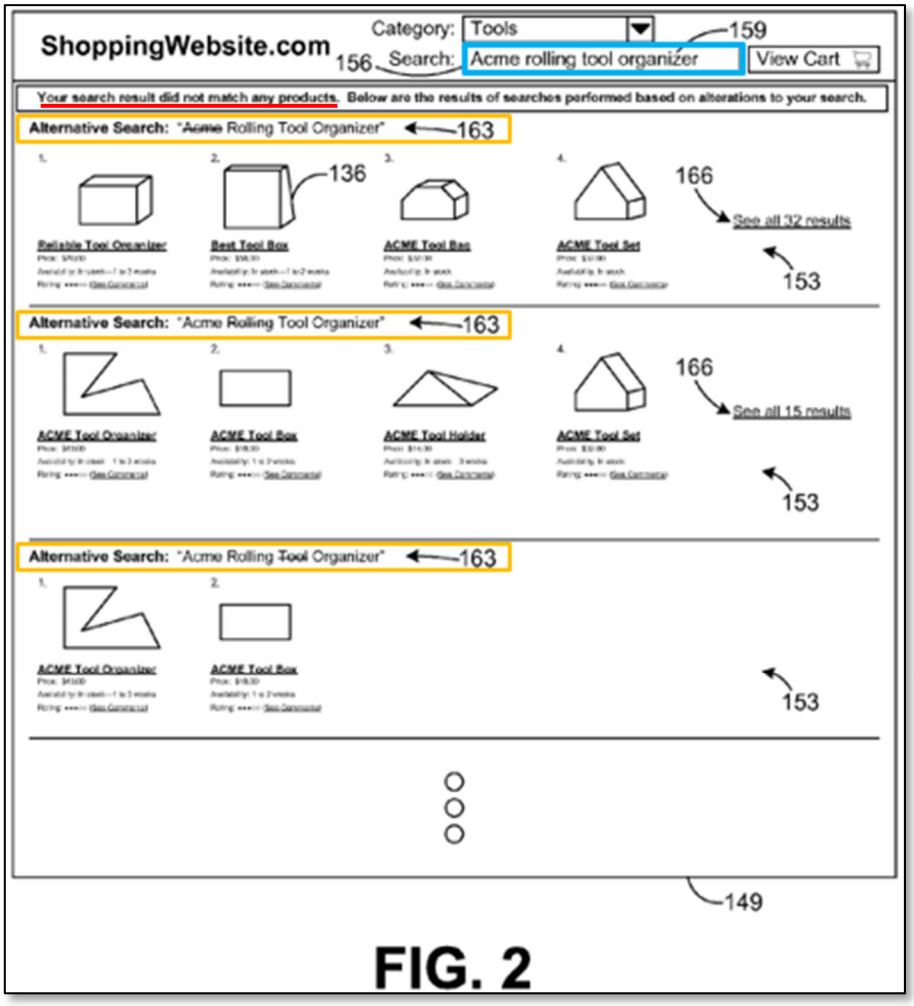


FIG. 2

267. 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."

268. "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.

269. 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.

270. 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.

271. 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 is 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.

272. 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].

273. 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].

274. 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-Brinson Combination

1. Annotating search results with search-term text based on Mills

275. 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.

276. 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).

277. 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.

278. 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.

279. 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.

280. 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").

281. 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 (§XI.A), but (without Mills) Wang does not indicate to the user which search terms have been removed for each broadened search result.

282. As I discussed above (§XI.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.").

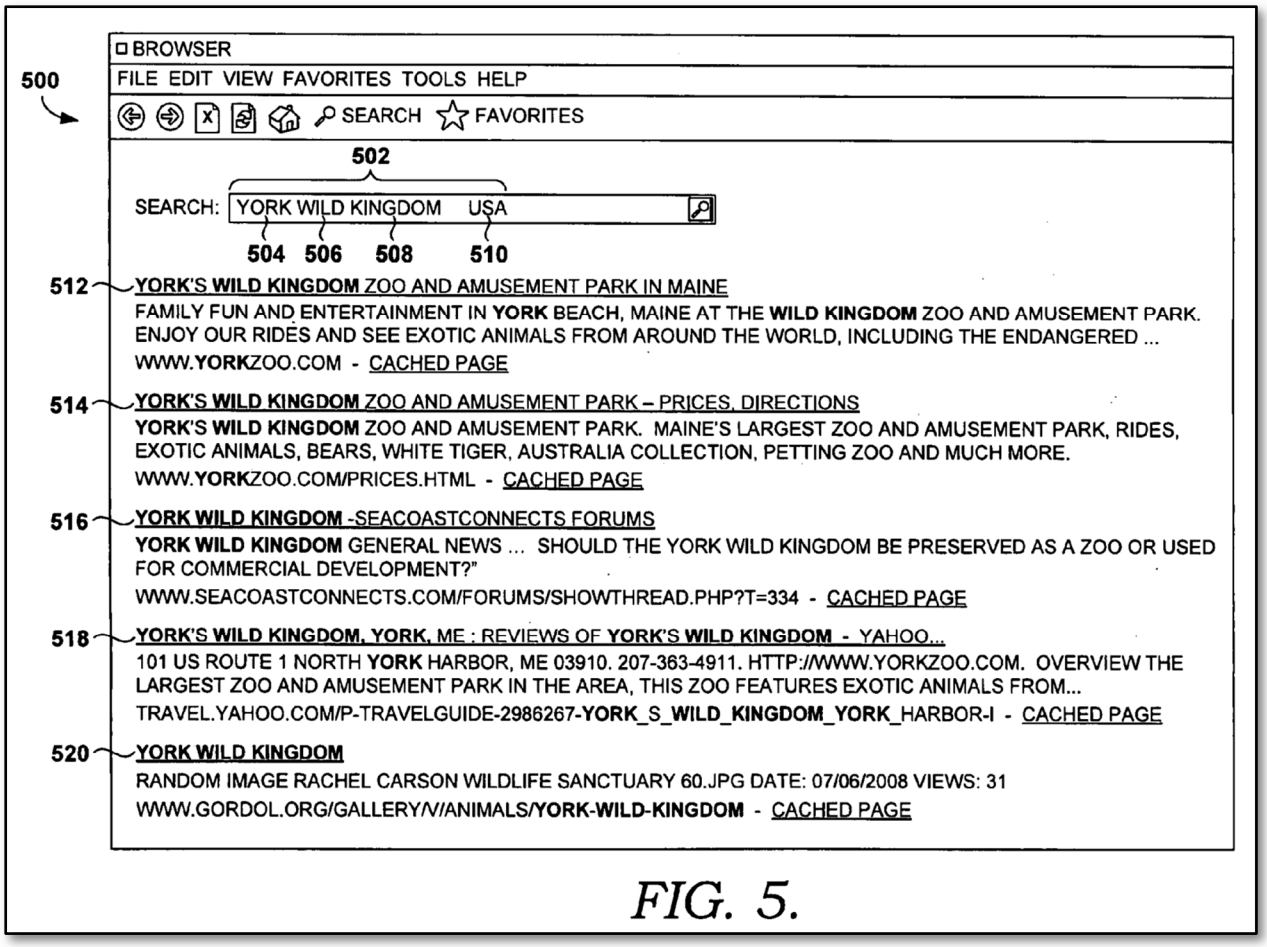


FIG. 5.

283. 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).

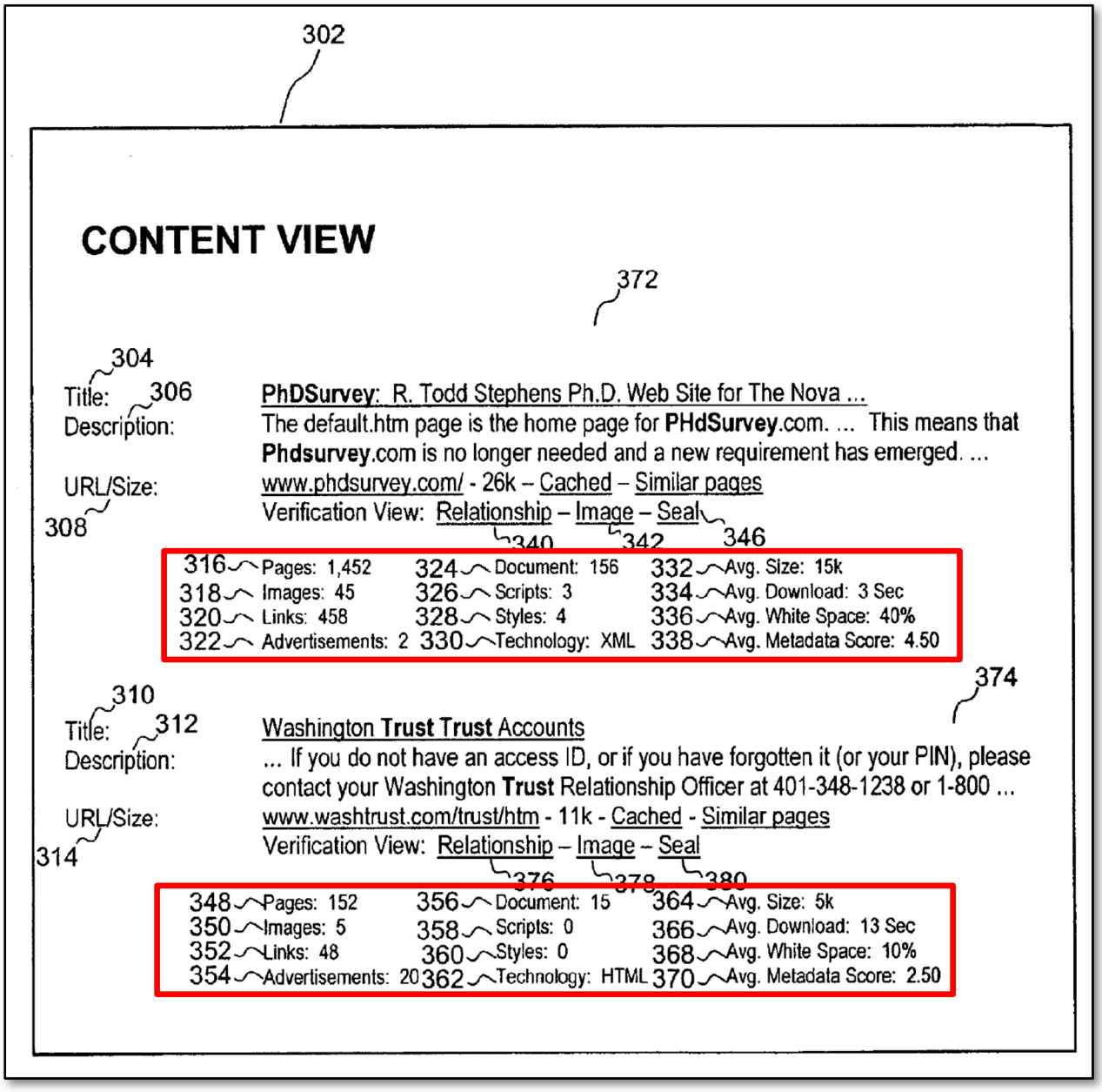
284. Wang displays a single list of results that are ordered based on conventional ranking methodologies, such as the frequency with which a particular result has been accessed previously or the user's geographic location. Wang, [0050] (explaining that "other alternatives are [] possible"). POSAs would 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.

285. 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.

