US008229951B2

(12) **United States Patent**
Nickell et al.

(10) **Patent No.: US 8,229,951 B2**
(45) **Date of Patent: Jul. 24, 2012**

(54) **METHOD AND SYSTEM FOR ENABLING USERS SEARCHING FOR COMMON SUBJECT MATTER ON A COMPUTER NETWORK TO COMMUNICATE WITH ONE ANOTHER**

(75) Inventors: **Seth Nickell**, Cambridge, MA (US); **Bryan Clark**, Cambridge, MA (US)

(73) Assignee: **Red Hat, Inc.**, Raleigh, NC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 384 days.

(21) Appl. No.: **11/160,897**

(22) Filed: **Jul. 14, 2005**

(65) **Prior Publication Data**

US 2007/0016585 A1 Jan. 18, 2007

(51) **Int. Cl.**
G06F 7/00 (2006.01)

(52) **U.S. Cl.** **707/767**; 715/758; 709/204

(58) **Field of Classification Search** 715/751–758; 709/204–207; 707/767

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,793,365	A *	8/1998	Tang et al.	715/758
6,006,225	A	12/1999	Bowman et al.	707/5
6,321,228	B1	11/2001	Crandall et al.	707/10
6,345,290	B2 *	2/2002	Okada et al.	709/204
6,430,558	B1	8/2002	Delano	707/5
6,559,863	B1 *	5/2003	Megiddo	715/753
6,651,086	B1 *	11/2003	Manber et al.	709/205
6,671,681	B1	12/2003	Emens et al.	707/5
6,732,088	B1	5/2004	Glance	707/3
6,745,178	B1 *	6/2004	Emens et al.	707/3
6,823,363	B1 *	11/2004	Noveck et al.	709/204
6,832,218	B1	12/2004	Emens et al.	707/3
7,257,766	B1 *	8/2007	Koppel et al.	715/205
7,263,526	B1 *	8/2007	Busey et al.	1/1
7,328,031	B2 *	2/2008	Kraft	455/466
7,356,772	B2 *	4/2008	Brownholtz et al.	715/752
2003/0001890	A1 *	1/2003	Brin	345/753
2003/0046281	A1 *	3/2003	Son	707/6
2003/0078972	A1 *	4/2003	Tapissier et al.	709/204
2003/0088623	A1 *	5/2003	Kusuda	709/204
2003/0195928	A1 *	10/2003	Kamijo et al.	709/204
2004/0049539	A1 *	3/2004	Reynolds et al.	709/203
2004/0225716	A1 *	11/2004	Shamir et al.	709/204
2005/0080868	A1 *	4/2005	Malik	709/207
2005/0097089	A1 *	5/2005	Nielsen et al.	707/3
2005/0149576	A1 *	7/2005	Marmaros et al.	707/200
2005/0193099	A1 *	9/2005	Reus et al.	709/220
2005/0223315	A1 *	10/2005	Shimizu et al.	715/512
2005/0234883	A1 *	10/2005	Szeto et al.	707/3

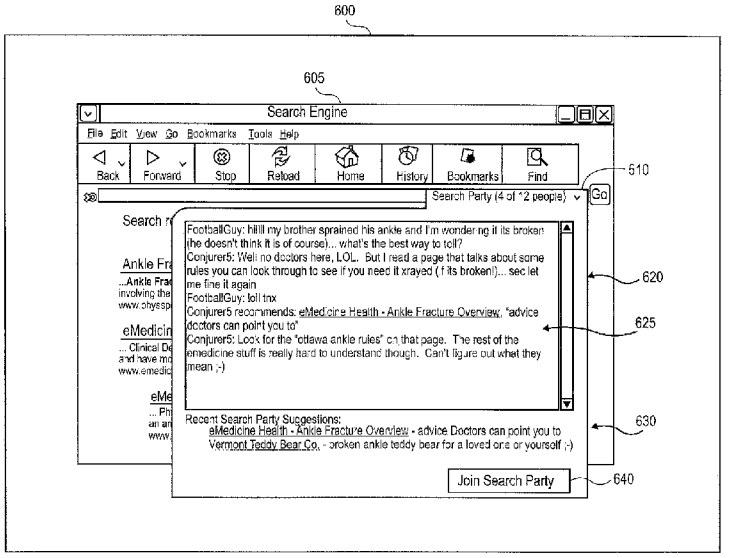
* cited by examiner

Primary Examiner — Vei-Chung Liang
(74) *Attorney, Agent, or Firm* — Lowenstein Sandler PC

(57) **ABSTRACT**

Users searching for common subject matter on a computer network are identified and enabled to communicate with one another, such as by engaging in an on-line chat. The users' search queries are transmitted to a server and processed to identify which users are searching for common subject matter within a time window. A dialogue such as an on-line chat is launched and the identified users are invited to join. The users may preview the chat before joining. The users can share links to resources such as web pages and provide annotations to accompany the links. Additionally, the users' search queries may be shared in the chat. The functionality may be provided by a plug-in to web browser software, or by an executable script embedded in a web page of search results.

36 Claims, 12 Drawing Sheets



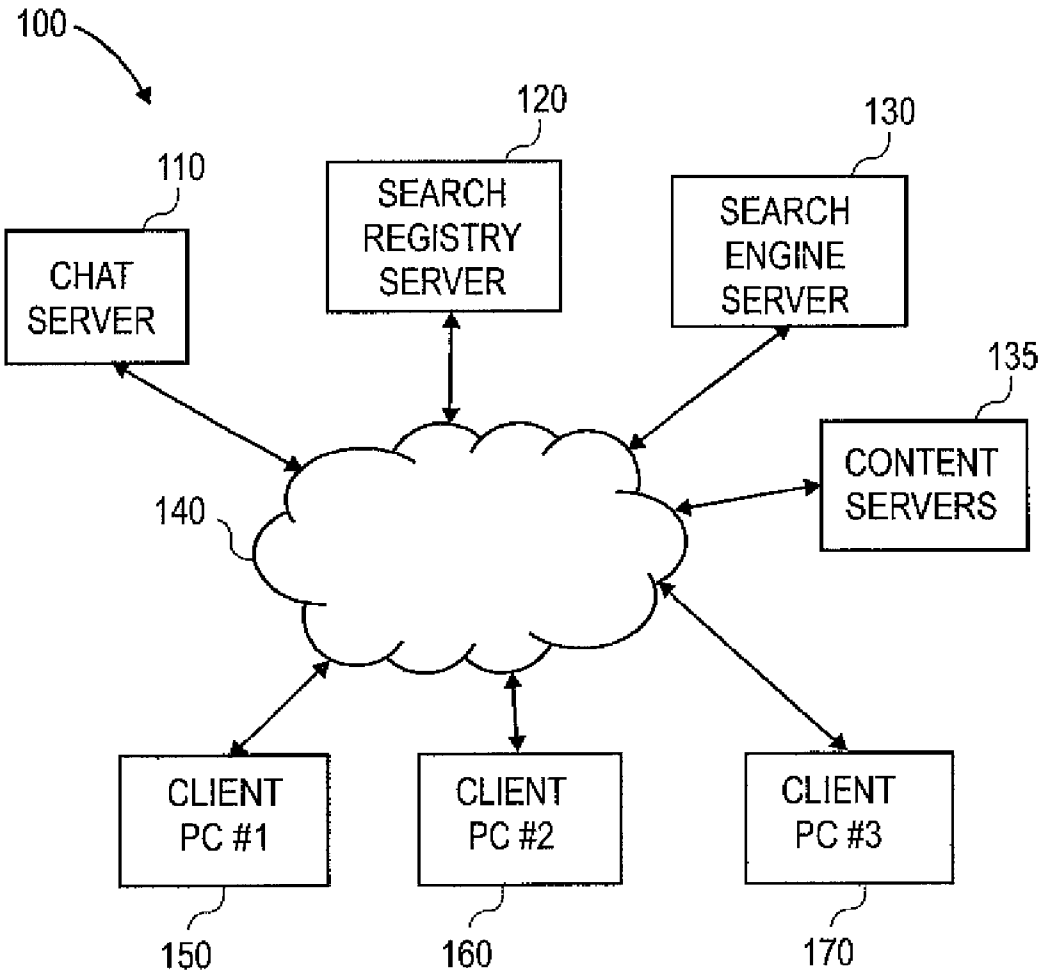

100
110
CHAT SERVER
120
SEARCH REGISTRY SERVER
130
SEARCH ENGINE SERVER
135
CONTENT SERVERS
140
CLIENT PC #1
CLIENT PC #2
CLIENT PC #3
150
160
170