286. 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,

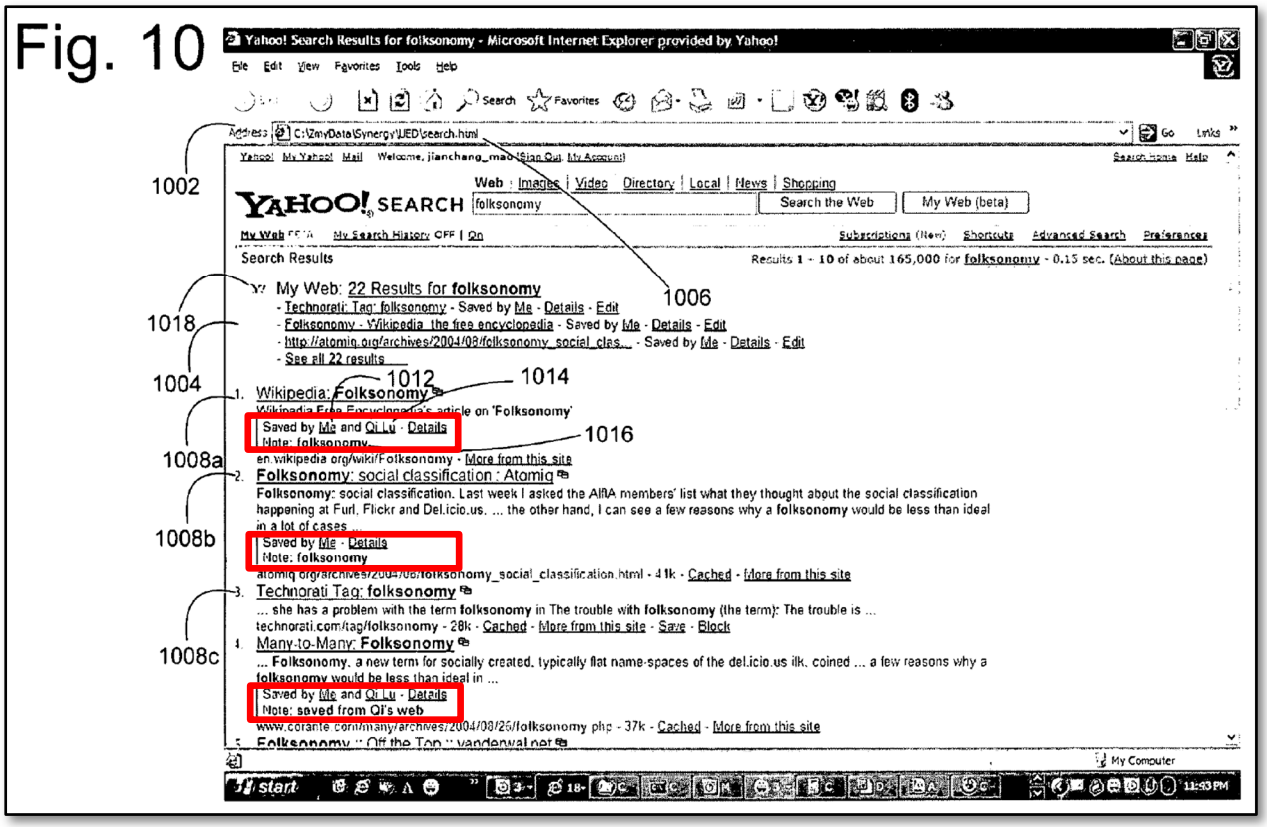
images, and page layouts) used within first and second websites 372 and 374, respectively." EX1029, 4:36-40. *See also* EX1029, 3:49-7:4 (describing the various other information provided by EX1029's annotations).



EX1029, FIG 3 (red boxes added)

287. 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.

288. 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].



289. 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 <u>each</u> data object matches <u>each</u> 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").

290. 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].

291. 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.

292. 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 516 and 520 (as indicated by the strikethrough to "USA") but "USA" is present in the webpages at results 512, 514, and 518.[15] *See also*

[15] 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

EX1028, 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").

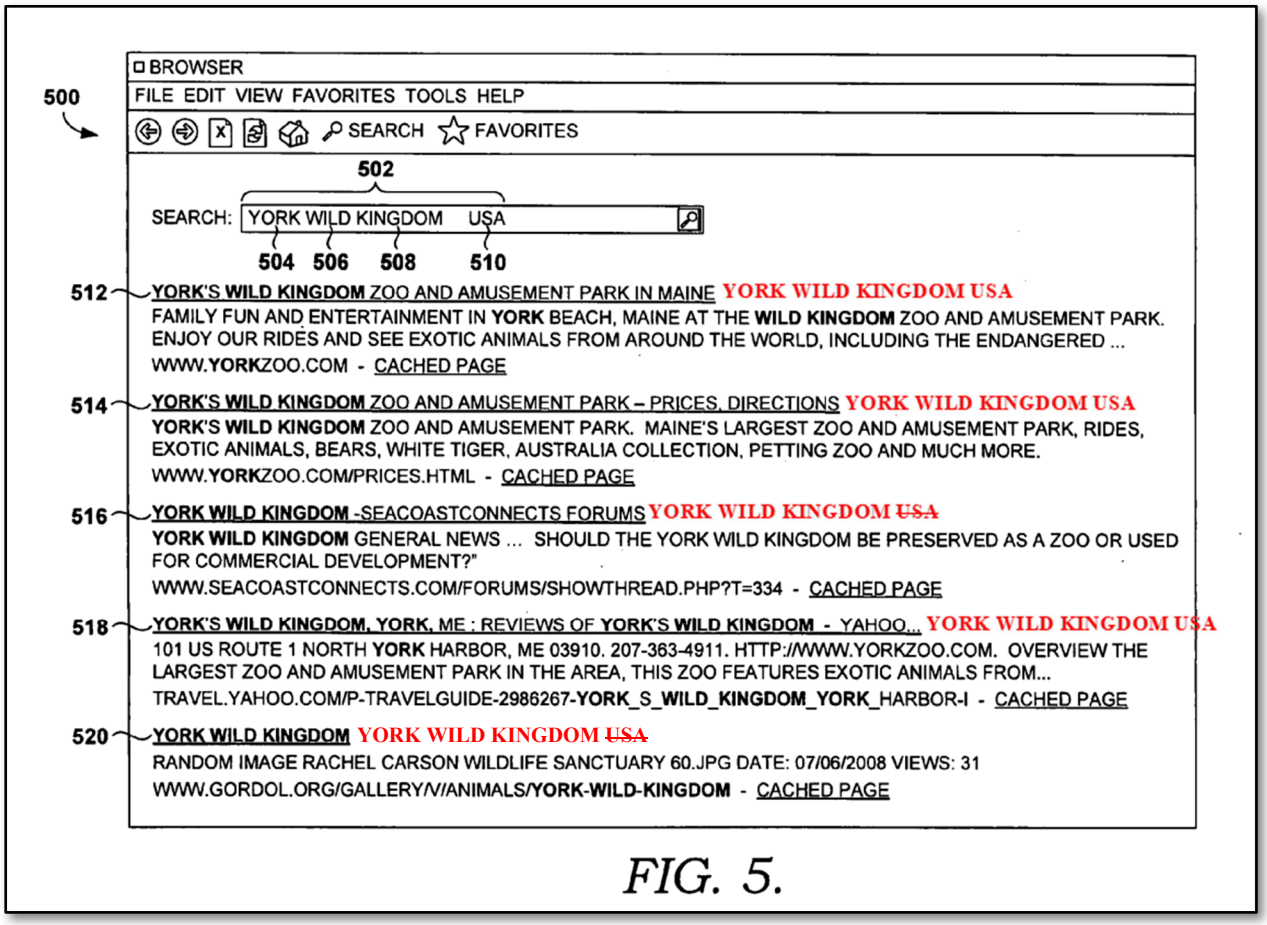


FIG. 5.

293. In my opinion, POSAs would have had a reasonable expectation of success in the above implementation of Wang in view of Mills. Wang and Mills both relate to search engines that identify search results that match a subset of a

---

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

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.

2. Adding GUI elements for search-term filtering based on Brinson

294. As I discussed above (§XI.A, §XI.A.1), Wang's relaxed search 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 identify 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.

295. As I discussed above for Ground 1A (§VIII.C), Brinson discloses a user-friendly GUI that allows a user to identify 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 (§VIII.C), 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 (§VIII.D.2; citing Fowler and Stonehocker as 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.

296. Thus, in my opinion, in view of Brinson, POSAs would have had reason to augment the combination of Wang and Mills (§XI.C.1) to include a user-selectable GUI element 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 drop-down boxes and 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). As I discussed above (§VIII.D.2; citing EX1068, [0017]-[0018]), POSA would have been aware of various, known user-selectable GUI elements for filtering search results (*e.g.*, clickable text and/or drop-down menus).

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

298. In my opinion, POSAs would have had a reasonable expectation of success in the Wang-Mills-Brinson combinations because, as I discussed above (§XI.A), Wang expressly supports the ability to make a search term mandatory, and as I discussed above (§VIII.D.3) 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 the Wang-Mills search engine.

D. Mapping to Challenged Claims

1. Claim 1

a. [1PRE] A process for Internet search, annotation, and filtering for providing an enhanced interactive graphical user interface for Internet search that enables a search engine user to automatically remove one or more search results that each reference a webpage that does not contain a desired search term element, enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element, the process comprising:

299. Wang discloses *a process* "for performing relaxed searching on a search engine…connected to a network" (Wang, [0032], FIG. 4), *e.g.*, "the *Internet*" (Wang, [0030], FIG. 3A (below)). Thus, Wang discloses *a process for Internet search*.

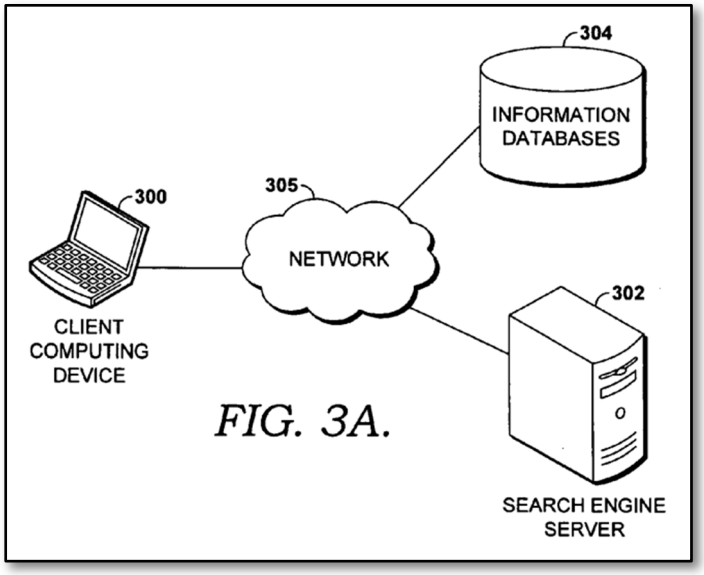


FIG. 3A.

300. Wang's "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*" *of* the *search engine*. Wang, [0013]; *see also* Wang, [0035]. "Once the web pages are located, their URLs are transmitted back to the client computing device [] and displayed as hyperlinks" (*search results*). Wang, [0035].

301. Wang's Figure 5 (below) depicts "a web browser window 500 rendering a web site for the search engine," which provides the *interactive GUI* shown below for the search result's webpage. Wang, [0053], [0035].

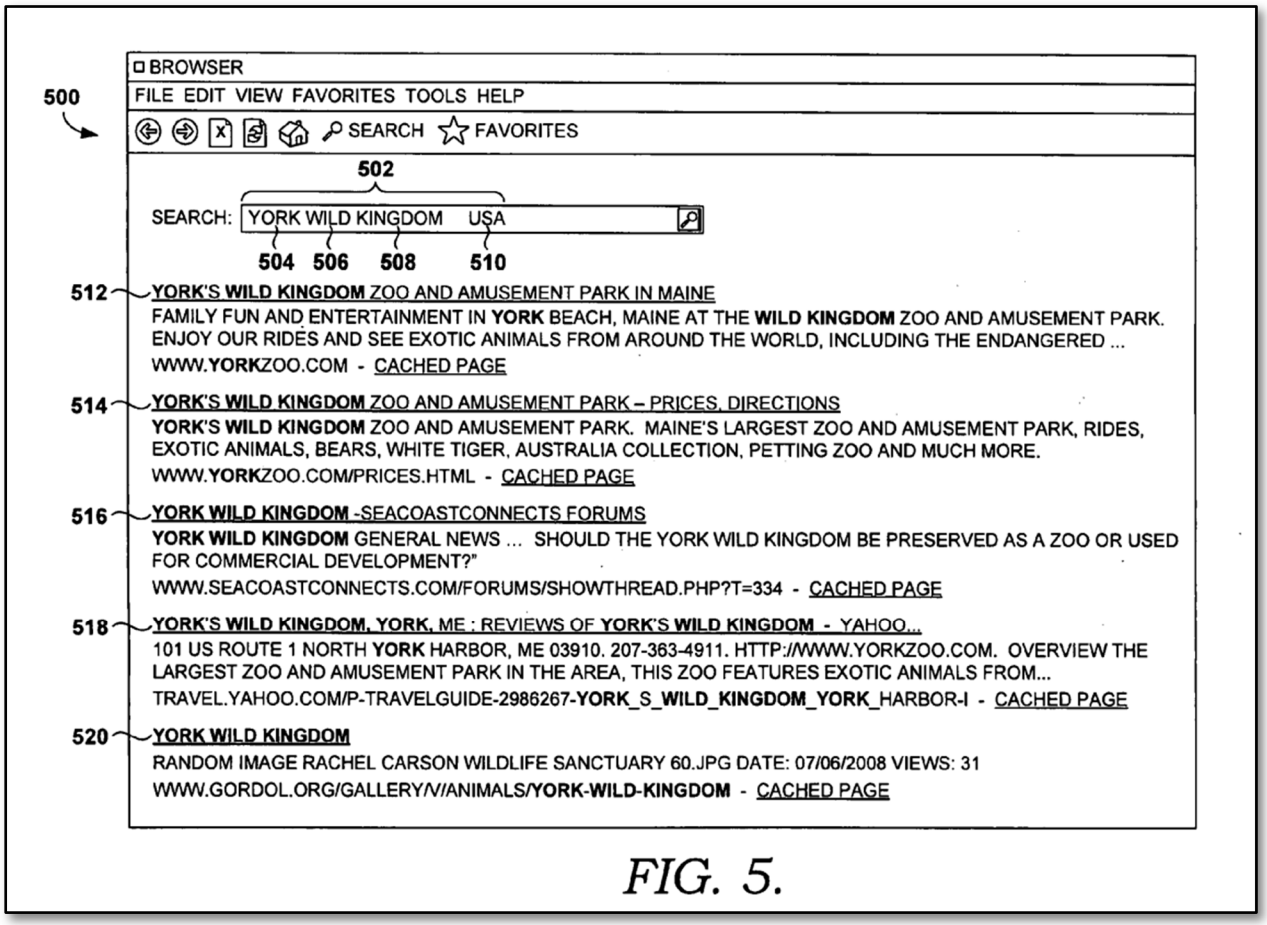


FIG. 5.