FIG. 1

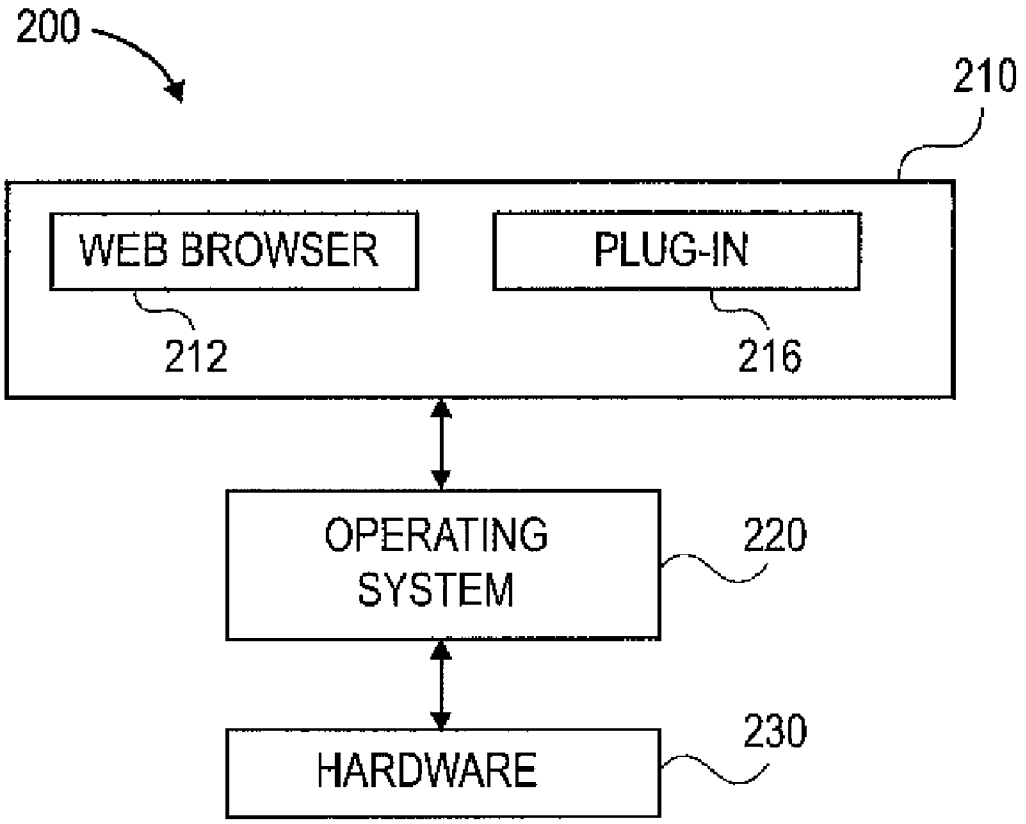

200
210
WEB BROWSER
PLUG-IN
212
216
OPERATING SYSTEM
220
HARDWARE
230

FIG. 2

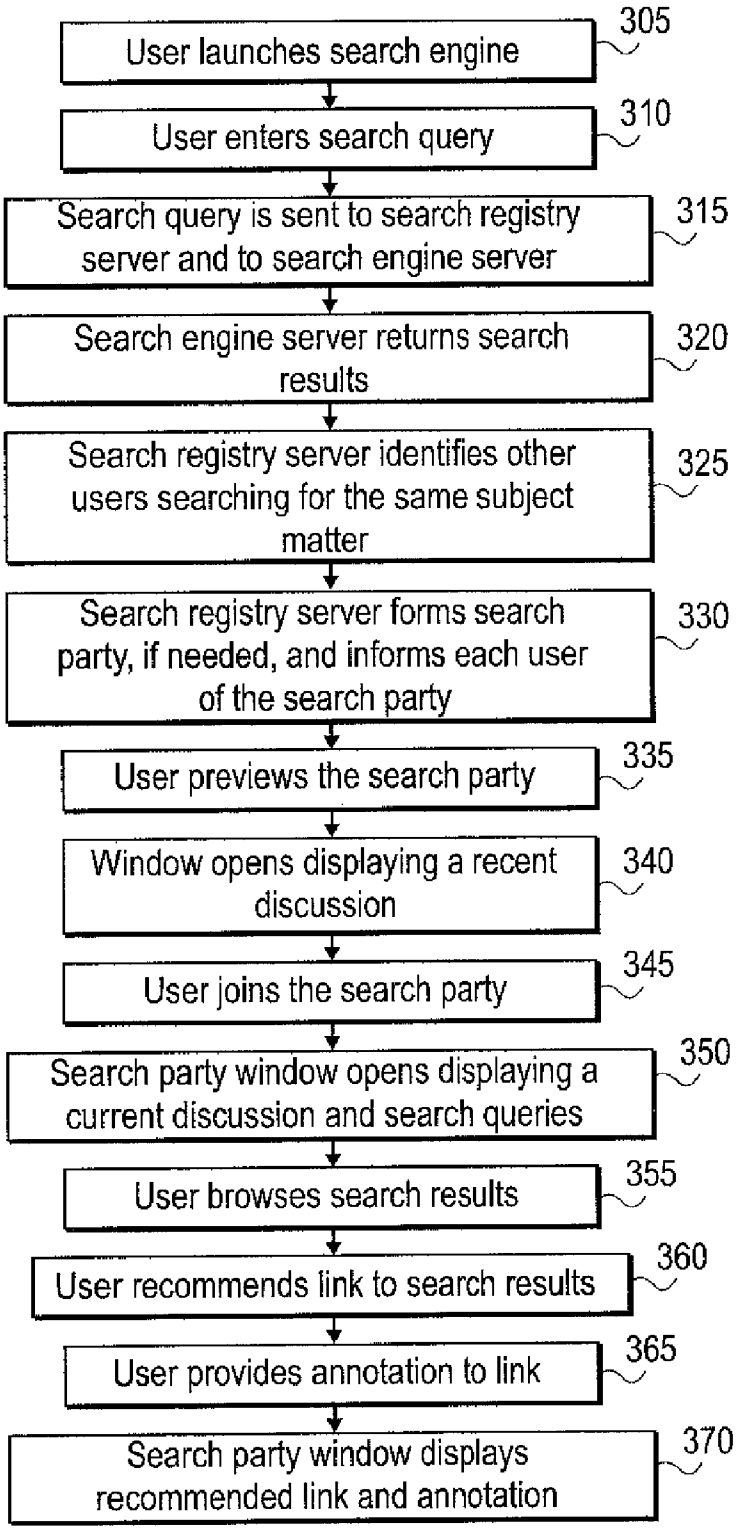

User launches search engine
305
User enters search query
310
Search query is sent to search registry server and to search engine server
315
Search engine server returns search results
320
Search registry server identifies other users searching for the same subject matter
325
Search registry server forms search party, if needed, and informs each user of the search party
330
User previews the search party
335
Window opens displaying a recent discussion
340
User joins the search party
345
Search party window opens displaying a current discussion and search queries
350
User browses search results
355
User recommends link to search results
360
User provides annotation to link
365
Search party window displays recommended link and annotation
370

FIG. 3

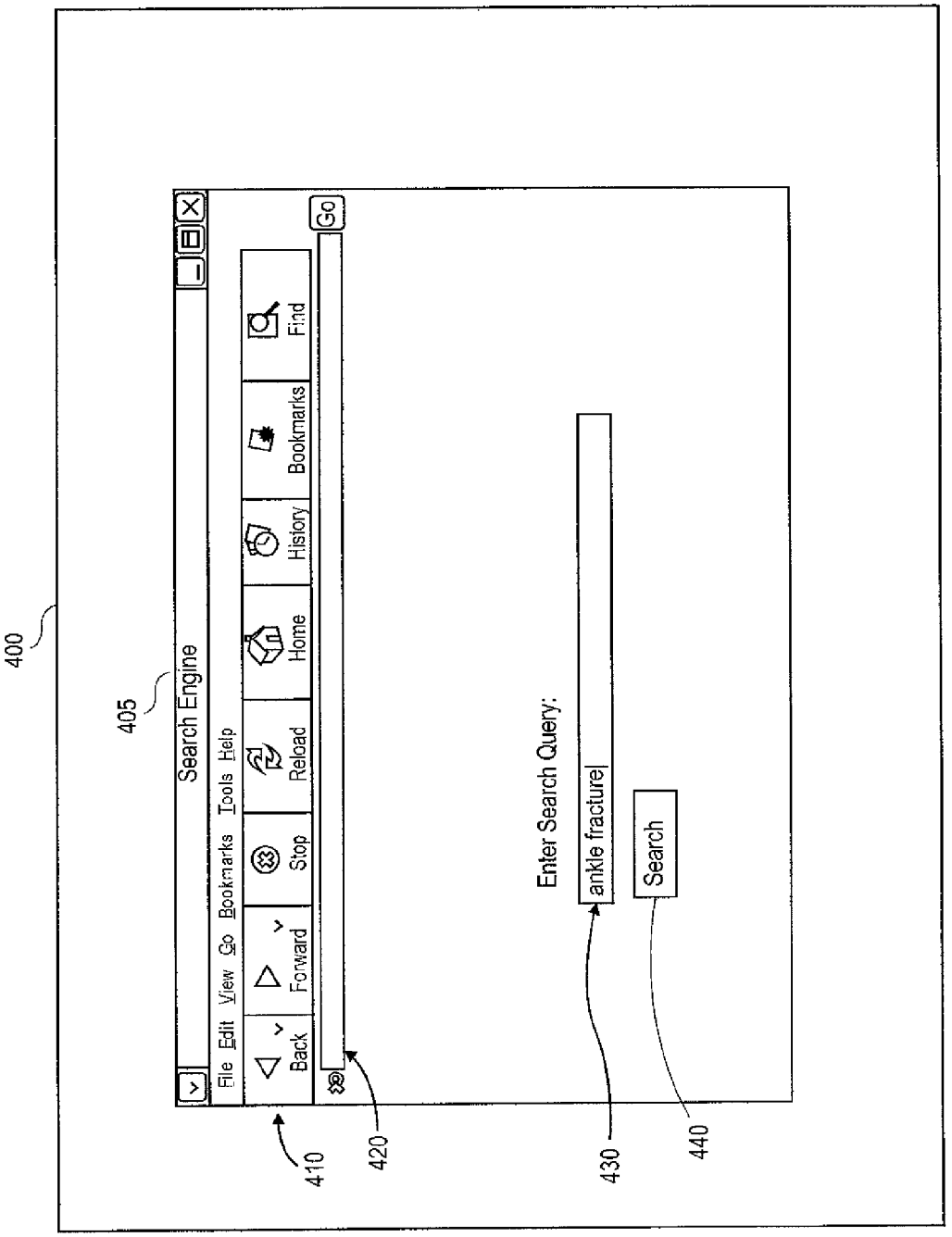

400
405
Search Engine
File Edit View Go Bookmarks Tools Help
Back
Forward
Stop
Reload
Home
History
Bookmarks
Find
Go
Enter Search Query:
ankle fracture
Search
410
420
430
440

FIG. 4

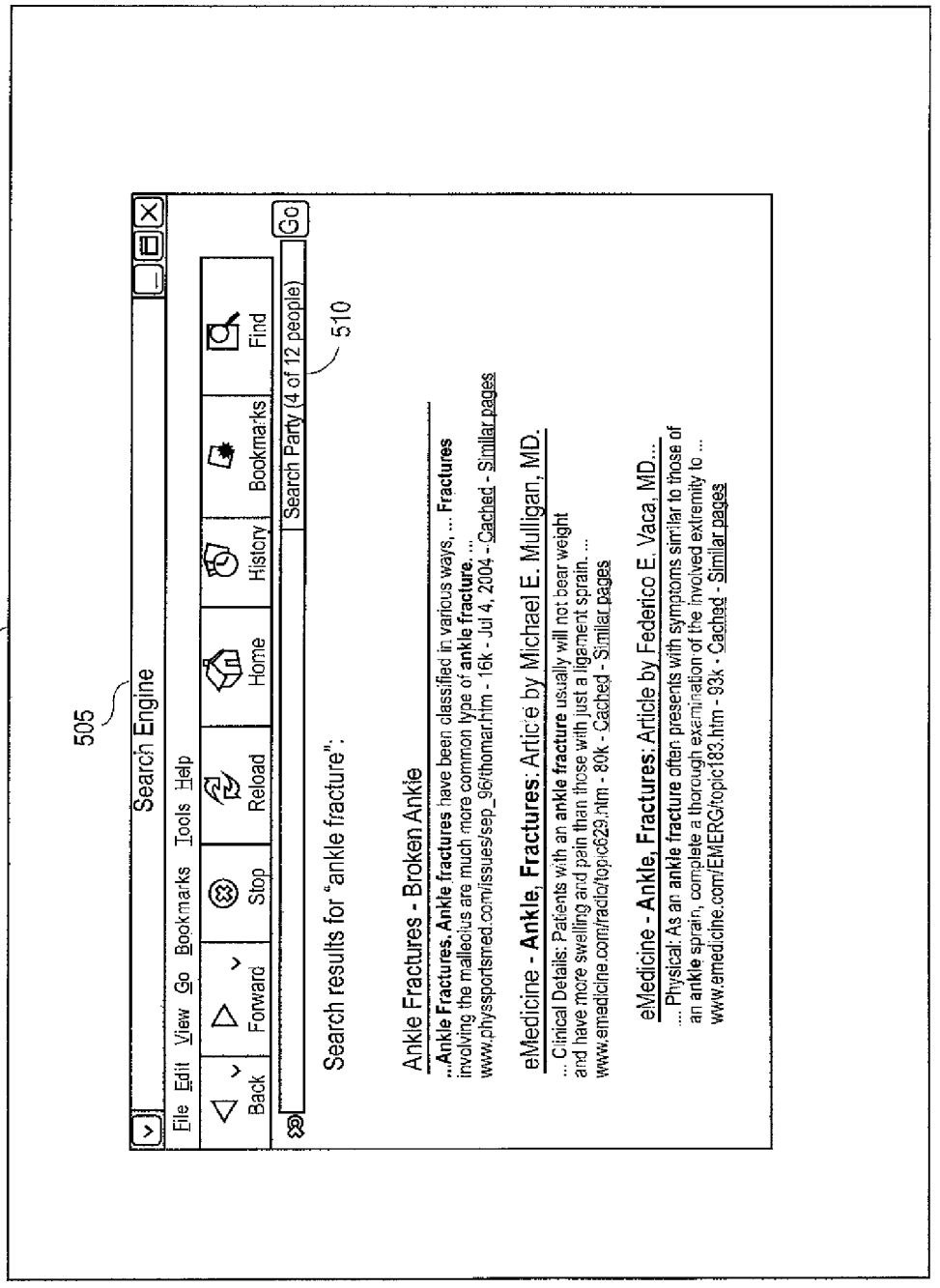

500
505
Search Engine
File Edit View Go Bookmarks Tools Help
Back
Forward
Stop
Reload
Home
History
Bookmarks
Find
Search Party (4 of 12 people)
Go
510
Search results for "ankle fracture":
Ankle Fractures - Broken Ankle
..Ankle Fractures. Ankle fractures have been classified in various ways, ... Fractures involving the malleolus are much more common type of ankle fracture. ...
www.physsportsmed.com/issues/sep_96/thomar.htm - 16k - Jul 4, 2004 - Cached - Similar pages
eMedicine - Ankle, Fractures: Article by Michael E. Mulligan, MD.
... Clinical Details: Patients with an ankle fracture usually will not bear weight and have more swelling and pain than those with just a ligament sprain. ...
www.emedicine.com/radio/topic629.htm - 80k - Cached - Similar pages
eMedicine - Ankle, Fractures: Article by Federico E. Vaca, MD...
... Physical: As an ankle fracture often presents with symptoms similar to those of an ankle sprain, complete a thorough examination of the involved extremity to ...
www.emedicine.com/EMERG/topic183.htm - 93k - Cached - Similar pages