302. As I discussed above (§XI.C.1) and further below (§XI.D.1.e, [**1D**]), based on Mills, the Wang-Mills-Brinson combination *enhances* Wang's GUI by *providing annotations* to search results that *do not contain a desired search term element* (by displaying those terms with a strikethrough).

303. As I discussed above (§XI.C.2) and further below (§XI.D.1.i, [**1H**]), based on Brinson, the Wang-Mills-Brinson combination also *enhances* Wang's GUI by *providing* user-selectable GUI elements (*e.g.*, clickable text) that allow users to designate a search term as "required" (*i.e.*, mandatory). That selection provides *filtering* so that the *GUI enables a search engine user to automatically remove search results that each reference a webpage that does not contain* the user-designated (*i.e.*, *desired*) mandatory *search term element*.

304. Thus, Wang-Mills-Brinson's process is *enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element* because the *annotations* allow the user to readily identify, and the mandatory-term filtering allows users to remove from being displayed, search results missing a search term element, thereby allowing users to avoid having to click on and visit each of those websites to ascertain that information.

b. [1A] receiving a search request from a search engine user on a personal computing device having a display screen, the search request comprising one or more search term elements;

305. Wang's Figure 3A (below) shows a client's *personal* "*computing device*" ([0032]) *having "a display device*" ([0021]) and "communicat[ing] with the search-engine server" ([0038]).

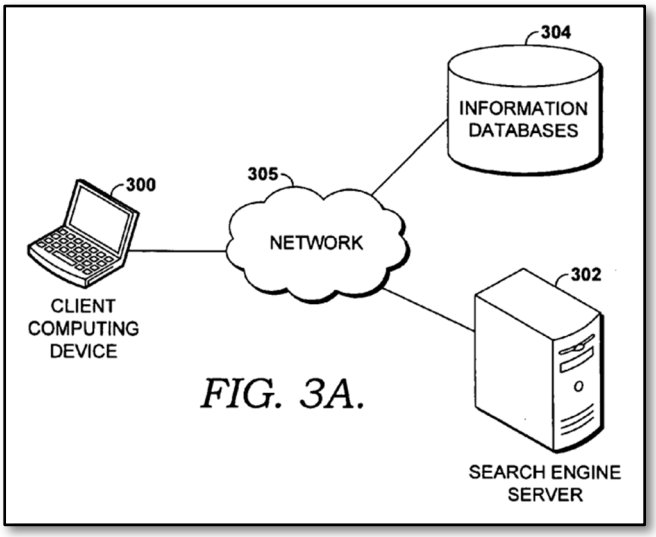


FIG. 3A.

306. "[T]he 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]. "[T]he search engine server 302 receives the query and parses the query into one or more keywords." Wang, [0040].

307. Thus, Wang's "query" *is received as a search request from a search engine user on a personal computing device* and *comprises* "keywords" (*search term elements*). Wang, [0035], [0002], [0004], FIG. 3B ("SEARCH ENGINE QUERY" [A] is received by PARSER 312 in SEARCH ENGINE SERVER 302).

c. [1B] generating, by operating a search engine in response to receiving the search request, a first Internet search result that references a first webpage that is missing a first search term element and a second Internet search result that references a second webpage;

308. *In response to receiving the search request* ([**1A**], §XI.D.1.b), Wang's "*search engine* server" *operates* to "search[] one or more inverted indexes for documents that contain" at least a subset of the "keywords." Wang, [0040], FIG. 5 (search request 502).

309. A POSA would understand that search results *generated* by the search engine using inverted indexes, as in Wang, are *Internet search results* 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**.").

310. Wang's Figure 5 (which I have highlighted below) depicts "a web browser window 500 rendering a web site for the search engine" (Wang, [0053]), which shows the *generated Internet search results* that *reference* "*webpages*" via

their titles (purple) and "hyperlinks" (green) (Wang, [0035]) on the search results webpage 500.

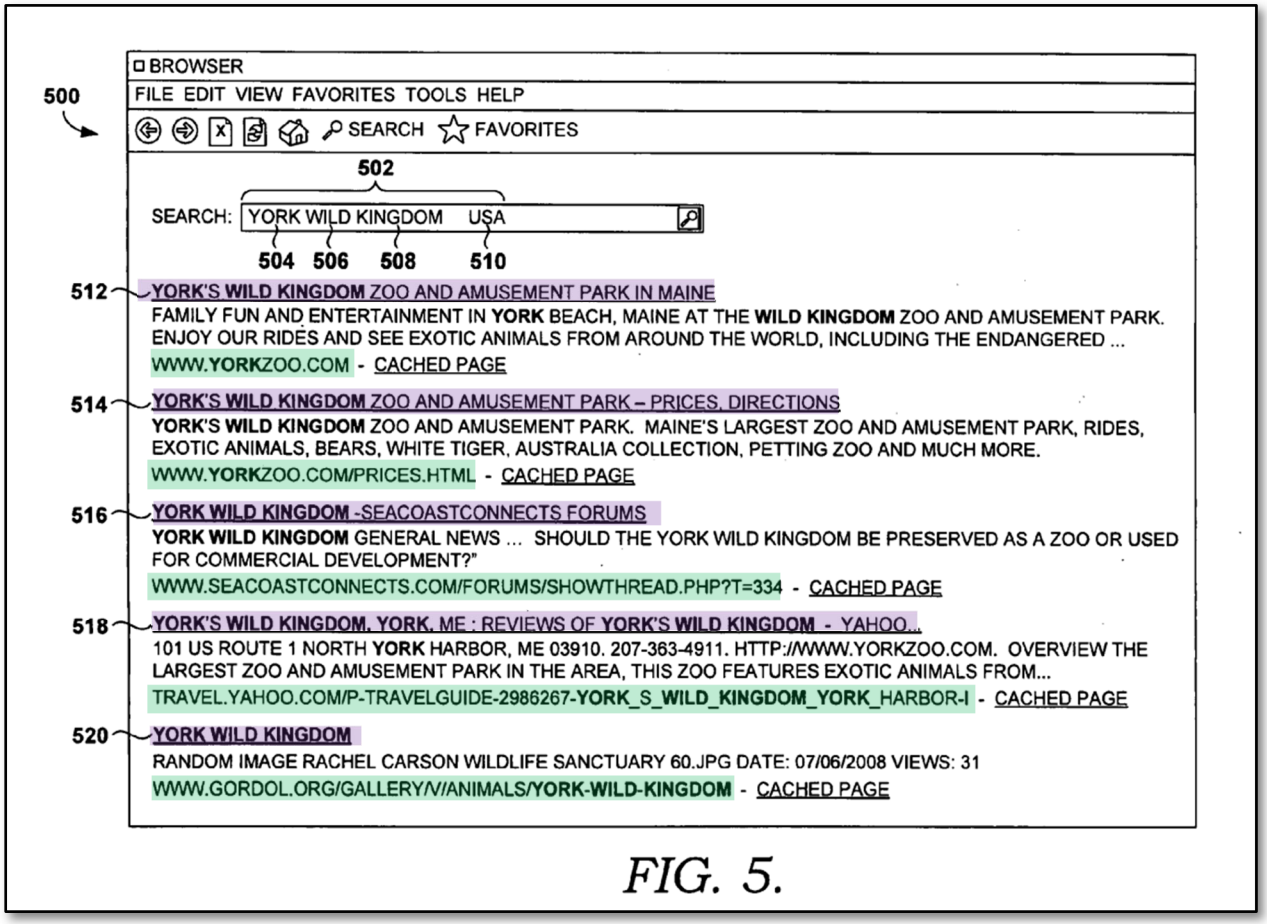


FIG. 5.

311. 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," *i.e.*, websites, that "have at least 3 of the 4 keywords." Wang, [0053]. As I discussed above (§XI.A), POSAs understood each result shown above includes at least "york," "wild," and "kingdom" (because those keywords are bolded in each search result) but each search result may or may not include "USA."

312. As I discussed above (§XI.C.1) and illustrate below based on Wang's Figure 5 (annotated), Wang-Mills-Brinson's process augments Wang's search results with the text of the search terms, based on Mills. Result 516 or 520 below meets *a first Internet search result that references a first webpage that is missing a first search term element* ("USA," as indicated by the strikethrough font, "~~USA~~"); result 512, 514, or 518 meets *a second Internet search result that references a second webpage*.[16]

[16] As I discussed above (§XI.C.2) and further below ([**1H**], §XI.D.1.i), based on Brinson, the GUIs would also include aspects of Brinson's (or other) known GUI elements for making a search term mandatory (*e.g.*, the search term text in the annotations could be clickable text to make a search-term mandatory).

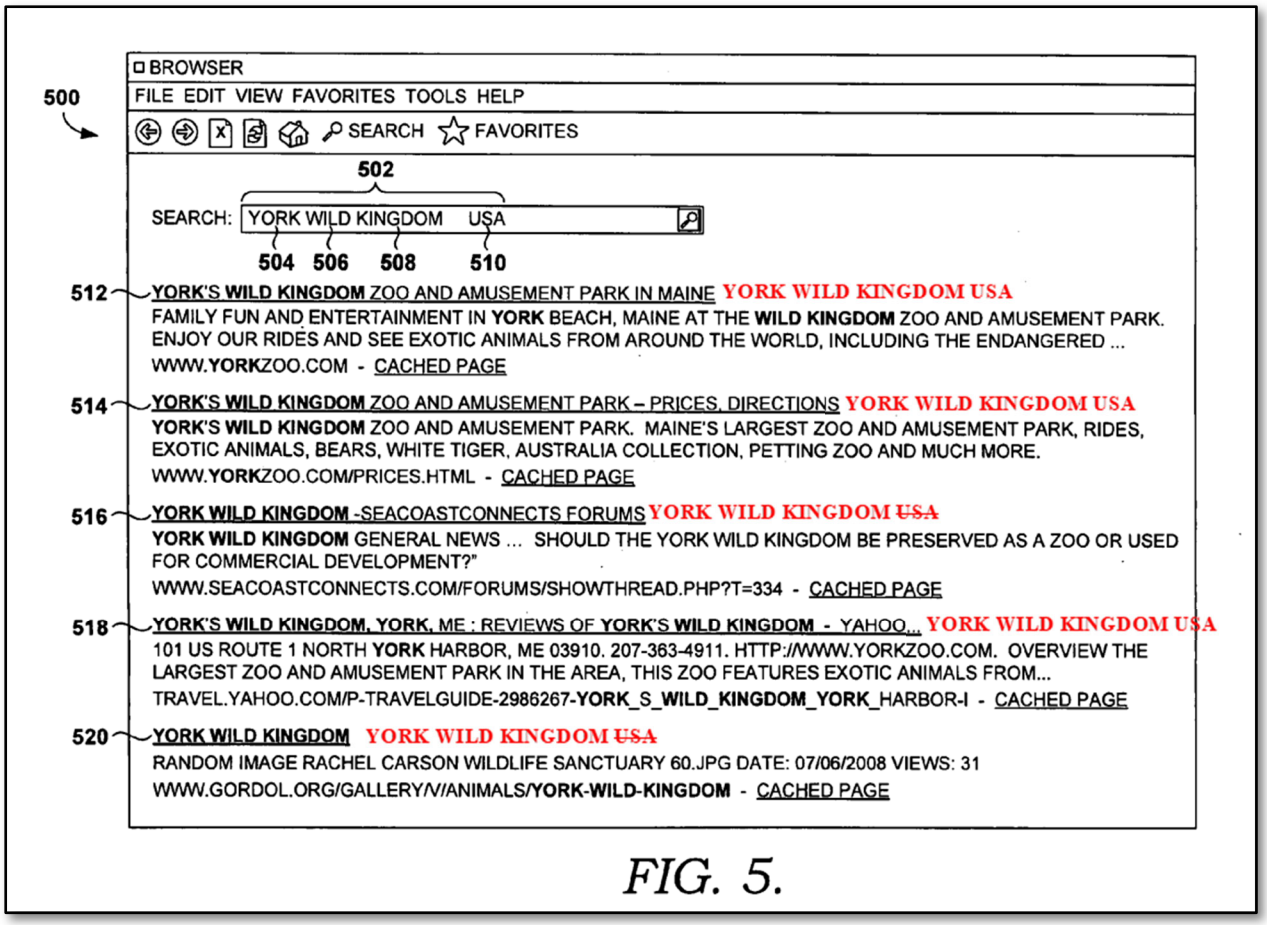


FIG. 5.

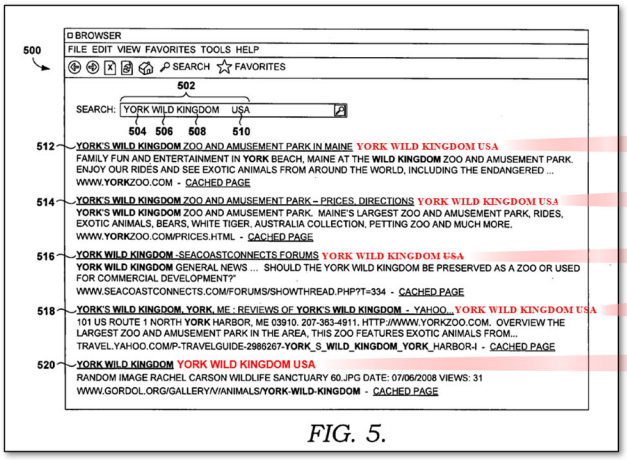


FIG. 5.

YORK WILD KINGDOM USA } *second Internet search result*

YORK WILD KINGDOM USA } *second Internet search result*

YORK WILD KINGDOM ~~USA~~ } *first Internet search result*

YORK WILD KINGDOM USA } *second Internet search result*

YORK WILD KINGDOM ~~USA~~ } *first Internet search result*

missing term

d. [1C] generating and providing, for display on the personal computing device, an Internet search user interface;

313. "The client [*personal*] *computing device*" includes "a web browser" that "enabl[es] a user to display and interact with information located on the Web." Wang, [0038]. Wang's Figure 5 (below) depicts "a web browser window 500 rendering a web site for the search engine," that is *generated and provided for display* as *an Internet search user interface*. Wang, [0053] ("FIG. 6 [sic: FIG. 5] illustrates a screen shot of a web browser window 500 rendering a web site for the search engine."), [0035]. EX1001, 5:28-30 ("The user interface…appears…in a browser window….").

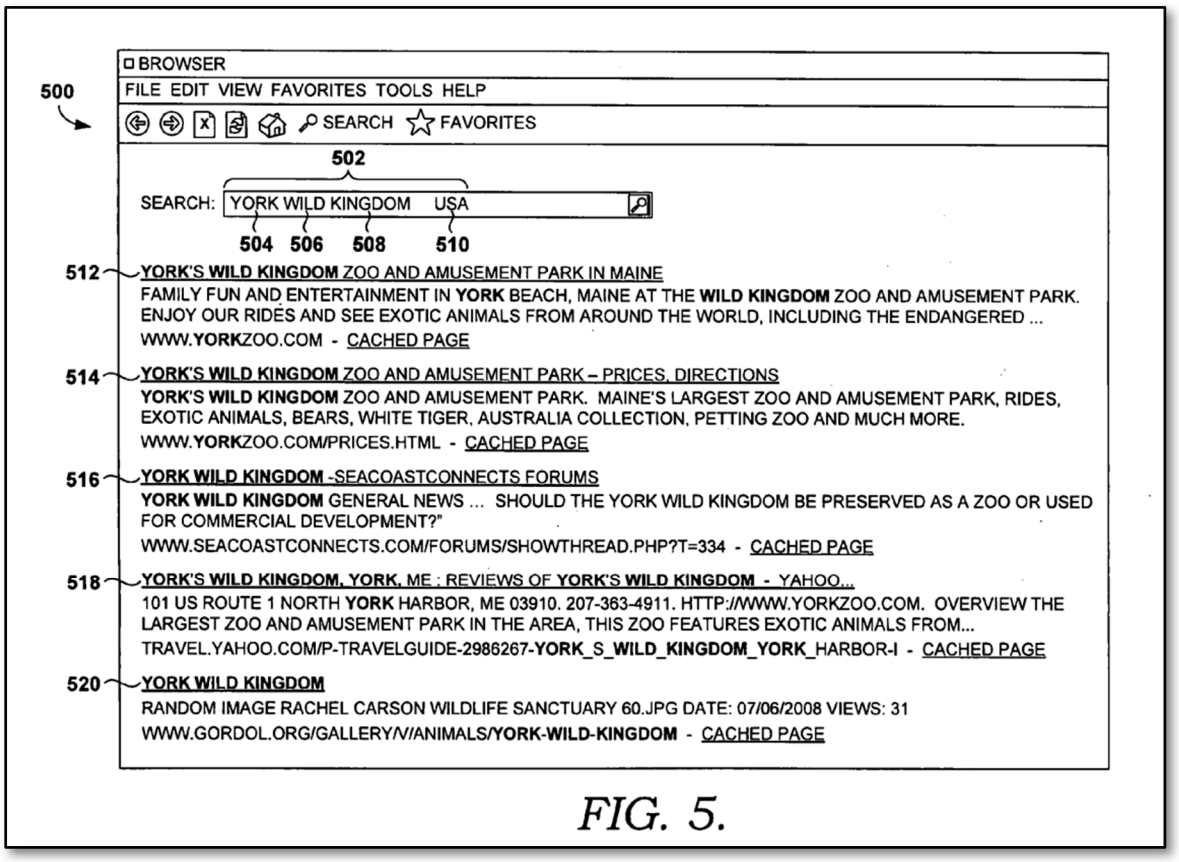


FIG. 5.

e. [1D] wherein the Internet search user interface comprises the first Internet search result and a first warning to the search engine user that the first webpage is missing the first search term element, wherein the first warning comprises a text representing the first search term element;

314. Using the example Wang-Mills-Brinson search-results page illustrated below (which is based on Wang's FIG. 5), the *Internet search user interface comprises the first Internet search result* (result 516 or 520) *and* annotations (red), which each include *a first warning to the search engine user that* those *webpages are missing the first search term elemen*t by annotating "USA" as "~~USA~~." Thus, the *first warning comprises a text representing the first search term element*.

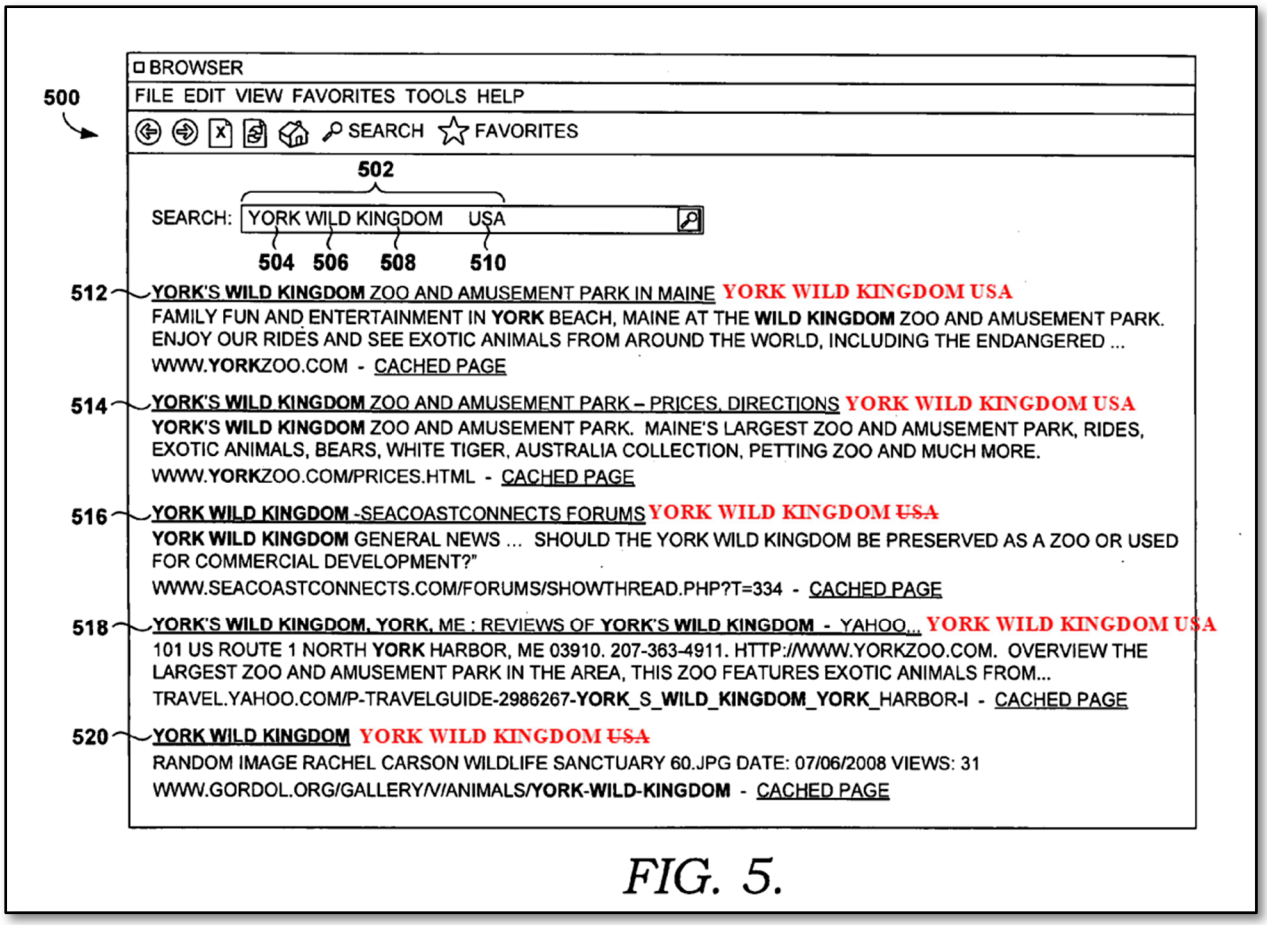


FIG. 5.

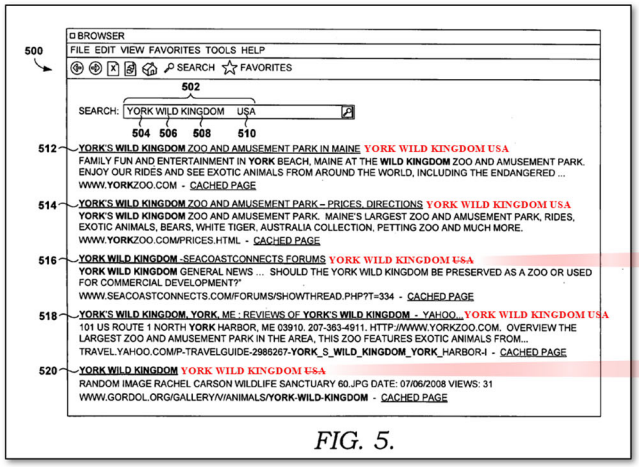


FIG. 5.

YORK WILD KINGDOM ~~USA~~ } *first Internet search result*

YORK WILD KINGDOM ~~USA~~ } *first Internet search result*

warning **that term is *missing***

f. [1E] wherein the first Internet search result is organized for display as a first search result grouping comprising a first excerpt for the first webpage, a first Internet link for the first webpage, and the first warning;

315. As shown below in the example Wang-Mills-Brinson search result webpage, the example *first Internet search result* that I discussed above ([**1B**]; results 516 or 520 below) *is organized for display as a first search result grouping* (blue boxes), *comprising a first excerpt* (orange), *first Internet link* (green), *and first warning* (red). Wang, [0035] ("Once the web pages are located, their URLs are transmitted back to the client computing device 202 and displayed as hyperlinks."), [0053] ("FIG. 5 is a diagram of a search-results list from a search engine….").