FIG. 5

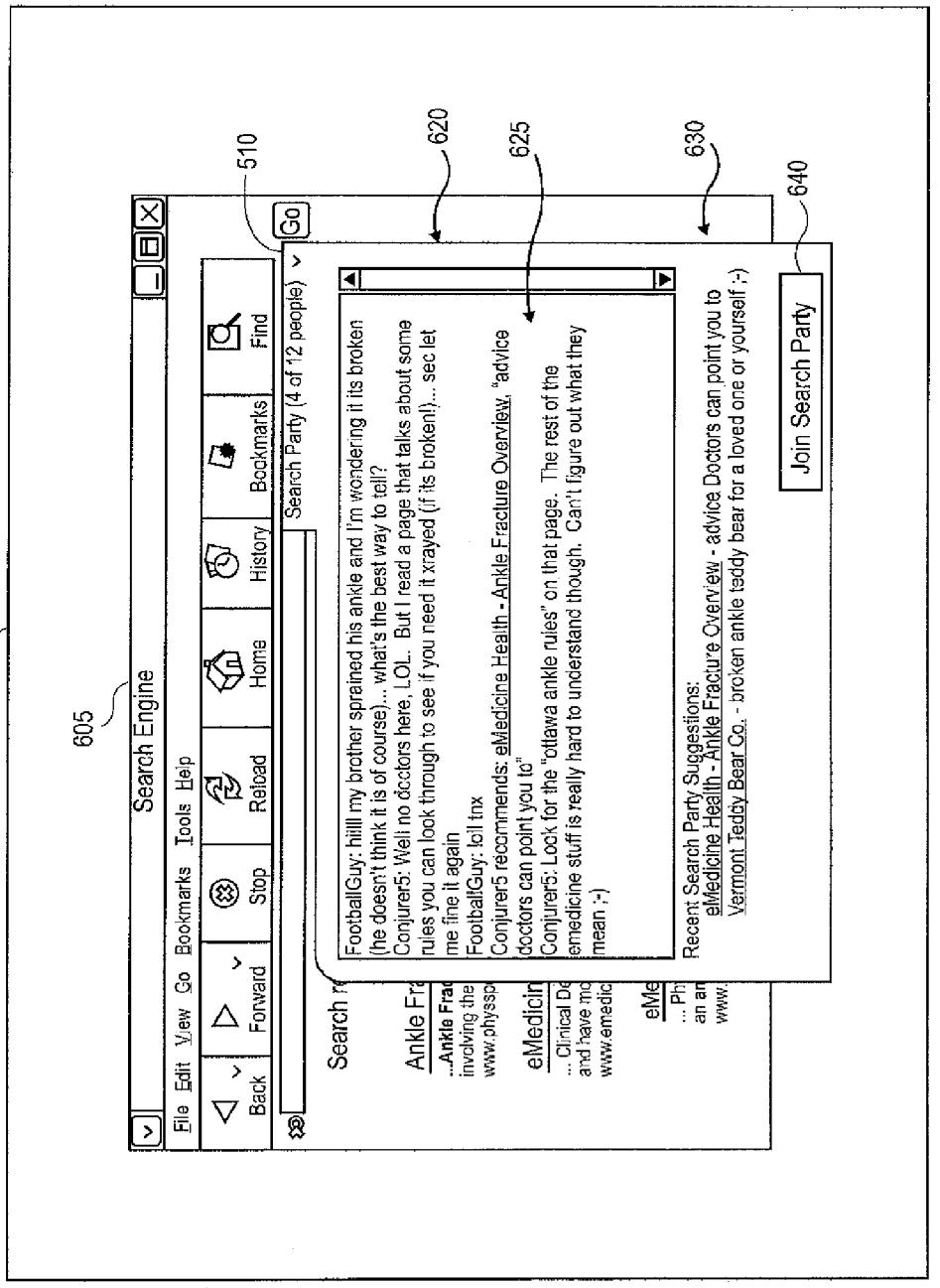

600
605
Search Engine
File Edit View Go Bookmarks Tools Help
Back
Forward
Stop
Reload
Home
History
Bookmarks
Find
510
Go
Search Party (4 of 12 people)
620
625
630
640
FootballGuy: hiiill my brother sprained his ankle and I'm wondering if its broken (he doesn't think it is of course)... what's the best way to tell?
Conjurer5: Well no doctors here, LOL. But I read a page that talks about some rules you can look through to see if you need it xrayed (if its broken!)... sec let me fine it again
FootballGuy: lol tnx
Conjurer5 recommends: eMedicine Health - Ankle Fracture Overview, "advice doctors can point you to"
Conjurer5: Look for the "ottawa ankle rules" on that page. The rest of the emedicine stuff is really hard to understand though. Can't figure out what they mean ;-)
Recent Search Party Suggestions:
eMedicine Health - Ankle Fracture Overview - advice Doctors can point you to
Vermont Teddy Bear Co. - broken ankle teddy bear for a loved one or yourself ;-)
Join Search Party

FIG. 6

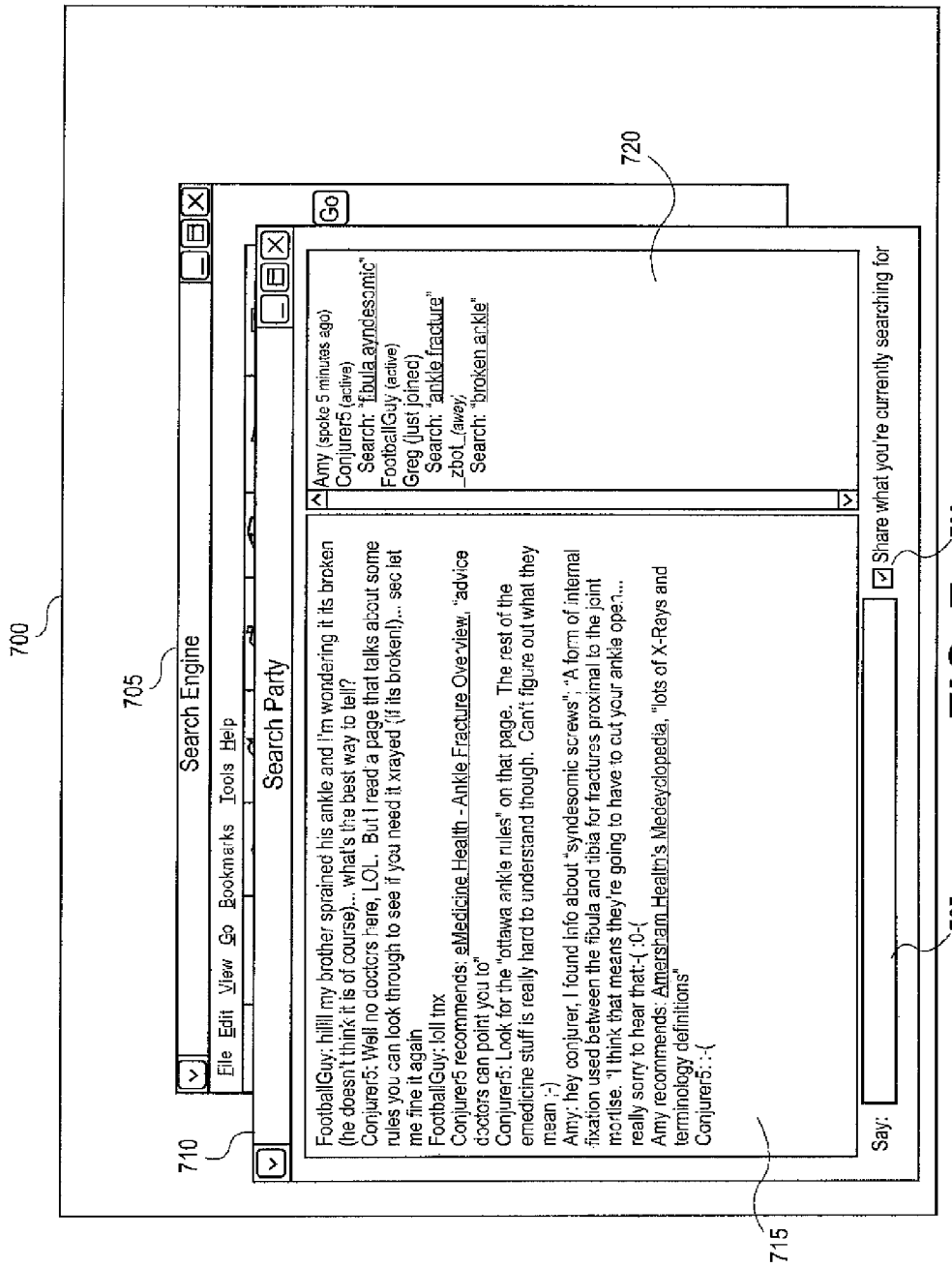

700
705
Search Engine
File Edit View Go Bookmarks Tools Help
710
Search Party
Go
720
Amy (spoke 5 minutes ago)
Conjurer5 (active)
Search: "fibula syndesomic"
FootballGuy (active)
Greg (just joined)
Search: "ankle fracture"
_zbot (away)
Search: "broken ankle"
FootballGuy: hillll my brother sprained his ankle and I'm wondering it its broken (he doesn't think it is of course)... what's the best way to tell?
Conjurer5: Well no doctors here, LOL. But I read a page that talks about some rules you can look through to see if you need it xrayed (if its broken)... sec let me fine it again
FootballGuy: loll tnx
Conjurer5 recommends: eMedicine Health - Ankle Fracture Overview, "advice doctors can point you to"
Conjurer5: Look for the "ottawa ankle rules" on that page. The rest of the emedicine stuff is really hard to understand though. Can't figure out what they mean :-)
Amy: hey conjurer, I found info about "syndesomic screws", "A form of internal fixation used between the fibula and tibia for fractures proximal to the joint mortise. "I think that means they're going to have to cut your ankle open... really sorry to hear that:-(:0-(
Amy recommends: Amersham Health's Medeydopedia, "lots of X-Rays and terminology definitions"
Conjurer5: :-(
715
Say:
725
Share what you're currently searching for
730

FIG. 7

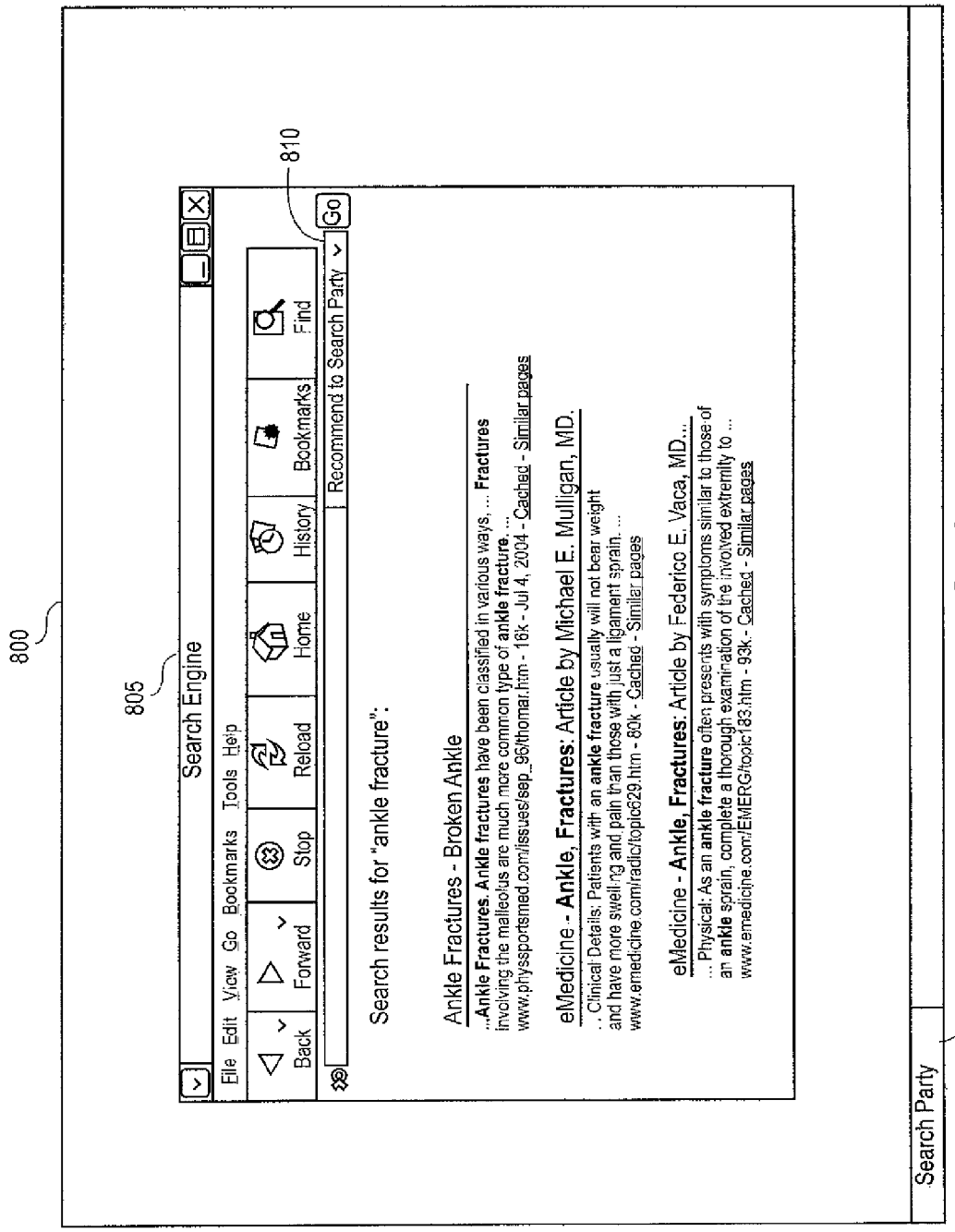

800
805
Search Engine
File Edit View Go Bookmarks Tools Help
Back
Forward
Stop
Reload
Home
History
Bookmarks
Find
810
Recommend to Search Party
Go
Search results for "ankle fracture":
Ankle Fractures - Broken Ankle
...Ankle Fractures. Ankle fractures have been classified in various ways, ... Fractures involving the malleolus are much more common type of ankle fracture. ... www.physsportsmed.com/issues/sep_96/thomar.htm - 16k - Jul 4, 2004 - Cached - Similar pages
eMedicine - Ankle, Fractures: Article by Michael E. Mulligan, MD.
... Clinical Details: Patients with an ankle fracture usually will not bear weight and have more swelling and pain than those with just a ligament sprain. ... www.emedicine.com/radio/topic629.htm - 80k - Cached - Similar pages
eMedicine - Ankle, Fractures: Article by Federico E. Vaca, MD...
... Physical: As an ankle fracture often presents with symptoms similar to those of an ankle sprain, complete a thorough examination of the involved extremity to ... www.emedicine.com/EMERG/topic183.htm - 93k - Cached - Similar pages
Search Party
820

FIG. 8

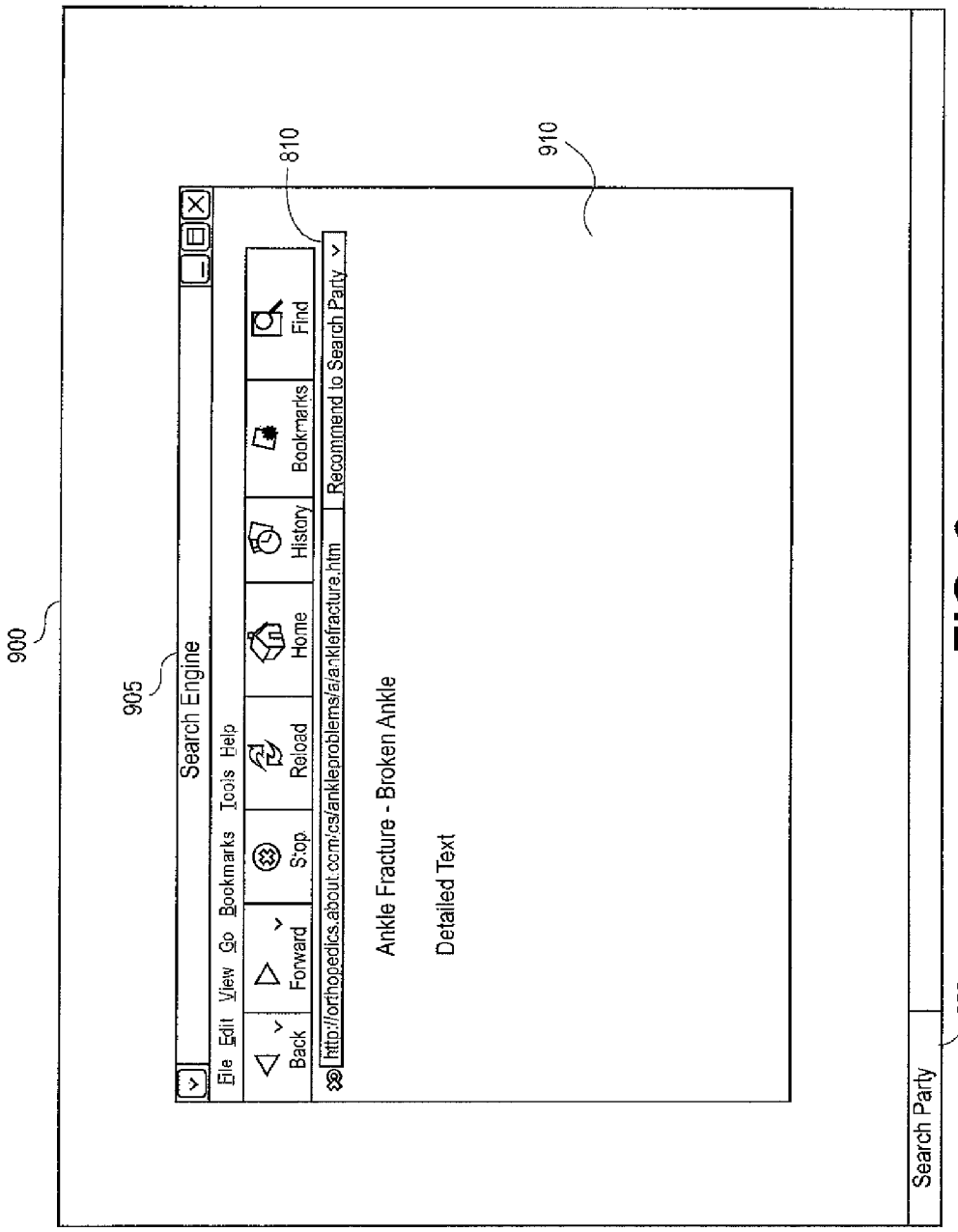

900
905
Search Engine
File Edit View Go Bookmarks Tools Help
Back
Forward
Stop
Reload
Home
History
Bookmarks
Find
810
http://orthopedics.about.com/cs/ankleproblems/a/anklefracture.htm
Recommend to Search Party
910
Ankle Fracture - Broken Ankle
Detailed Text
Search Party
820

FIG. 9

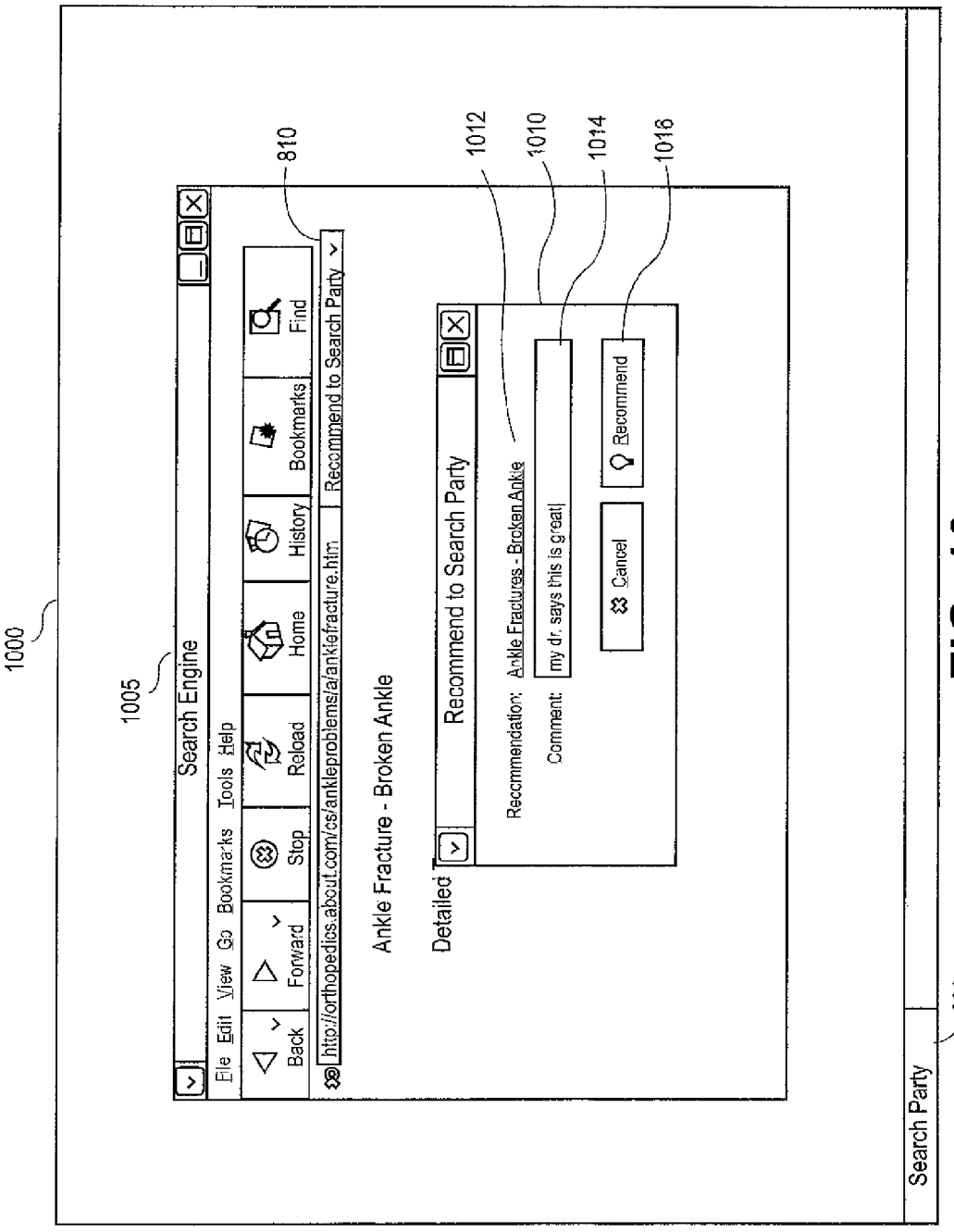

1000
1005
Search Engine
File Edit View Go Bookmarks Tools Help
Back
Forward
Stop
Reload
Home
History
Bookmarks
Find
810
http://orthopedics.about.com/cs/ankleproblems/a/anklefracture.htm
Recommend to Search Party
Ankle Fracture - Broken Ankle
Detailed
Recommend to Search Party
1012
1010
1014
1016
Recommendation: Ankle Fractures - Broken Ankle
Comment: my dr. says this is great!
Cancel
Recommend
Search Party
820