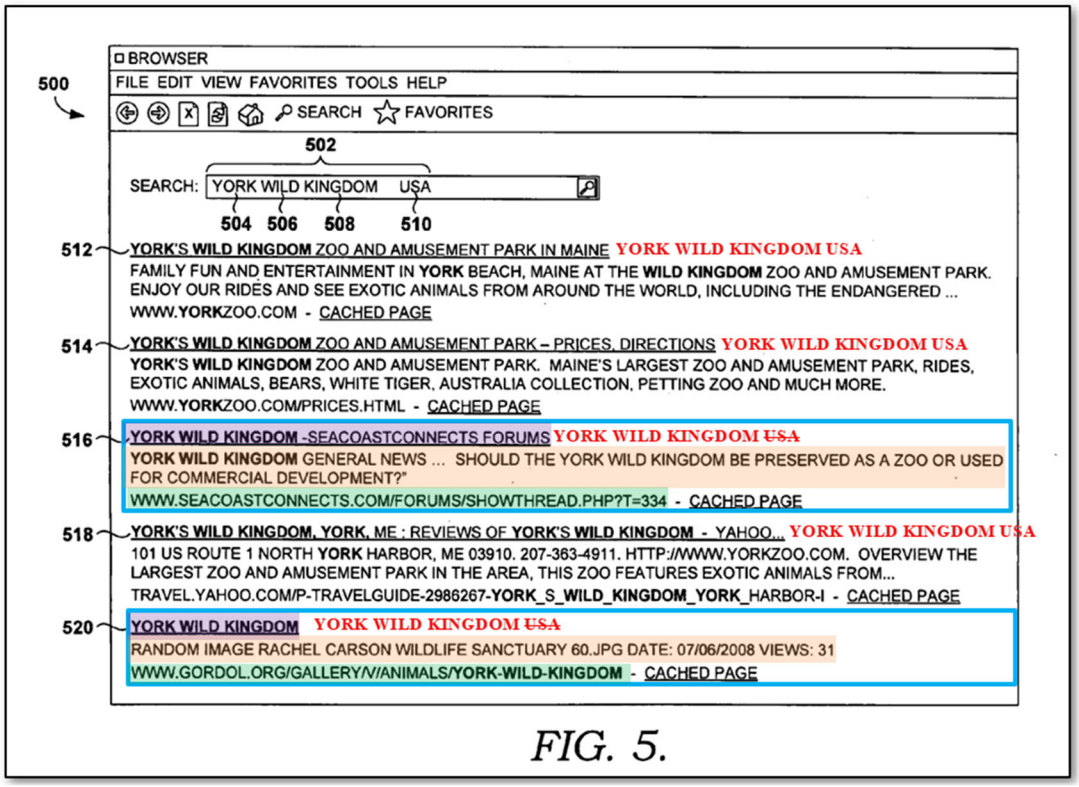


FIG. 5.

g. [1F] wherein the Internet search user interface further comprises the second Internet search result; wherein the second Internet search result is organized for display as a second search result grouping that comprises a second excerpt from the second webpage and a second Internet link for the second webpage but does not comprise any warning that any of the one or more search term elements is missing from the second webpage;

316. The example Wang-Mills-Brinson search-results page above shows *the Internet search user interface further comprises the* example *second Internet search result* that I discussed above ([**1B**]; result 512, 514, or 518), which, like the *first Internet search result* are each *organized as a (second) search result grouping that comprises a* respective *(second) excerpt and (second) Internet link*. Wang, [0035], [0053].

317. As I discussed above (§XI.D.1.c, [**1B**]), each example *second Internet search result* is **not** missing any search term and, thus, its search result grouping will ***not*** *comprise any warning that any of the search term elements is missing from the second webpage*—rather, in those results, each search term is displayed **without** strikethrough font.

h. [1G] wherein the first and second search result groupings are each a unique search result grouping displayed separately from each other;

318. As shown below using the example Wang-Mills-Brinson interface, the *first* (blue) and *second* (red) *search result grouping are each a unique search result grouping displayed separately from each other*.

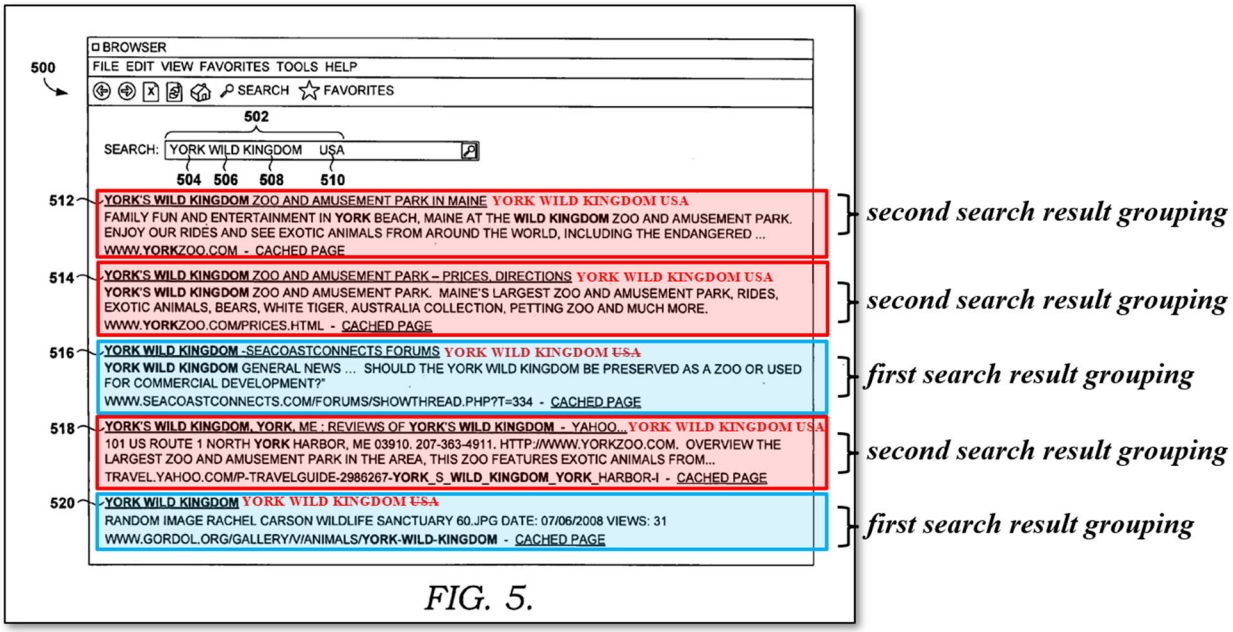


FIG. 5.

i. [1H] wherein the Internet search user interface provides a filtering option, wherein the search engine user's selection of the filtering option causes an updated Internet search user interface to be generated and provided for display on the personal computing device, and wherein the updated Internet search user interface does not display the first Internet search result; and

319. As I discussed above (§XI.C.2), based on Brinson, Wang-Mills-Brinson includes user-selectable GUI elements (*e.g.*, clickable search-term text) that allow users to designate a search term as "required" (*i.e.*, mandatory). *See*

also supra §XI.D.1.a ([**1PRE**]). As I discussed above (§XI.C.2), Wang-Mills-Brinson would have applied the "required"-term designation to the already-identified search results, rather than execute a new search, as a known, beneficial, and obvious way to implement what Brinson describes. That designation *provides a filtering option* that, when selected by the user, *causes an updated Internet search user interface to be generated and provided for display on the* terminal (*personal computing device*) because all search-result webpages missing the now-mandatory search term will be removed from being displayed.

320. For example, in the Wang-Mills-Brinson example illustrated below, *the updated user interface* will *not display the first Internet search results* 516 and 520 if the user selects "USA" as mandatory because their webpages are missing that term (as I discussed above, [**1B**], §XI.D.1.c).

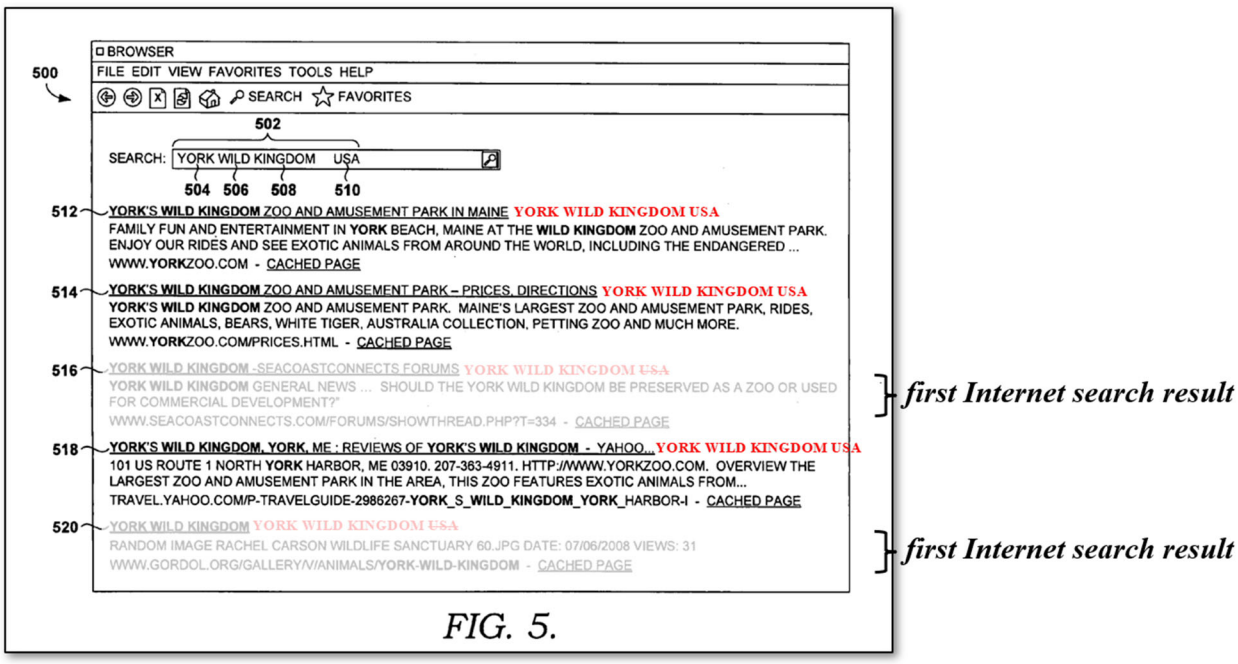


FIG. 5.

j. [1I] wherein the process is performed on one or more servers located remotely from the personal computing device.

321. Wang-Mills-Brinson's *process* that I discussed above *is performed on* Wang's "search-engine *server*," which "receive[s] queries *from [the] remote…*client *[personal]* computing device." Wang, [0035], FIGS. 3A-3B, 4; *see also* Wang, [0011] ("FIG. 4 is a flow diagram illustrating **steps for performing relaxed searching on a search engine**…."). As shown in Wang's FIG. 3, Wang's search engine server is *located remotely from* the client's *computing device* over a network (*e.g.*, the Internet). Wang, [0042].

2. Claim 15

322. Independent claim 15 recites a system whose actions largely mirror the process recited in independent claim 1. Wang-Mills-Brinson meets the following limitations of claim 15 for the reasons discussed in the corresponding sections above that are identified below.

Limitation	**Addressed in Section:**
[**15PRE**]	§XI.D.1.a ([**1PRE**]; Wang, FIG. 3A (illustrating *system*))
[**15A**]	§XI.D.1.b ([**1A**]; discussing the *personal computing device*); §XI.D.1.j ([**1I**]; discussing the search engine comprising *servers*)
[**15B**]	§XI.D.1.b ([**1A**]; discussing the *search request*)
[**15C**]	§XI.D.1.c ([**1B**])
[**15D**]	§XI.D.1.d ([**1C**])
[**15E**]	§XI.D.1.e ([**1D**])
[**15F**]	§XI.D.1.f ([**1E**])
[**15G**]	§XI.D.1.g ([**1F**])
[**15H**]	§XI.D.1.h ([**1G**])
[**15I**]	§XI.D.1.i ([**1H**])

3. Claim 29

323. Independent claim 29 recites a process that largely mirrors the process recited in independent claim 1, but claim 29 requires two results with missing-term warnings and filtering options. Wang-Mills-Brinson meets the following limitations of claim 29 for the reasons discussed in the corresponding sections above that are identified below.

Limitation	**Addressed in Section:**
[**29PRE**]	§XI.D.1.a ([**1PRE**])
[**29A**]	§XI.D.1.b ([**1A**])
[**29B**]	§XI.D.1.c ([**1B**]; Where result 516 that I discussed in [**1B**] meets *a first Internet search result…missing a first search term* ("USA"); result 520 that I discussed in [**1B**] meets *a second Internet search result…missing a second search term* (also "USA"); *see infra* claim 39 (*first* and *second search term* can be the *same*))
[**29C**]	§XI.D.1.d ([**1C**])
[**29D**]	§XI.D.1.e ([**1D**])

[**29E**]	§XI.D.1.f ([**1E**])
[**29F**]	§XI.D.1.g ([**1F**]; result 520's annotation that I discussed in [**1F**] provides *a second warning*)
[**29G**]	§XI.D.1.f ([**1E**])
[**29H**]	§XI.D.1.h ([**1G**])
[**29I**]	§XI.D.1.i ([**1H**]; where, as I discussed *supra* §XI.C.2, a search term in an annotation could be designated mandatory by, *e.g.*, clicking the term; designating the term "USA" as mandatory in result 516's annotation meets *a first filtering option* that *causes a first updated Internet search user interface* to *not display* result 516; designating the term "USA" as mandatory in result 520's annotation meets *a second filtering option* that *causes a second updated Internet search user interface* to *not display* result 520)
[**29J**]	§XI.D.1.j ([**1I**])

4. Claim 39

a. [39A] The process of claim 29, wherein the first search term element and the second search term element are a same search term element, wherein the first text and the second text are identical, and

324. In the example Wang-Mills-Brinson search-results page below, *the first and second search term elements are a same search term element* ("USA") and *the first text and the second text are identical* warning text ("~~USA~~").