FIG. 10

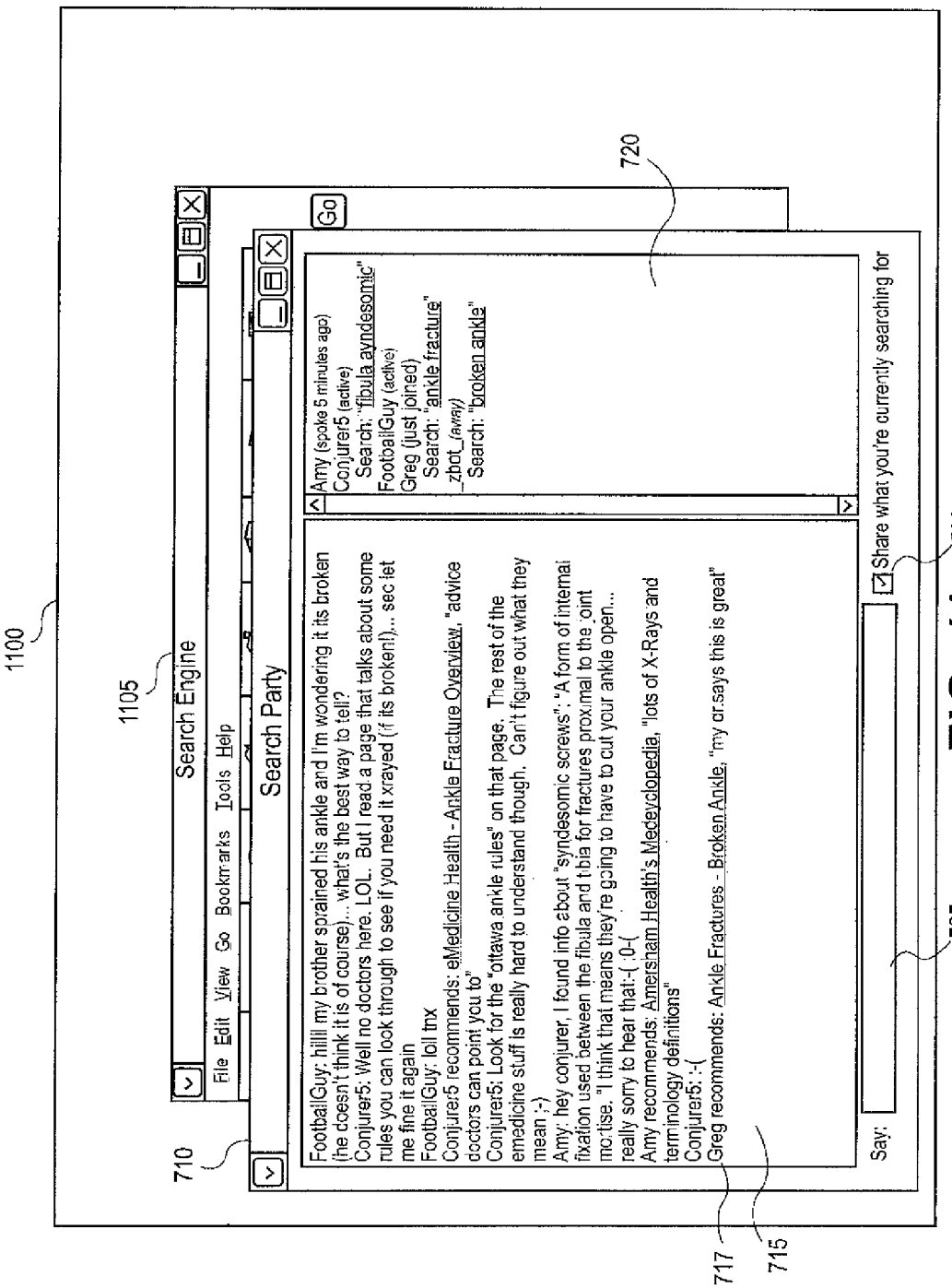

1100
1105
Search Engine
File Edit View Go Bookmarks Tools Help
Search Party
710
Go
720
Amy (spoke 5 minutes ago)
Conjurer5 (active)
Search: "fibula syndesomic"
FootballGuy (active)
Greg (just joined)
Search: "ankle fracture"
zbot_(away)
Search: "broken ankle"
FootballGuy: hilllll my brother sprained his ankle and I'm wondering it its broken (he doesn't think it is of course)... what's the best way to tell?
Conjurer5: Well no doctors here. LOL. But I read a page that talks about some rules you can look through to see if you need it xrayed (if its broken!)... sec let me fine it again
FootballGuy: lol tnx
Conjurer5 recommends: eMedicine Health - Ankle Fracture Overview, "advice doctors can point you to"
Conjurer5: Look for the "ottawa ankle rules" on that page. The rest of the emedicine stuff is really hard to understand though. Can't figure out what they mean ;-)
Amy: hey conjurer, I found info about "syndesomic screws": "A form of internal fixation used between the fibula and tibia for fractures proximal to the joint mortise. "I think that means they're going to have to cut your ankle open... really sorry to hear that:-(:0-(
Amy recommends: Amersham Health's Medcyclopedia, "lots of X-Rays and terminology definitions"
Conjurer5: :-(
Greg recommends: Ankle Fractures - Broken Ankle, "my dr says this is great"
Share what you're currently searching for
730
Say:
725
717
715

FIG. 11

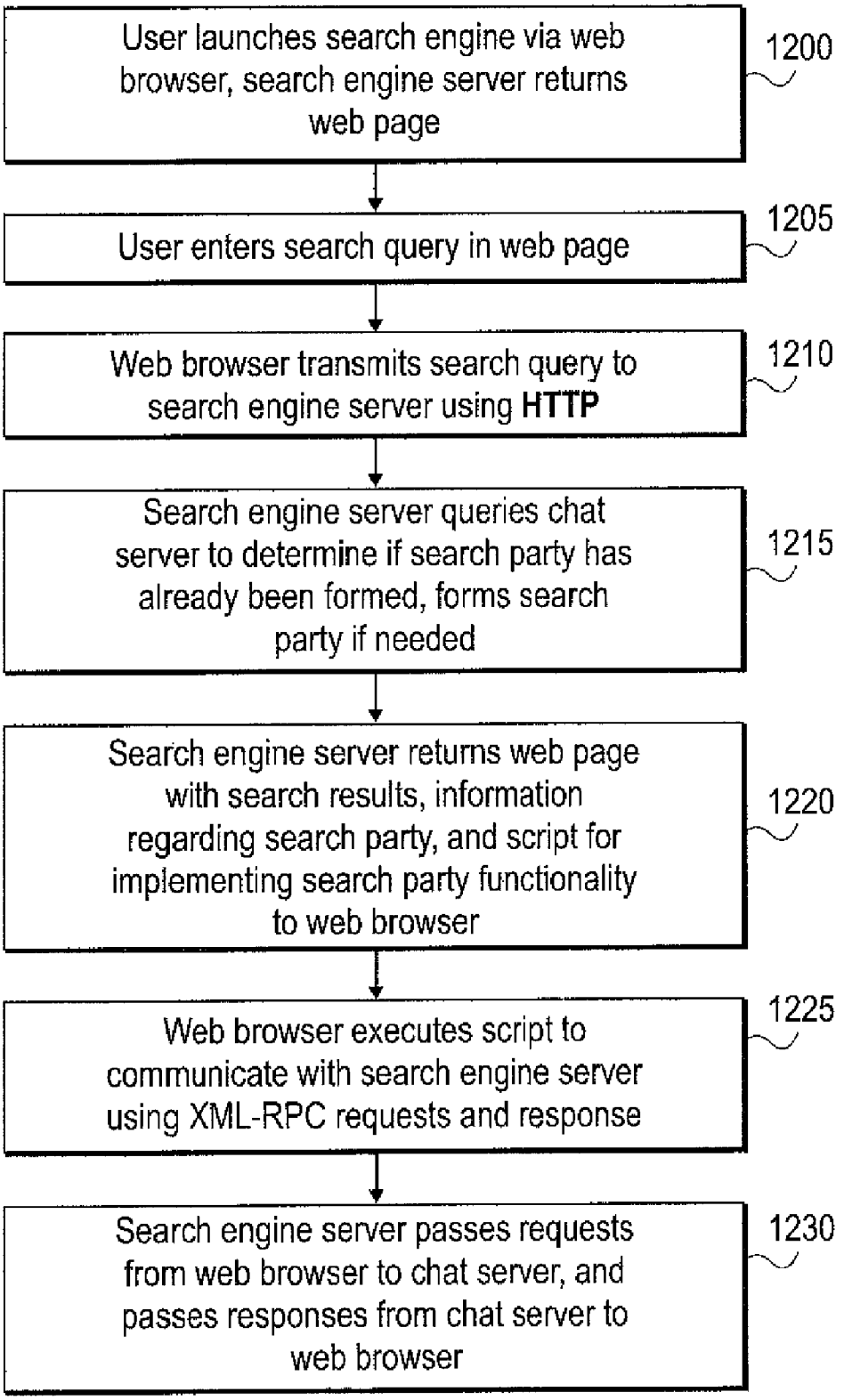

User launches search engine via web browser, search engine server returns web page
1200
User enters search query in web page
1205
Web browser transmits search query to search engine server using HTTP
1210
Search engine server queries chat server to determine if search party has already been formed, forms search party if needed
1215
Search engine server returns web page with search results, information regarding search party, and script for implementing search party functionality to web browser
1220
Web browser executes script to communicate with search engine server using XML-RPC requests and response
1225
Search engine server passes requests from web browser to chat server, and passes responses from chat server to web browser
1230

FIG. 12

METHOD AND SYSTEM FOR ENABLING USERS SEARCHING FOR COMMON SUBJECT MATTER ON A COMPUTER NETWORK TO COMMUNICATE WITH ONE ANOTHER

FIELD OF THE INVENTION

The present invention relates to a computer-implemented technique for enabling users who are searching for common subject matter on a computer network, such as by using web browser-based search engines, to communicate with one another to form a search party to share information between users that are actively conducting a search relating to the common subject matter. There is no need for the users to already know each other or otherwise be associated with one another.