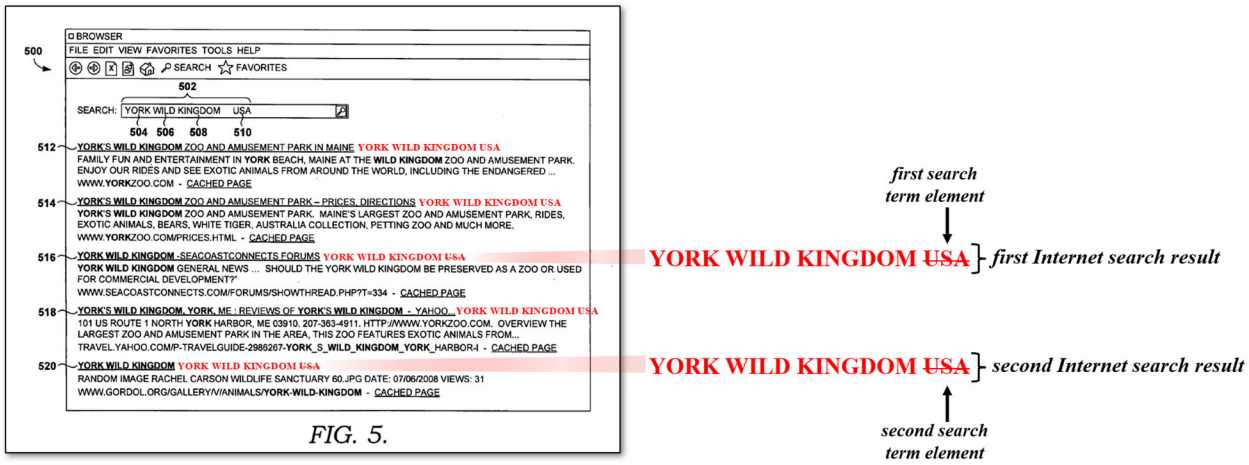


FIG. 5.

b. [39B] wherein each of the first and second updated Internet search user interfaces does not display the first and second Internet search results.

325. As I discussed above (§XI.D.1.i, [**1H**]), *the updated Internet search user interface* removes from display *search result(s)* missing *the first search term element* because the filtering designates that term as a mandatory term. Thus, in the example search results discussed above ([**39A**]) *the first **and** second Internet search results* – which are both missing *the first search term* ("USA") – would ***not*** be *displayed* in *the first and second updated user interfaces*.

XII. GROUND 2B: WANG-MILLS-BRINSON-MEHTA RENDERS OBVIOUS CLAIMS 2-8, 13-14, 16-22, 27-28, AND 30-38

326. Ground 2B challenges dependent claims 2, 16, and 30 (and their dependent claims 3-8, 13-14, 17-19, 27-28, and 30-38), which require the *selectable-advertisement* limitation (which I defined in §IX above in Ground 1B).

A. The Wang-Mills-Brinson-Mehta Combination

327. As I discussed above in Ground 1B (§IX.A), Mehta teaches displaying "relevant advertisement[s]" as "click[able]" (*i.e.*, selectable) "[s]ponsored links" alongside Internet search results. Mehta, [0005]-[0006], [0033]. *See also* EX1001, 2:66-3:3 (the '937 patent itself recognizing that displaying selectable advertisements that relate to a user's search terms was conventional in the prior art). For the same reasons I discussed in Ground 1B (with corroboration from EX1015, [0004] and EX1016, [0006]), POSAs would have had motivation, based on Mehta and POSAs' background knowledge, to display in the Wang-Mills-Brinson combination selectable advertisements related to the user's search terms (*e.g.*, to generate revenue).

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

329. In my opinion, POSAs would have had a reasonable expectation of success in Wang-Mills-Brinson-Mehta because, as I discussed above (§IX.B, Ground 1B), displaying such 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. Claim 2: The process of claim 1, wherein the Internet search user interface further comprises a selectable advertisement that is related to at least some of the one or more of the search term elements.

330. Claim 2 depends from independent claim 1. Ground 2B's Wang-Mills-Brinson-Mehta builds on Ground 2A's Wang-Mills-Brinson combination and meets claim 1 for the reasons that Wang-Mills-Brinson meets claim 1 (*see* §XI.D.1, Ground 2A).

331. Dependent claim 2 adds the *selectable-advertisement* limitation to claim 1. As I discussed above (§XII.A), Mehta provides POSAs with motivation to augment Wang-Mills-Brinson to display *selectable advertisements* ("*[s]ponsored links*") "relevant to [the user's] search criteria." Mehta, [0005]-[0006]. Once augmented in this manner, Wang-Mills-Brinson-Mehta meets the *selectable-advertisement* limitation in the same way that the Ground 1B combinations meet that limitation (*see* §IX.C.1 above). Thus Wang-Mills-Brinson-Mehta renders claim 2 obvious.

2. Claim 3: The process of claim 2, wherein the text representing the first search term element is shown 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.

332. As shown again below, Wang-Mills-Brinson-Mehta's annotation comprises *text representing the first search term element* (*e.g.*, "USA") with a strikethrough (*e.g.*, in the annotations for results 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 (§IX.C.2, Ground 1B, **claim 3**), the '937 patent does not explain the difference between text with "merged" lines versus "superimposed" lines. However, POSAs understood Wang-Mills-Brinson-Mehta's strikethrough text meets at least one (if not both) of those formats.

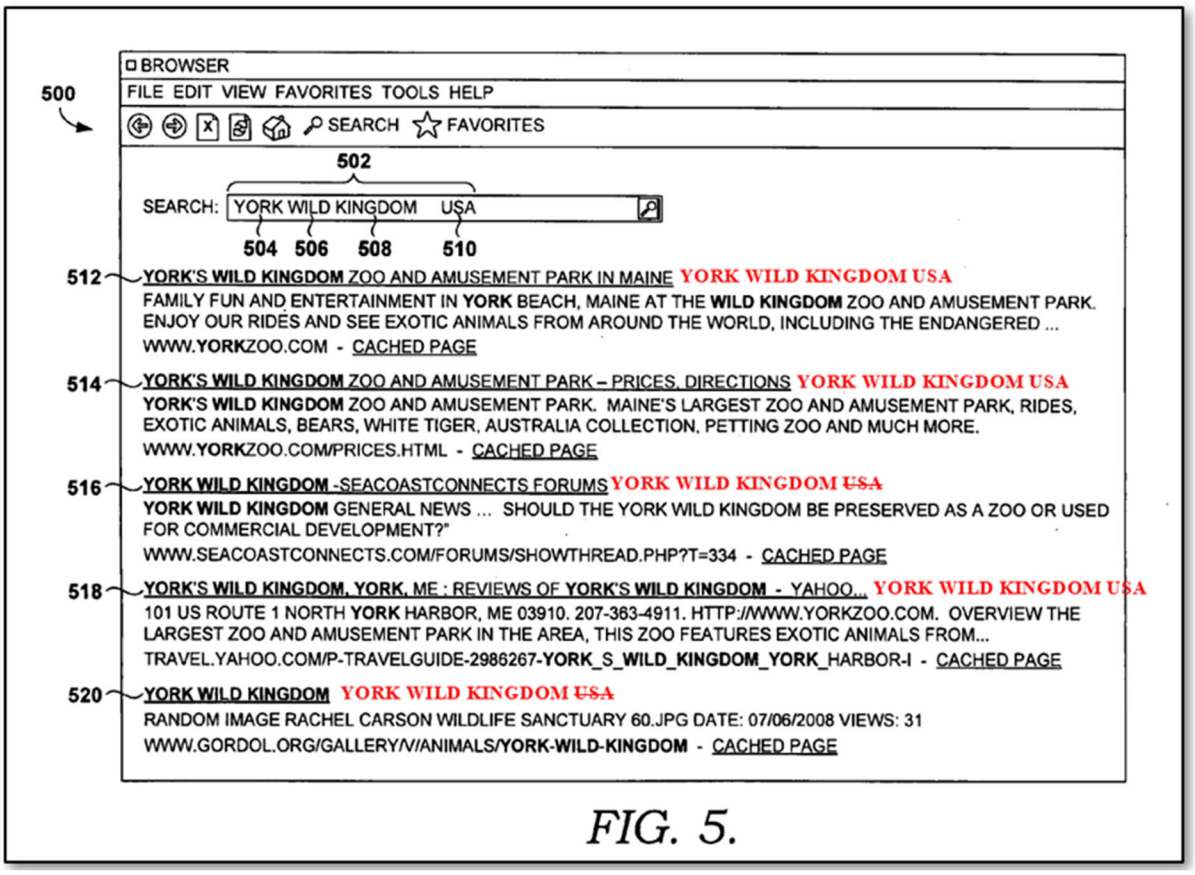


FIG. 5.

3. Claim 4: The process of claim 3, wherein the first Internet search result would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.

333. As I discussed above (§XI.D.1.c, Ground 2A, [**1B**]), each example *first Internet search result* (516 or 520 below) is missing "USA" (as indicated by the strikethrough font). Both of those results w*ould not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element* ("USA") because "USA" is missing in those results

and including "USA" in an "AND" logical operation requires "USA" to be present. *See, e.g.*, Wang, [0002] (searches that require the search terms "is typically referred to as 'and-based searching'").

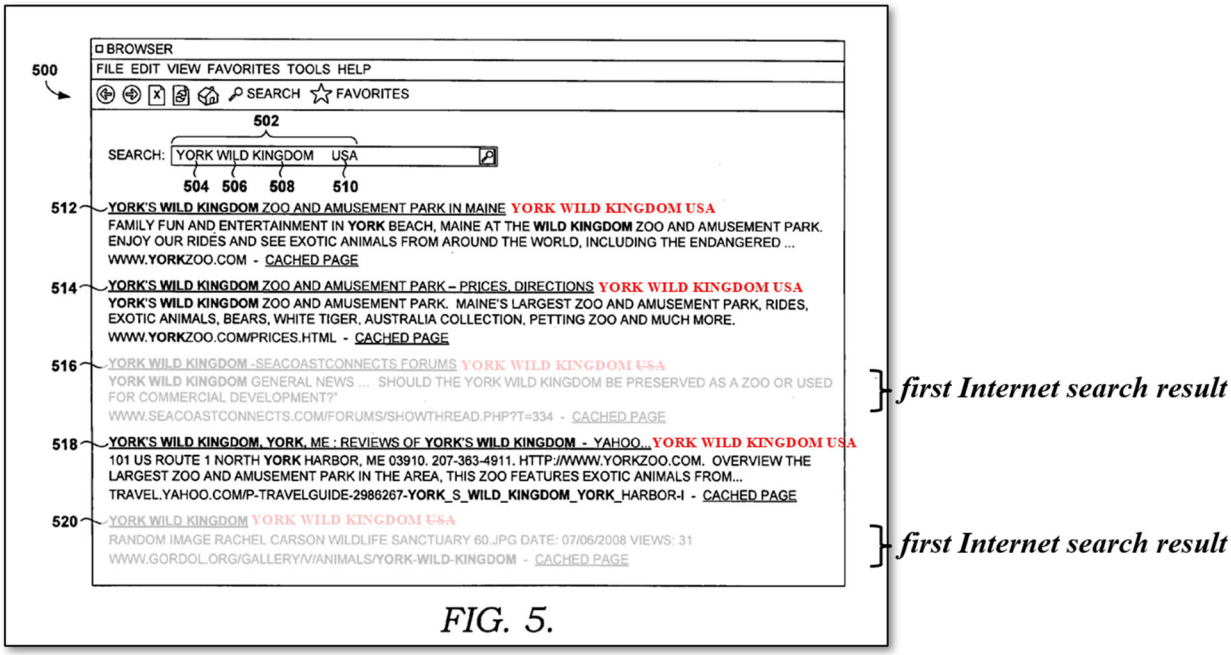


FIG. 5.

4. Claim 5: The process of claim 4, wherein the first webpage has one or more descendant webpages, wherein each of the one or more descendant webpages is also missing the first search term element, and wherein each of the one or more descendant webpages is linked directly one level from the first webpage.

334. In Wang's Figure 5, result 512 references "WWW.YORKZOO.COM" and result 514 references "WWW.YORKZOO.COM/PRICES.HTML," which discloses (or at least suggests and renders obvious to a POSA) that 514's webpage is a *descendant webpage linked directly one level* from 512's webpage. Similarly, it would have been obvious and commonplace for an example *first webpage* that I discussed above (*see* §XI.D.1.c, [**1B**]) to be a different example (*e.g.*, website's

homepage) that *has one or more descendant webpages* that are each *linked directly one level* therefrom (*e.g.*, a "prices" webpage), and for scenarios to occur where each *descendant webpage is also missing the* same (*e.g.*, *first*) *search term element* as *the first webpage*. *See also* Ground 2B, claim 5 (discussing how it was commonplace for search result webpages to have one or more descendant webpages that are missing a same search term as a referenced webpage; citing, as corroboration, EX1029, 3:65-4:5; Naick, [0003]-[0004]).

5. Claims 6 and 8

a. [6A]/[8A]: The process of claim 5/[claim 3], wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, or tablet computer's display screen, and

335. Wang's *personal* "*computing device…may be a…smartphone*" ([0019], [0037]), which POSAs understood conventionally had *a smaller display screen than a laptop, desktop, or tablet computer's display screen*, which are the other devices recited in [**6A**]/[**8A**].

b. [6B]/[8B]: wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.

336. As I discussed above (§XI.D.1.i, Ground 2A, [**1H**]), *the updated Internet search user interface* removes from display *search result(s)* missing *the first search term element* because the example filter designates that term as mandatory. Once that one or more result is removed from the display, a POSA would understand that the search engine will display or will cause to be displayed (from the original set of results) additional search results that are **not** missing the *first search term element*. *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 one or more results from being displayed, additional results that satisfy

the search query (and that are not missing *the first search term element*) will fill-in the space left by the removed result(s).

337. Thus, the *updated Interface user interface* will *enable the smaller display screen to display an increased number of Internet search results that each reference a webpage containing* (*i.e.*, not missing) *the first search term element 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 other results. Doing so *further speeds the search engine user's operation of Internet search* because the user can see additional relevant results in the interface, without spending time requiring scrolling and/or viewing less relevant results. Thus, Wang-Mills-Brinson-Mehta renders obvious claims 6 and 8.

6. Claim 7: The process of claim 6, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element.

338. As I discussed above (§XI.D.1.c, Ground 2A, [**1B**]), in Wang's method (as implemented in Wang-Mills-Brinson-Mehta) *a search term element is considered present if the webpage contains the search term element* itself. For example, Wang discloses that "[t]he search engine server 302 searches one or more

inverted indexes for documents that **contain N−K keywords**." Wang, [0040]; *see also* Wang, [0004] (search engine "locat[es] web documents that satisfy a subset of the words in a search-engine query"), [0031] ("'Relaxed searching' refers to searching for documents that match a subset of the total number of keywords submitted in a search-engine query.").

339. For the reasons I discussed above (§IX.C.6; Ground 1B, **claim 7**), it would have also been beneficial and conventional for a search engine (like Wang-Mills-Brinson-Mehta's) to consider a search term to be *contained in a webpage* if it *contains a synonym or a misspelled version of the search term element*. That is because POSAs would have recognized that considering *synonyms* and *misspelled versions* of search terms in webpages was conventional in prior-art search techniques. My opinion in this regard is corroborated by EX1059, which discloses "**a search tool provides the user with the ability to search for one or both of synonyms**" of "search terms" entered by users. EX1059, [0014]-[0015]. My opinion in this regard is further corroborated by EX1060, which discloses "indexing…a webpage that includes **one or more misspelled words**" and "automatically correcting a spelling" in the index that is being searched. EX1060, [0005].

340. Thus, considering synonyms and misspelled versions would have been to a POSA the use of a known technique to improve Wang-Mills-Brinson-

Mehta's similar search-term engine in the same way, by beneficially ensuring that webpages were not excluded because of a spelling error and/or missing a user's keyword but including another word with the same/similar meaning. *See* EX1060, [0002] (background information that "it is desirable…to better index…webpages according to the **meaning intended by the author of the web page when**…words are **not spelled correctly** in the webpage), [0005]; EX1059, [0014]-[0015]).

7. Claim 13

a. [13A] The process of claim 2, wherein the selectable advertisement and the first search result grouping are simultaneously viewable on the display screen; and

341. Based on Mehta's Figure 3A (which I have highlighted below) and conventional search-engine interface design, Wang-Mills-Brinson-Mehta would have included "sponsored [*selectable*] *advertisements* 210 [red] rendered along with [*simultaneously viewable on the display screen* as] a plurality of *search results* 220 [blue]." Mehta, [0033]; *see also, e.g.*, EX1015, FIG. 3, [0032] (which, as I discussed above in Ground 1B, claim 13, also demonstrates that it was conventional to display *selectable advertisements* on the same display screen as search results).

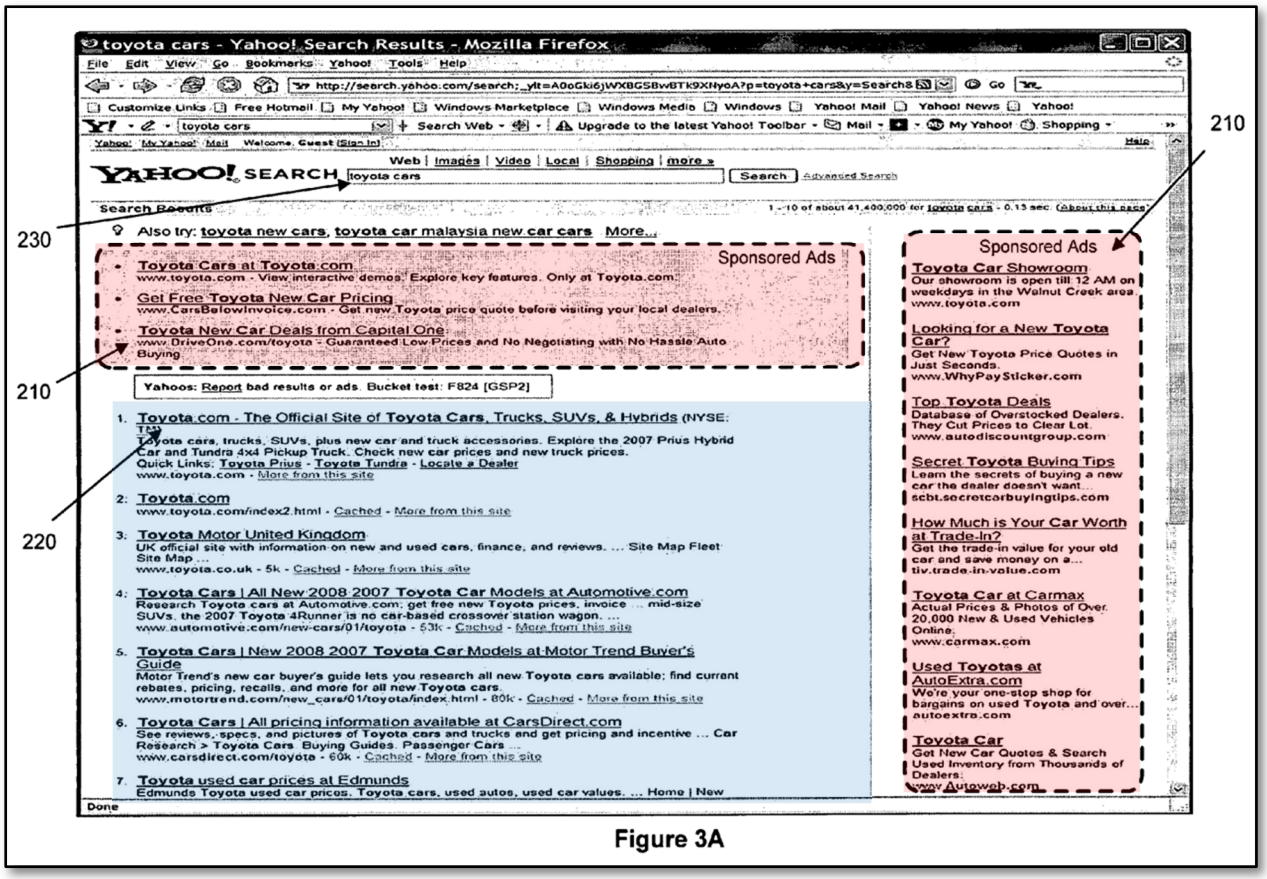


Figure 3A

342. In Wang-Mills-Brinson-Mehta, the search results shown on the display screen alongside the selectable advertisements would have included the example *first search result groupings* that I discussed above (§XI.D.1.e, Ground 2A, [**1D**]).

b. [13B] wherein the first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.

343. As I discussed above for **claim 4** (§XII.B.3), each example *first Internet search result grouping* in Wang-Mills-Brinson-Mehta is missing *the first*

search term element and, thus, each example *first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element*.

8. Claim 14: The process of claim 13, wherein the selectable advertisement and the first or second search result grouping are adjacent to each other.

344. As I discussed above (§XII.B.7.a), based on Mehta, *the selectable advertisement and* search results (including *the first and/or second search results*) *are adjacent to each other* (*e.g.*, advertisements above and/or alongside search results).

345. As I discussed above ([**13A**], §XII.B.7.a), based on Mehta and conventional search result GUI design, it would have been obvious to display *the selectable advertisement and* search results (including *the first and/or second search results*) *adjacent to each other* (*e.g.*, advertisements above and/or alongside search results as illustrated in Mehta's FIG. 3A and EX1015's FIG. 3). *See also* EX1001, FIG. 1, 2:66-3:3 (describing FIG. 1 as illustrating a "common" search-result webpage GUI where advertisements 106 and 107 are displayed adjacent the search results).

9. Claims 16-22, 27-28, and 30-38

346. Wang-Mills-Brinson-Mehta (§XII.A) meets the limitations added by the claims below for the reasons discussed in the corresponding sections above that are identified below.

Claims	Addressed in Section:
16/30	§XII.B.1 ([**claim 2**])
17/31	§XII.B.2 ([**claim 3**])
18/32	§XII.B.3 ([**claim 4**]; for claim 32 see also §XI.D.3 ([**29B**] (wherein I identified a *second Internet search result* that is missing *the second search term element*))
19/33	§XII.B.4 ([**claim 5**])
20/22/34/36	§XII.B.5 ([**claim 6**])
21/35	§XII.B.6 ([**claim 7**])
27/37	§XII.B.7 ([**claim 13**]; for claim 37 *see also* §XI.D.3 ([**29B**] wherein I identified a *second Internet search results* that is missing *the second search term element*))
28/38	§XII.B.8 ([**claim 14**])

XIII. GROUND 2C: WANG-MILLS-BRINSON-MEHTA-NAICK RENDERS OBVIOUS CLAIMS 9-12 AND 23-26

A. The Wang-Mills-Brinson-Mehta-Naick Combination

347. As I discussed above in Ground 1C (§X.A), in identifying a webpage as a search result, Naick's search technique considers whether the user's search terms are found on either (or both) the webpage and its descendant webpage(s) because doing so can better ensure that the search identifies "possible relevant information." Naick, [0004].

348. Thus, in my opinion, POSAs would have had the same reasons to augment Wang-Mills-Brinson-Mehta based on Naick in the same ways that I discussed above in Ground 1C (§X.B), where I explained that POSAs would have had reason to augment Bates-Brinson-Mehta and Bates-Bhagat-Brinson-Mehta based on Naick.

349. For the same reasons I discussed above for the Ground 1C's combinations (§X.B; citing corroboration), POSAs would have been motivated to provide implementations of Ground 2C's Wang-Mills-Brinson-Mehta-Naick combination in which the search engine searches only one descendant level, as POSAs knew this would have been a reasonable design tradeoff that may be desirable in situations where speed (*i.e.*, reducing the number of levels to aggregate and search across) was prioritized over finding all potentially relevant websites (*e.g.*, by searching all possible descendant levels). Making a tradeoff between

speed and breadth of search would have been a well-understood design tradeoff to POSAs. POSAs understood that a line would have to be drawn somewhere for how many descendent levels to search and that searching one descendent level would have been a reasonable design choice.

350. In my opinion, POSAs would have had a reasonable expectation of success because Naick says its "[s]earch logic may be substantially similar to that of conventional search systems" (Naick, [0026]) and only requires a "search engine" with "conventional components" (Naick, [0028]-[0029]).

B. Mapping to the Challenged Claims

1. Claims 9 and 23

a. [9A]/[23A]: The process of claim 3[/claim 17], wherein the first webpage has one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first referenced webpage; and

351. As I discussed above for Ground 2B, **claim 5** (§XII.B.4 above; citing corroboration), POSAs understood it would have been obvious and commonplace for each example *first webpage* to *ha[ve] one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first referenced webpage* (*e.g.*, all webpages from the same multi-webpage website missing the same search term).

b. [9B]/[23B]: wherein the second webpage is missing a second search term element, wherein the second webpage has one or more second descendant webpages, wherein the second search result grouping not comprising any warning that any of the one or more search term elements is missing from the second referenced webpage indicates that the second search term element is contained in at least one of the one or more second descendant webpages, and wherein each of the one or more second descendant webpages is linked directly one level from the second webpage.

352. For the same reason that it would have been obvious and commonplace for the *first webpage* to have *descendant webpages*, it would have been obvious and commonplace for each example *second webpage* to have *descendant webpages*.