DESCRIPTION OF RELATED ART

Despite the tremendous growth of raw data on the World Wide Web, people are often the best source of information due to their ability to tailor data to specific situations. Chat rooms, such as Internet Relay Chat (IRC), and Yahoo! chat, web forums, and mailing lists, for instance, allow like-minded people to communicate with one another and disseminate information. For example, a group of people interested in cross-country skiing might start a chat room or web forum on this topic. These approaches work well for people with a persistent interest in a topic. However, people who have only an infrequent or ephemeral interest in a subject are not likely to seek out a discussion channel on the subject. Moreover, no mechanism is available for enabling users who are searching for common subject matter on the Internet or other computer network, such as by entering search terms in a web browser for a search engine, to communicate with one another.

BRIEF SUMMARY OF THE INVENTION

The present invention addresses the above and other issues by providing a technique for enabling users who are searching for common subject matter on a computer network to communicate with one another.

In one aspect of the invention, a computer-implemented method is provided for enabling users searching for common subject matter on a computer network to communicate with one another. The method includes receiving respective search queries made by the users via respective client devices in searching the computer network, determining which of the respective search queries are for common subject matter, and enabling particular ones of the users whose search queries are for the common subject matter to communicate with one another via their respective client devices.

In another aspect of the invention, a computer-based system is provided for enabling users searching for common subject matter on a computer network to communicate with one another. The system includes at least one server resource for receiving respective search queries made by the users via respective client devices in searching the computer network, for determining which of the respective search queries are for common subject matter, and for enabling particular one of the users whose respective search queries are for the common subject matter to communicate with one another via their respective client devices.

In a further aspect of the invention, a computer-implemented method is provided for enabling a particular user searching for subject matter on a computer network to communicate with other users who are also searching for the subject matter. The method includes transmitting, to at least one server resource, a search query made by the particular user via a respective client device in searching the computer network. The at least one server resource identifies the other users who have entered search queries for the subject matter via their respective client devices. The method further includes receiving data from the at least one server resource for enabling the particular user to communicate with the other users.

In a further aspect, a computer-implemented method is provided for enabling users searching for common subject matter on a computer network to communicate with one another. The method includes receiving, at a server resource, respective search queries made by the users via respective client devices in searching the computer network, determining which of the respective search queries are for the common subject matter, performing respective searches using the respective search queries of particular ones of the users whose respective search queries are for the common subject matter to obtain respective search results, and transmitting the respective search results with scripts to the respective client devices of the particular users. The scripts are executable at the respective client devices of the particular users to enable the particular users to communicate with one another via their respective client devices.

In yet another aspect, a computer-implemented method is provided for enabling a particular user searching for subject matter on a computer network to communicate with other users who are also searching for the subject matter. The method includes transmitting, to at least one server resource, a search query made by the particular user via a respective client device in searching the computer network for the subject matter, receiving search results with a script from the at least one server resource, wherein the search results are responsive to the search query, and executing the script to enable the particular user to communicate with the other users who are also searching for the subject matter via respective client devices.

Corresponding program storage devices are also provided.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, benefits and advantages of the present invention will become apparent by reference to the following text and figures, with like reference numbers referring to like structures across the views, wherein:

FIG. **1** illustrates an exemplary computer network that enables users who are searching for common subject matter to communicate with one another, according to an embodiment of the present invention.

FIG. **2** illustrates a computer architecture that enables a user to communicate with other users who are searching for common subject matter, according to the invention;

FIG. **3** illustrates a method in which a user communicates with other users who are searching for common subject matter, and recommends a link to the other users, according to the invention;

FIG. **4** illustrates a user interface of a conventional search engine;

FIG. **5** illustrates the user interface of FIG. **4** in which search results are displayed, and which further indicates that a search party relating to searched for subject matter is available, according to the invention;

FIG. **6** illustrates a search party preview window, according to the invention;

FIG. **7** illustrates a search party window, according to the invention;

FIG. **8** illustrates the user interface of FIG. **4** which further includes a button that allows a user to recommend a resource located by the search engine to other users in the search party, according to the invention;

FIG. **9** illustrates a user interface of a search engine which displays a detailed view of a selected resource located by the search engine, where the button that allows the user to recommend the resource to other users in the search party is selected, according to the invention;

FIG. **10** illustrates a window for entering an annotation to accompany a recommended resource, according to the invention;

FIG. **11** illustrates the search party window of FIG. **7** in which the recommended resource and the accompanying annotation are displayed, according to the invention; and

FIG. **12** illustrates a method for carrying out a web page-based embodiment for enabling users who are searching for common subject matter to communicate with one another, according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** illustrates a computer network that enables users who are searching for common subject matter to communicate with one another, according to the invention. The network, shown generally at **100**, includes a chat server **110**, a search registry server **120**, a search engine server **130**, content servers **135** and a number of client devices such as personal computers (PC) **150**, **160** and **170**. The clients and servers can communicate with one another via a communication medium **140**. The client PCs run applications such as web browsers for search engines that allow the respective users to search resources available on the network **100**, such as resources stored at the search engine server **130** or at the content servers **135**. The resources can include web pages, other files with text or graphics, multimedia files, and so forth. The communication medium **140** can be provided by the Internet or a private intranet, for instance.

When a user enters a search query in a search engine running at the respective PC, the PC transmits the query to the search engine server **130**. Generally, search engines use automated software programs known as spiders or bots to survey a network such as the Web to build a database. Resources such as web documents are retrieved by the programs and analyzed, typically by keyword, and data collected from each resource is added to a search engine index. When the search engine server **130** receives a user's query, the query is checked against the search engine's index of all the web pages it has analyzed. Links to the resources that match the query most closely are then returned to the user and displayed on the search engine interface, typically ranked in order of relevance. The user can then select a desired link to view the resource in detail. Resources that are frequently requested by users may be stored locally at the search engine server **130** for quicker access. Otherwise, the search engine server **130** provides a link to the user that allows the resource to be accessed directly from one of any number of content servers worldwide. Different search engine servers may be operated by different entities. Example search engines that are currently popular include Google, Yahoo, AltaVista, and Ask Jeeves, which are registered trademarks of their respective owners.

A chat server **110** allows any number of users to engage in an on-line dialogue with one another such as an on-line chat. A chat generally refers to a real-time communication between users via computer. Once a chat has been initiated, a user can enter text by typing on the keyboard, and the entered text will appear on the other users' screens.

In accordance with the invention, a search registry server **120** is provided which also receives the search queries from the users. The search registry server **120** analyzes the search queries to identify users that are searching for common subject matter. A similarity in the search terms provided by different users can be used to establish that the users have a mutual interest in a topic. For example, if a number of users enter the search term "superbowl" on respective search engine interfaces, software running at the search registry server **120** can conclude that the users are interested in the same topic. The search terms need not be identical in order for the search registry server **120** to determine that they relate to common subject matter. Groupings of related words can be established using a variety of well-known techniques. For example, large corpuses of data can be scanned for proximal occurrences of words. Using these groupings, associations between different search terms can be automatically inferred. For instance, it may be inferred that the search terms "superbowl" and "football" are related to common subject matter, such that users providing these terms should be joined in a common search party, such as a chat room or other online dialogue. It can be concluded that search queries relate to common subject matter when they include the same or synonymous keywords, in the same order or any order, or when a commonality is indicated by techniques such as word associations, probabilistic analysis or fuzzy matching, for instance.

When it is determined that the search terms of different users relate to common subject matter, the search registry server **120** sends a message to the identified users informing them that other users are currently searching for information relating to the same subject matter. The search registry server **120** can also communicates with the chat server **110** to initiate an on-line dialogue such as a chat, which is one possible aspect of the search party, for the subject matter. The chat server **110** or the search registry server **120** transmits a message to the identified users to inform them that the dialogue has been created and to give them the opportunity to participate in the search party. Additional users that subsequently search for the common subject matter can also be identified and given the opportunity to participate. The users can be informed of the existence of the dialogue, how many users are currently actively participating and/or how many users are eligible to participate. The number of users that have declined to participate in the dialogue can be inferred based on the difference between the number of users eligible and the number of users participating. The search registry server **120** can also communicate with the chat server **110** to determine how many users are currently participating in a dialogue.

Moreover, multiple dialogues can be conducted at the same time for different subjects. Users that participate in a dialogue can view the search terms that were provided by the other users in the dialogue as well as view comments entered by the other users, and enter their own comments to share with the other users. Additionally, the users can share links to resources, such as web pages, with the other users in the dialogue. Users can also elect to have any search terms they provide, until they leave the search party, automatically shared with the other users accessing the search party, without requiring manual user intervention. Once in a dialogue, a user may exit by entering a specific command, or the user may be automatically removed after a specified time-out period in which the user is inactive, for instance.

The search registry server **120** may employ a defined time window in analyzing which search queries are for common

subject matter. In one possible approach, a relatively small time window, such as one minute or a few minutes, is used so that the dialogues will contain real-time exchanges between users that are currently on line. However, it is also possible to use a longer time window so that a user can be matched to a dialogue that was created some time ago.

Note that the chat server **110**, search registry server **120**, and the search engine server **130** need not be independent, but may be integrated in whole or in part. Generally, any server resource arrangement, regardless of the number, configuration and location of specific server machines, may be used to achieve the functionality described herein.

FIG. **2** illustrates a computer architecture **200** that enables a user to communicate with other users who are searching for common subject matter, according to the invention. At each of the client PCs **150**, **160** and **170**, software, firmware, micro code and hardware may be used to provide the specified architecture. The hardware **230** can include one or more processors that can execute any type of computer code devices, such as software, firmware, micro code or the like, to achieve the functionality described herein. A computer program product or program storage device that tangibly embodies such computer code devices, such as a memory device, may also be provided in a manner apparent to those skilled in the art. An operating system **220** can be provided via software executed by the hardware. Application programs **210** can include a conventional search engine application such as a web browser **212**, along with a software plug-in **216** that is provided according to the invention for achieving the functionality described herein. The use of a plug-in **216** allows existing web browsers to be used. Optionally, the web browser **212** and the software plug-in **216** need not be separate software components, but their functions may be integrated in whole or in part. That is, the chat feature and the search party notifications can be implemented entirely in the context of a web page, and thereby displayed inside a web browser, without the need for an additional software plug-in to the web browser, as discussed further in connection with FIG. **12**.

When a user performs a search using the search engine software such as the web browser **212**, the plug-in software **216**, which may be provided as an extension to the web browser **212**, notices the search and extracts the search query, e.g., the search terms or keywords. The plug-in software **216** initiates a transmission of the search query to the search registry server **120**, e.g., using any desired network transmission protocol. The operating system **220** and hardware **230** coordinate to transmit the message initiated by the plug-in software **216** in a manner apparent to those skilled in the art. The search registry server **120** responds to the transmission by analyzing the search query, as discussed previously, to determine whether the search query is for the same subject matter which has been requested by other users, and/or for which a dialogue has already been launched. The search registry server **120** transmits a message back to the plug-in software **216**, via the hardware **230** and the operating system **220**, indicating whether a dialogue for the searched for subject matter has been launched, and other information such as how many users have joined the dialogue. The plug-in software **216** initiates the display of the information relating to the dialogue on the user interface, e.g., screen. Additionally, similar to the above case, an implementation is possible wherein the client PC only uses a web browser that communicates with the search engine server to achieve the desired functionality, in which case the search engine server returns a web page containing the search party information. In this case, there is no need for a search registry server or a software plug-in to the web browser.

The plug-in software **216** can also fetch chat text from the chat server **110** for the dialogue relating to the searched for subject matter. Furthermore, the plug-in software **216** can communicate with the chat server **110** to provide the user recommendations and annotations discussed previously. The plug-in software **216** can also monitor the user's activities such as for the purpose of processing a user request to exit the dialogue, or automatically removing the user from the dialogue after a specified time-out period in which the user is inactive, for instance, or when it is detected that the user has closed the search engine application or the search party application. The plug-in software **216** can further enable the user to preview a dialogue before joining, as well as transmit additional search queries made by the user to the chat server **110** for sharing with other users in the dialogue. The plug-in software **216** can also allow a user to participate in multiple dialogues at the same time for different subjects, e.g., via different instances of the search engine application, e.g., the web browser **212**, in different windows. In one possible approach, discussed further in connection with FIG. **12**, the functionality of the software plug-in is provided by a script such as Javascript executing within a web page, where a non-rich web page interface is used for display.

Additionally, the plug-in software **216** can provide a rich client application. Such applications provide a richer user interface (UI) by providing a graphical interface with a number of controls for the user. A control refers to, e.g., an object in a window or dialog box that allows a user to interface with the application and operating system. Examples of controls include push-buttons, scroll bars, radio buttons, pull-down menus, dialog boxes, pop-up windows, pull-down menus, icons, resizable window edges, progress indicators, selection boxes, windows, tear-off menus, menu bars, toggle switches and forms. A rich client application can also provide access to local resources in the client PCs such as disk storage and application programming interfaces (APIs). Because they run locally on the client computers, rich client applications use available resources more efficiently, and can speed response times. For example, as a user navigates the application, the application can automatically merge local data with updated information that is transparently picked up across the Internet or other network.

Furthermore, the plug-in software **216** may use the example pseudo-code of Table 1 to achieve some of its functions. The pseudo-code maps to real protocol requests such as TCP/IP requests.

TABLE 1

Pseudo-code:	Description:
giveRecentText( )	used to talk to the chat server
giveSuggestions( )	used to provide a list of URLs
addASuggestion( )	used to share information
whosOnline( )	used to obtain a list of users
setMyCurrentSearch Terms( )	used to set search terms

FIG. **3** illustrates a method in which a user communicates with other users who are searching for common subject matter, and recommends a link to the other users, according to the invention. The sequence of events is meant to be illustrative of one possible scenario, although many variations are possible. At block **305**, the user launches a search engine such as a web-based search engine. At block **310**, the user enters a search query and, at block **315**, the search query is sent to the search registry server and the search engine server. At block **320**, the search engine server returns search results and, at block **325**, the search registry server identifies other users

searching for the same subject matter. This may occur before or after a search party has been launched.

If a search party has been launched, the other users searching for the same subject matter have already been identified, and new users can be added to the existing dialogue. If a dialogue has not yet been launched, the search registry server can identify groups of users searching for the same subject matter using the techniques discussed previously. A search party can be created with two or more users. However, a minimum group size may be set to reduce the number of search party that are launched, so that a new search party is not created until the minimum number of users is identified. A maximum search party size can also be enforced. The users who are searching for common subject matter can be identified, e.g., by maintaining information such as an IP or other network address of the identified users.

At block **330**, the search registry server forms a search party, if not already formed, and informs each user of the number of other users who are searching for the same subject matter. At block **335**, after being made aware of the existence of a search party, a user can choose to preview the search party, in which case a window is opened on the user interface displaying a recent discussion that is obtained by a backlog of comments made in the past few minutes (block **340**). At this point, the user is not actively participating in the dialogue provided by the search party. However, at block **345**, the user can choose to actively join the search party, in which case a new window, e.g., a search party window, opens displaying a current discussion and search queries (block **350**). The preview window and the search party window may open on top of the existing search engine window, e.g., in a cascaded manner, or on a separate screen of a multi-screen setup, for instance. The user can view the dialogue, or return to browse the search results obtained from the user's initial or subsequent searches (block **355**). The user can recommend a link to a search result to share with the other users in the search party (block **360**), in addition to sharing a typed in annotation to the link (block **365**). In response, the search party window displays the recommended link and the annotation for all users in the search party to view (block **370**).

The following figures illustrate an example series of user interfaces that may be provided by the invention.

FIG. **4** illustrates a user interface **400** of a conventional search engine, which includes a window **405** in which a search engine application runs. A background region behind the window **405** may include an interface of a desktop application, for example. The window **405** includes a search engine toolbar **410** with various commands that are conventional for web-based browsers, a region **420** in which the address of a resource on a computer network, such as a URL, can be displayed, and a text box **430** in which a user can type in a search query. Note that the search query can include keywords as well as other search criteria defined by the user. For example, some browsers allow the user to enter an advanced search mode in which the user can specify, e.g., that the search should locate only an exact keyword or keywords, that the keyword should appear in a certain field of a resource, such as the title or abstract, or that a certain category of resources should be searched, e.g., based on a topic such as sports, news, a specific professional field, and so forth. These criteria are part of the search query. In the example provided, the search query is for an "ankle fracture". Such a query might be made by a person who has hurt his or her ankle and is not sure if it is sprained or broken. Once the query is entered, the user clicks on a "search" button **440** to run the search.

FIG. **5** illustrates the user interface of FIG. **4** in which search results are displayed, and which further indicates that a search party relating to searched for subject matter is available, according to the invention. Specifically, the search engine window **505** in the user interface **500** displays links to resources such as web pages having articles relating to ankle fractures. The links may include a title as well as a preview of the text of the resource. Additionally, a toolbar button **510**, which reads "Search Party (4 of 12 people)" indicates that a search party relating to the subject matter of ankle fractures is available, and that out of twelve users who are searching for the same subject matter, four of the users have chosen to participate in the search party. As mentioned, the search party allows the users to communicate such as by on-line chatting and sharing links to resources.

FIG. **6** illustrates a search party preview window **620**, according to the invention. A user may preview a dialogue before joining it by viewing recent discussions between active members, e.g., from stored backlogs of the discussions. This allows a user to quickly ascertain whether the dialogue is of interest. In particular, in the search engine window **605** of the user interface **600**, the search party preview window **620** opens when the user clicks on, or mouses over, the button **510**, for instance. The chat server **110** can pre-fill the window **620** with the past few minutes of recent discussions so that the user can quickly determine if the search party will be helpful without waiting for new comments to appear. The window **620** includes a region **625** in which the comments of the different users appear next to respective screen names of the users. Additionally, it can be seen that one of the comments includes a hyperlink entitled "eMedicine Health—Ankle Fracture Overview". The user can click on this link to view the associated web page. The window further includes a region **630** that lists recent search party suggestions/links. Although the suggestion relating to "Vermont Teddy Bear Co." does not seem to be relevant, the comments overall seem to be relevant, and the user may choose to join the dialogue by clicking on the "Join Search Party" button **640**.

FIG. **7** illustrates a search party window **710**, according to the invention, which may appear in a cascaded form over the search engine window **705** of the user interface **700**. A region **715** of the window **710** includes the live chat from the users in the search party, while a region **720** includes search queries that other users have used, and a member roster that is associated with the chat window. As can be seen, the recent search queries include "fibula syndesome" from a user named "Conjurer5", "ankle fracture", which is the query of the present user, "Greg", who recently joined the search party, and "broken ankle" from a user named "_zbot_", who joined the search party after Greg. The search queries in the region **720** can be updated as the users run further searches. The text in the region **715** is also updated as the users enter additional comments in the dialogue. A checkbox **730** in the window **710** allows the users to indicate whether they elect to have any search queries they provide shared, while still in the search party, with the other users, such as in the region **720**. This aids in the dissemination of search strategies. A text box **725** allows the user to type in text that will appear in the chat. After typing in text, the user may press the "enter" key on a keyboard, for example, to cause the text to be transmitted from the local client to the chat server **110**, for instance, using techniques apparent to those skilled in the art.

Generally, the search party can be implemented using different types of communication modes. In the example given, on-line chatting is provided along with sharing of links and search queries. However, it is also possible to provide only a subset of these features, or to provide other features. For example, only sharing of links may be provided, or only chatting. Furthermore, the search registry server **120** may

analyze the search queries and communications made by the users to better formulate search engine strategies, or for other purposes. The search registry server **120** may also track the number of users that elect to participate in a search party, the average time spent in a search party, and so on, for statistical purposes. In another possible approach, users may consent to sharing certain personal information with the search registry server **120**, such as their geographic location, age, gender or other demographic information. In this case, the search registry server **120** can select which users are identified for participation in a search party based on the personal information. For instance, separate search parties may be formed for women and men searching for information on the subject of "motorcycling". In another option, the identified users can send email messages to one another, either using their actual email addresses, or anonymously. In a further possible option, the identified users can be joined in a video or audio conference.

After viewing the search party window **710**, the user may decide to return to the previous search results to explore them in further detail. The user may return to the search engine window **805** in the interface **800** by clicking on the search engine window **805**, for instance, or by minimizing the search party window **710**, as shown in FIG. **8**.

FIG. **8** illustrates the user interface of FIG. **4**, which further includes a button that allows a user to recommend a resource located by the search engine to other users in the search party, according to the invention. Specifically, when a user has joined a dialogue, a control such as a button **810**, entitled "Recommend to Search Party", can be displayed on the search engine window **805** in the user interface **800** to allow the user to recommend a resource such as a web page to other users in the dialogue. Note also that a button **820** at the bottom of the interface **800** indicates that the search party application is running in the background. This application can be returned to the foreground by clicking on the button **820**. In the user interface **800**, the user has not yet selected a particular resource, so the button **810** is inactive. Clicking on the button **810** causes a recommendation window to appear that allows the user to recommend a specific resource that the user is currently browsing, e.g., by sharing a link to the resource with other users in the dialogue.

FIG. **9** illustrates a user interface of a search engine that displays a detailed view of a selected resource located by the search engine, where the button that allows the user to recommend the resource to other users in the search party is selected, according to the invention. Once the user selects a particular search result to view in detail, the corresponding resource, such as a web page, is displayed in a region **910** of the search engine window **905** in the user interface **900**. In the present example, the resource is a web page with a link entitled "Ankle Fractures—Broken Ankle". The detailed text of the web page is also displayed. After reading the web page, the user may decide to click on the "Recommend to Search Party" button **810** to share the resource with the other users in the search party.

FIG. **10** illustrates a window for entering an annotation to accompany a recommended resource, according to the invention. Once the user selects the button **810**, a recommendation window **1010** is displayed on the search engine window **1005** on the interface **1000**. The window **1010** includes a portion **1012** that is the link to the recommended resource, and a text box portion **1014** that allows the user to type in an annotation to the link. In the present example, the user types in the annotation "my dr. says this is great", and selects the "recommend" button **1016** to transmit the link and the annotation to the chat server **110**, for instance, for sharing with the other users in the search party.

FIG. **11** illustrates the search party window **710** of FIG. **7** in which the recommended resource and the accompanying annotation are displayed, according to the invention. In particular, the text **717** in the region **715** reads: "Greg recommends: Ankle Fractures—Broken Ankle, 'my dr. says this is great'". The link "Ankle Fractures—Broken Ankle" may appear in a highlighted manner to indicate that it is an active link, such as a URL, that the users can click on to view the associated resource. In this example, the recommendations are displayed together with the general chat, in the region **715**. However, it is also possible for the recommendations from the different users to be aggregated and displayed in a region of the dialogue window **710**, e.g. at the bottom of the window, that is separate from the region in which the general chat conversation occurs.