353. Ground 2C's Wang-Mills-Brinson-Mehta-Naick combination build on Ground 1B's combination (*i.e.*, Wang-Mills-Brinson-Mehta), and therefore includes the *annotations* used in Wang-Mills-Brinson-Mehta. *See supra* Ground 2A, limitation [**1D**] (§XI.D.1.e, discussing the annotation in the combination). Based on Naick, these *annotations* for a webpage also consider the presence or absence of search-term elements in the webpage's descendant webpage(s). Naick, [0004]-[0006], [0022]-[0023]. As I also discussed above (§XIII.A), POSAs would have had reason to limit the search to only search descendant webpages that are linked directly one level from the referenced webpage. Thus, when *the second webpage is missing a second search term element* the absence of *any warning*

would *indicate that the second search term element is contained in at least one…descendant webpage[]…linked directly one level* therefrom.

354. Therefore, the Ground 2C's Wang-Mills-Brinson-Mehta-Naick combination meets and renders obvious claims 9 and 23.

2. Claims 10-12, and 24-26

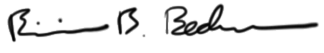
355. Wang-Mills-Brinson-Mehta-Naick meets the limitations added by the claims below for the reasons discussed in the corresponding sections above that are identified below.

Claim(s)	**Addressed in Section(s):**
10/24	§XII.B.5([**claim 6**])
11/25	§XII.B.6 ([**claim 7**])
12/26	§XI.D.4.a ([**39A**])

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



Benjamin B. Bederson

XIV. CLAIM LISTING APPENDIX

Claim 1
[1PRE] A process for Internet search, annotation, and filtering for providing an enhanced interactive graphical user interface for Internet search that enables a search engine user to automatically remove one or more search results that each reference a webpage that does not contain a desired search term element, enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element, the process comprising:
[1A] receiving a search request from a search engine user on a personal computing device having a display screen, the search request comprising one or more search term elements;
[1B] generating, by operating a search engine in response to receiving the search request, a first Internet search result that references a first webpage that is missing a first search term element and a second Internet search result that references a second webpage;
[1C] generating and providing, for display on the personal computing device, an Internet search user interface;
[1D] wherein the Internet search user interface comprises the first Internet search result and a first warning to the search engine user that the first webpage is missing the first search term element, wherein the first warning comprises a text representing the first search term element;
[1E] wherein the first Internet search result is organized for display as a first search result grouping comprising a first excerpt for the first webpage, a first Internet link for the first webpage, and the first warning;
[1F] wherein the Internet search user interface further comprises the second Internet search result; wherein the second Internet search result is organized for display as a second search result grouping that comprises a second excerpt from the second webpage and a second Internet link for the second webpage but does not comprise any warning that any of the one or more search term elements is missing from the second webpage;
[1G] wherein the first and second search result groupings are each a unique search result grouping displayed separately from each other;

[1H] wherein the Internet search user interface provides a filtering option, wherein the search engine user's selection of the filtering option causes an updated Internet search user interface to be generated and provided for display on the personal computing device, and wherein the updated Internet search user interface does not display the first Internet search result; and
[1I] wherein the process is performed on one or more servers located remotely from the personal computing device.
Claim 2
The process of claim 1, wherein the Internet search user interface further comprises a selectable advertisement that is related to at least some of the one or more of the search term elements.
Claim 3
The process of claim 2, wherein the text representing the first search term element is shown 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 4
The process of claim 3, wherein the first Internet search result would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.
Claim 5
The process of claim 4, wherein the first webpage has one or more descendant webpages, wherein each of the one or more descendant webpages is also missing the first search term element, and wherein each of the one or more descendant webpages is linked directly one level from the first webpage.

Claim 6
[6A] The process of claim 5, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, or tablet computer's display screen, and
[6B] wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.
Claim 7
The process of claim 6, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element.
Claim 8
[8A] The process of claim 3, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, or tablet computer's display screen, and
[8B] wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.

Claim 9
[9A] The process of claim 3, wherein the first webpage has one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first referenced webpage; and
[9B] wherein the second webpage is missing a second search term element, wherein the second webpage has one or more second descendant webpages, wherein the second search result grouping not comprising any warning that any of the one or more search term elements is missing from the second referenced webpage indicates that the second search term element is contained in at least one of the one or more second descendant webpages, and wherein each of the one or more second descendant webpages is linked directly one level from the second webpage.
Claim 10
[10A] The process of claim 9, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, or tablet computer's display screen, and
[10B] wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.
Claim 11
The process of claim 10, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element.
Claim 12
The process of claim 9, wherein the first search term element and the second search term element are a same search term element.

Claim 13
[13A] The process of claim 2, wherein the selectable advertisement and the first search result grouping are simultaneously viewable on the display screen; and
[13B] wherein the first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.
Claim 14
The process of claim 13, wherein the selectable advertisement and the first or second search result grouping are adjacent to each other.
Claim 15
[15PRE] A system for providing an enhanced interactive graphical Internet search user interface for an Internet search process combining Internet search, annotation, and filtering that enables a search engine user to request an Internet search and automatically remove one or more search results that each reference a webpage that does not contain a desired search term element, enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element, the system comprising:
[15A] one or more servers for operating a search engine and for providing an Internet search user interface to a search engine user for operation on a personal computing device having a display screen;
[15B] wherein the one or more servers receive a search request from the search engine user via the personal computing device, the search request comprising one or more search term elements;
[15C] wherein the one or more servers generate, by operating the search engine in response to receiving the search request, a first Internet search result that references a first webpage that is missing a first search term element and a second Internet search result that references a second webpage;
[15D] wherein the one or more servers generate and provide, for display on the personal computing device, the Internet search user interface;
[15E] wherein the Internet search user interface comprises the first Internet search result and a first warning to the search engine user that the first webpage is missing the first search term element, wherein the first warning comprises a text representing the first search term element;

[15F] wherein the first Internet search result is organized for display as a first search result grouping comprising a first excerpt for the first webpage, a first Internet link for the first webpage, and the first warning;
[15G] wherein the Internet search user interface further comprises the second Internet search result, wherein the second Internet search result is organized for display as a second search result grouping that comprises a second excerpt from the second webpage and a second Internet link for the second webpage but does not comprise any warning that any of the one or more search term elements is missing from the second webpage;
[15H] wherein the first and second search result groupings are each a unique search result grouping displayed separately from each other;
[15I] wherein the Internet search user interface provides a filtering option, wherein the search engine user's selection of the filtering option causes an updated Internet search user interface to be generated and provided, by the one or more servers, for display on the personal computing device; and wherein the updated Internet search user interface does not display the first Internet search result.
Claim 16
The system of claim 15, wherein the Internet search user interface further comprises a selectable advertisement that is related to at least some of the one or more of the search term elements.
Claim 17
The system of claim 16, wherein the text representing the first search term element is shown 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 18
The system of claim 17, wherein the first Internet search result would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.

Claim 19
The system of claim 18, wherein the first webpage has one or more descendant webpages, where each of the one or more descendant webpages is also missing the first search term element, and wherein each of the one or more descendant webpages is linked directly one level from the first webpage.
Claim 20
[20A] The system of claim 19, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and
[20B] wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.
Claim 21
The system of claim 20, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element.
Claim 22
[22A] The system of claim 17, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and
[22B] wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.
Claim 23
[23A] The system of claim 17, wherein the first webpage has one or more first descendant webpages, wherein each of the one or more first descendant webpages is also missing the first search term element, wherein each of the one or more first descendant webpages is linked directly one level from the first webpage; and

[23B] wherein the second webpage is missing a second search term element, wherein the second webpage has one or more second descendant webpages, wherein the second search result grouping not comprising any warning that any of the one or more search term elements is missing from the second webpage indicates that the second search term element is contained in at least one of the one or more second descendant webpages, and wherein each of the one or more second descendant webpages is linked directly one level from the second webpage.
Claim 24
[24A] The system of claim 23, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and
[24B] wherein the updated Internet search user interface enables the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first search term element compared with the Internet search user interface prior to the selection of the filtering option without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.
Claim 25
The system of claim 24, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element.
Claim 26
The system of claim 23, wherein the first search term element and the second search term element are a same search term element.
Claim 27
[27A] The system of claim 16, wherein the selectable advertisement and the first search result grouping are simultaneously viewable on the display screen; and
[27B] wherein the first Internet search result grouping would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first search term element.
Claim 28
The system of claim 27, wherein the selectable advertisement and the first or second search result grouping are adjacent to each other.

Claim 29
[29PRE] A process for Internet search, annotation, and filtering for providing an enhanced interactive graphical user interface for Internet search that enables a search engine user to automatically remove one or more search results that each reference a webpage that does not contain a desired search term element, enabling a faster operation of Internet search for the search engine user by enabling the search engine user to avoid spending time visiting a webpage that is missing the desired search term element, the process comprising:
[29A] receiving a search request from a search engine user via a personal computing device having a display screen, the search request comprising one or more search term elements;
[29B] generating, by operating a search engine in response to receiving the search request, a first Internet search result that references a first webpage that is missing a first search term element and a second Internet search result that references a second webpage that is missing a second search term element;
[29C] generating and providing, for display on the personal computing device, an Internet search user interface;
[29D] wherein the Internet search user interface comprises the first Internet search result and a first warning to the search engine user that the first webpage is missing the first search term element, wherein the first warning comprises a first text representing the first search term element;
[29E] wherein the first Internet search result is organized for display as a first search result grouping comprising a first excerpt from the first webpage, a first Internet link for the first webpage, and the first warning;
[29F] wherein the Internet search user interface further comprises the second Internet search result and a second warning to the search engine user that the second webpage is missing the second search term element, wherein the second warning comprises a second text representing the second search term element;
[29G] wherein the second Internet search result is organized for display as a second search result grouping comprising a second excerpt from the second webpage, a second Internet link for the second webpage, and the second warning;
[29H] wherein the first and second search result groupings are each a unique search result grouping displayed separately from each other, wherein the first warning from the first search result grouping and the second warning from the second search result grouping are each an individual warning displayed separately from each other;

[29I] wherein the Internet search user interface provides a first filtering option in connection with the first search term element and a second filtering option in connection with the second search term element, wherein the search engine user's selection of the first filtering option causes a first updated Internet search user interface to be generated and provided for display on the personal computing device, wherein the first updated Internet search user interface does not display the first Internet search result, wherein the search engine user's selection of the second filtering option causes a second updated Internet search user interface to be generated and provided for display on the personal computing device, wherein the second updated Internet search user interface does not display the second Internet search result; and
[29J] wherein the process is performed on one or more servers located remotely from the personal computing device.
Claim 30
The process of claim 29, wherein the Internet search user interface further comprises a selectable advertisement that is related to at least some of the one or more search term elements.
Claim 31
The process of claim 30, wherein the first or second text representing the first or second search term element, respectively, is shown in at least one of the following formats: (i) a font representing the first or second text has been altered; (ii) the first or second text is shown with one or more lines merged with the text; (iii) the first or second text is shown with one or more lines superimposed thereupon; (iv) the first or second text is shown within a shaded area; and (v) the first or second text is shown with a reversed format.
Claim 32
The process of claim 31, wherein the first and second Internet search results would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first and second search term elements.
Claim 33
The process of claim 32, wherein the first webpage has one or more descendant webpages, wherein each of the one or more descendant webpages is also missing the first search term element, and wherein each of the one or more descendant webpages is linked directly one level from the first referenced webpage.

Claim 34
[34A] The process of claim 33, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and
[34B] wherein the first and second updated Internet search user interfaces enable the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first or second search term elements, respectively, compared with the Internet search user interface prior to the selection of the first or second filtering option, respectively, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.
Claim 35
The process of claim 34, wherein a search term element is considered to be contained in a webpage if the webpage contains at least one of: the search term element, a synonym of the search term element, or a misspelled version of the search term element.
Claim 36
[36A] The process of claim 31, wherein the personal computing device is a smartphone with a smaller display screen than a laptop, desktop, notebook, or tablet computer's display screen, and
[36B] wherein the first and second updated Internet search user interfaces enable the smaller display screen to display an increased number of Internet search results that each reference a webpage containing the first or second search term elements, respectively, compared with the Internet search user interface prior to the selection of the first or second filtering option, respectively, without being scrolled by the search engine user, thereby further speeding the search engine user's operation of Internet search.
Claim 37
[37A] The process of claim 30, wherein the selectable advertisement and the first or second search result grouping are simultaneously viewable on the display screen; and
[37B] wherein the first and second Internet search results would not have been displayed on the Internet search user interface if, in response to receiving the search request, the search engine was operated by using an "AND" logical operation that includes the first and second search term elements.

Claim 38
The process of claim 37, wherein the selectable advertisement and the first or second search result grouping are adjacent to each other.
Claim 39
[39A] The process of claim 29, wherein the first search term element and the second search term element are a same search term element, wherein the first text and the second text are identical, and
[39B] wherein each of the first and second updated Internet search user interfaces does not display the first and second Internet search results.