FIG. **12** illustrates a method for carrying out a web page-based embodiment for enabling users who are searching for common subject matter to communicate with one another, according to the invention. As discussed previously in connection with FIG. **2**, the functionality of the software plug-in **216** can be provided instead by a script such as JAVASCRIPT executing within a web page, where a non-rich web page interface is used for display. ECMAscript, commonly called JAVASCRIPT or JSCRIPT, is a scripting language that can interact with HTML source code to provide dynamic content for web pages. INTERNET EXPLORER® supports a subset of JAVASCRIPT that MICROSOFT® refers to as JSCRIPT®. A scripting language is a simple or lightweight programming language for writing scripts. A script, also referred to as a macro or batch file, provides a list of commands that can be executed without user interaction.

The embodiment described in FIG. **12** uses a web-page only search engine implementation to achieve the search party functionality. In this case, the search registry server **120** is not needed. At block **1200**, the user launches a search engine via a web browser, and the search engine returns a web search page, such as shown in FIG. **4**, that is displayed in the web browser. At block **1205**, the user enters a search query by typing in one or more search keywords and presses "enter" or selects a "search" button. At block **1210**, the web browser transmits the search query to the search engine using a protocol such as HTTP. At block **1215**, the search engine server identifies users who are searching for common subject matter, using techniques discussed previously, and queries the chat server **110** to determine if a search party has already been set up for the subject matter. If a search party has already been set up, the search engine server obtains information relating to the search, such as the number of eligible and actual participants, and past chat discussion text. The search engine server can alternatively form a search party, if needed. The search engine server also performs a search using the search query to obtain search results.

At block **1220**, the search engine server returns a web page containing the results of the search to the web browser. Other information that is returned to the web browser can include the information regarding the search party, such as the availability of the search party, the number of people currently participating, past chat discussion text, and so forth, in addition to a script program implementation of software for implementing the search party functionality. A script can be provided that works inside web pages and displays information using the web browser. When the script executes, the search party chat box is added to the search web page, which contains the search results, as seen in FIG. **7**. Advantageously,

with this approach, there is no need for the user to install additional software to achieve the search party functionality.

At block **1225**, the web browser can execute the script to communicate with the search engine, such as by using XML-RPC requests and responses. RPC, or remote procedure call, is a type of protocol that allows a program on one computer to execute a program on a server computer. Using RPC, a system developer is not required to develop specific procedures for the server. The client program sends a message to the server with appropriate arguments and the server returns a message containing the results of the program executed. CORBA and DCOM provide the same types of capabilities as traditional RPCs, and may also be used. XML-RPC is newer than DCOM and CORBA, though it is more simplistic, being designed for web use rather than complicated enterprise RPC needs. In particular, XML-RPC is a technique for encoding procedure call strings as simple XML, which are then interpreted by the server software. XML-RPC requires the server computer to have code that is responsive to the XML-RPC protocol requests, it does not allow the client to execute arbitrary code on the server. The main advantage of XML-RPC is that it is easy to use from a lightweight scripting language such as Javascript.

At block **1230**, the search engine server passes requests or calls from the web browser to the chat server, and passes the corresponding responses back to the script, such as ECMA-script code, inside the web page/browser. This communication may use code that is analogous to the pseudocode API described above in connection with Table 1.

The invention has been described herein with reference to particular exemplary embodiments. Certain alterations and modifications may be apparent to those skilled in the art, without departing from the scope of the invention. The exemplary embodiments are meant to be illustrative, not limiting of the scope of the invention.

What is claimed is:

1. A method, comprising:

identifying, by a processor, two users that have made respective search queries for common subject matter via respective client devices;

launching an on-line dialogue window for the two users to communicate with one another via respective client devices;

receiving, from an additional user that has made a search query for the common subject matter, a request to preview the on-line dialogue;

retrieving, in response to receiving the request, a backlog of a recent discussion in the on-line dialogue window, wherein the backlog of the recent discussion occurred prior to the request from the additional user being received; and

providing a preview window to the additional user that displays the backlog of the recent discussion and one or more suggested links relating to the recent discussion.

2. The method of claim **1**, further comprising:

transmitting data to the respective client devices of the two users for use in informing the two users that the on-line dialogue window has been launched.

3. The method of claim **2**, further comprising:

receiving data from at least one of the respective client devices that indicates whether the two users have elected to participate in the on-line dialogue window.

4. The method of claim **1**, further comprising:

transmitting data to at least one of the respective client devices of the two users for use in indicating that the two users have elected to participate in the on-line dialogue window.

5. The method of claim **1**, further comprising:

receiving data from at least one of the respective client devices of the two users that includes a link to a resource that the two users are browsing, and an annotation to the link which is generated by the two users.

6. The method of claim **1**, further comprising:

receiving data from at least one of the respective client devices of the two users that includes a link to a resource that the two users are browsing.

7. The method of claim **1**, wherein:

the respective search queries are made by the two users by entering search terms in web browsers for a search engine;

the web browsers provide the respective search queries to plug-ins to the web browsers; and

the respective search queries are received from the plug-ins in the identifying step.

8. The method of claim **1**, wherein:

the respective search queries are made by the two users by entering search terms in web browsers for a search engine; and

the respective search queries are received from the web browsers in the identifying step.

9. The method of claim **1**, further comprising:

receiving data from at least one of the respective client devices of the two users that comprises a search query of one of the two users.

10. The method of claim **1**, further comprising:

performing respective searches using the respective search queries of the two users to obtain respective search results; and

transmitting the respective search results with scripts to the respective client devices of the two users,

wherein the scripts are executable at the respective client devices of the two users to generate the on-line dialogue window through which the two users communicate with one another via their respective client devices.

11. The method of claim **1**, wherein the preview window comprises a link to an additional on-line dialogue window and a comment associated with the link.

12. A system, comprising:

a memory; and

a processor coupled to the memory, the processor configured to:

identify two users that have made respective search queries for common subject matter via respective client devices,

launch an on-line dialogue window for the two users to communicate with one another via respective client devices,

receive, from an additional user that has made a search query for the common subject matter, a request to preview the on-line dialogue,

retrieve, in response to receiving the request, a backlog of a recent discussion in the on-line dialogue window, wherein the backlog of the recent discussion occurred prior to the request from the additional user being received, and

provide a preview window to the additional user that displays the backlog of the recent discussion and one or more suggested links relating to the recent discussion.

13. The system of claim **12**, wherein the preview window comprises a link to an additional on-line dialogue window and a comment associated with the link.

14. A method, comprising:

transmitting, to a server comprising a processor and a memory, a search query for subject matter, wherein the server is configured to, upon receiving the transmitted

search query, identify other users who have entered search queries for the subject matter via respective client devices, and configured to generate data for an interface to an on-line dialogue window for communicating with the other users;

transmitting, to the server, a request to preview the on-line dialogue, wherein the server is configured to retrieve, in response to receiving the request, a backlog of a recent discussion in the on-line dialogue window, wherein the backlog of the recent discussion occurred prior to the request being transmitted; and

receiving, in a preview window, the backlog of the recent discussion and one or more suggested links relating to the recent discussion.

15. The method of claim **14**, wherein the on-line dialogue window comprises an on-line chat.

16. The method of claim **14**, further comprising:

transmitting data to the server indicating that the user has elected to participate in the on-line dialogue window.

17. The method of claim **14**, further comprising:

receiving data from the server indicating a number of the other users who have elected to participate in the on-line dialogue window.

18. The method of claim **14**, further comprising:

receiving data from the server that includes a link to a resource that at least one of the other users is browsing.

19. The method of claim **14**, further comprising:

receiving data from the server that includes a link to a resource that at least one of the other users is browsing and an annotation to the link that was generated by the at least one of the other users.

20. The method of claim **14**, wherein:

the search query is made using a web browser for a search engine.

21. The method of claim **14**, further comprising:

transmitting, to the server, subsequent search queries.

22. The method of claim **14**, further comprising:

receiving data from the server that includes a search query of at least one of the other users.

23. The method of claim **14**, wherein transmitting the search query comprises:

receiving, by a web browser, a search term in a search engine;

providing, by the web browser, the search query to a plug-in to the web browser; and

transmitting the search query from the plug-in to the at least one server.

24. The method of claim **14**, wherein transmitting the search query comprises:

receiving, by a web browser, a search term in a search engine; and

transmitting the search query from the web browser to the at least one server.

25. The method of claim **14**, further comprising:

receiving search results with a script from the at least one server, wherein the search results are responsive to the search query; and

executing the script to create the interface to the on-line dialogue window.

26. A non-transitory program storage device programmed to cause a processor to perform a method according to claim **14**.

27. The method of claim **14**, wherein the preview window comprises a link to an additional on-line dialogue window and a comment associated with the link.

28. A method, comprising:

determining, by a processor, that respective search queries made by two users are for common subject matter;

performing respective searches using the respective search queries of the two users to obtain respective search results;

generating scripts that create an interface to an on-line dialogue window through which the two users communicate with one another via respective client devices of the two users;

transmitting the respective search results with the scripts to the respective client devices of the two users, wherein the scripts are executable at the respective client devices of the two users;

receiving, from an additional user that has made a search query for the common subject matter, a request to preview the on-line dialogue;

retrieving, in response to receiving the request, a backlog of a recent discussion in the on-line dialogue window, wherein the backlog of the recent discussion occurred prior to the request from the additional user being received; and

providing a preview window to the additional user that displays the backlog of the recent discussion and one or more suggested links relating to the recent discussion.

29. The method of claim **28**, wherein the search results comprises web pages, and wherein the scripts are executable within the web pages.

30. A non-transitory program storage device programmed to cause a processor to perform a method according to claim **28**.

31. The method of claim **28**, wherein the preview window comprises a link to an additional on-line dialogue window and a comment associated with the link.

32. A method for enabling users searching for common subject matter on a computer network to communicate with one another, comprising:

defining a period of time comprising a start time and an end time;

receiving, within the period of time, respective search queries for the common subject matter made by a first user and a second user via respective client devices in searching the computer network;

launching, by a processor, an on-line dialogue for the first user and the second user;

receiving, within the period of time, a search query for the common subject matter made by a third user; and

providing, to the third user, the on-line dialogue comprising a backlog of discussion that occurred prior to receiving the search query from the third user and one or more suggested links relating to the discussion.

33. A non-transitory program storage device programmed to cause a processor to perform a method comprising:

identifying, by a processor, two users that have made respective search queries for the common subject matter via respective client devices;

launching an on-line dialogue window for the two users to communicate with one another via respective client devices;

receiving, from an additional user that has made a search query for the common subject matter, a request to preview the on-line dialogue;

retrieving, in response to receiving the request, a backlog of a recent discussion in the on-line dialogue window, wherein the backlog of the recent discussion occurred prior to the request from the additional user being received; and

providing a preview window to the additional user that displays the backlog of the recent discussion and one or more suggested links relating to the recent discussion.

34. The non-transitory program storage device of claim **33**, further comprising:

receiving data from at least one of the respective client devices of the two users that includes a link to a resource that the two users are browsing, and an annotation to the link which is generated by the two users.

35. The non-transitory program storage device of claim **33**, further comprising:

receiving data from at least one of the respective client devices of the two users that includes a link to a resource that the two users are browsing.

36. The non-transitory program storage device of claim **33**, further comprising:

performing respective searches using the respective search queries of the two users to obtain respective search results; and

transmitting the respective search results with scripts to the respective client devices of the two users,

wherein the scripts are executable at the respective client devices of the two users to generate the on-line dialogue window through which the two users communicate with one another via their respective client devices.

* * * * *