

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner

v.

DODOTS LICENSING SOLUTIONS LLC,
Patent Owner

Inter Partes Review Case No. IPR2023-00937
U.S. Patent No. 9,369,545

**DECLARATION OF DR. LOREN TERVEEN
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,369,545**

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CLAIM LISTING

Claim 1:

Claim 1[Pre] A computer-implemented method of obtaining content over a network and displaying the content to a user, the method being implemented in a client computing device in operative communication with a server over a network, the client computing device including electronic storage, a display, and one or more processors configured to execute one or more computer program modules, the method comprising:

1(a) transmitting a request to the server over the network, the request requesting networked information monitor template;

1(b) receiving the requested networked information monitor template from the server over the internet, the requested networked information monitor template having been transmitted from the server over the network responsive to the transmitted request, the networked information monitor template comprising:

1(b)(i) a definition of a viewer graphical user interface within which content in a web browser-readable language may be presented on the display of the client computing device; and

1(b)(ii) a definition of a first content element for the networked information monitor template, the definition of the first content element referencing a first

network location from which the first content element for the networked information monitor template is served over the network;

1(c) responsive to instructions included in the requested networked information monitor template, transmitting over the network a first content request to the first network location referenced by the definition of the first content element for the networked information monitor template;

1(d) responsive to instructions included in the requested networked information monitor template, presenting the viewer graphical user interface defined by the networked information monitor on the display of the client computing device separate from and outside of any other graphical user interface that includes user controls for specifying the first network location from which the first content element for the networked information monitor is served over the network;

1(e) receiving, over the network, the first content element transmitted responsive to the first content request;

1(f) presenting the received the first content element in the viewer graphical user interface defined by the networked information monitor template, wherein the definition of the viewer graphical user interface and/or the first content element define all controls for enabling a user to interact with the first content element through the viewer graphical user interface.

Claim 2:

The method of claim 1, wherein the definition of the viewer graphical user interface includes a definition of at least one control effective for controlling an aspect of the viewer graphical user interface, and wherein presenting the viewer graphical user interface comprises presenting the at least one control.

Claim 3:

The method of claim 2, wherein the aspect is the location at which the user interface is rendered on a display device.

Claim 4:

The method of claim 2, wherein the aspect is the size of the user interface when presented on the display of the client computing device.

Claim 5:

The method of claim 1, wherein the networked information monitor template includes instructions in extensible markup language (XML) format, and further wherein the method further comprises parsing the definition of the viewer graphical user interface.

Claim 6:

The method of claim 1, wherein the definition of the viewer graphical user interface defined by the networked information monitor template comprises an image, and wherein presenting the viewer graphical user interface defined by the

networked information monitor template on the display of the client computing device comprises presenting the image included in the definition as part of the viewer graphical user interface.

Claim 7:

The method claim 6, wherein presenting the received the first content element in the viewer graphical user interface defined by the networked information monitor template comprises presenting the received the first content element in association with the image.

Claim 8:

The method of claim 6, wherein presenting the received the first content element in the viewer graphical user interface defined by the networked information monitor template comprises presenting the received the first content element at least in part within the image.

Claim 9:

The method of claim 1, wherein the definition of the viewer graphical user interface defines at least one control permitting the modification of the appearance of the viewer graphical user interface defined by the networked information monitor template, and wherein presenting the viewer graphical user interface

defined by the networked information monitor template on the display of the client computing device comprises presenting the at least one control.

Claim 10:

The method of claim 1, wherein the first content element includes audio content, video content, graphics content, still image content, textual content and/or interactive content.

Claim 11:

The method of claim 1, further comprising: executing a client parser application that is separate from the networked information monitor template, the client parser application being configured to present the viewer graphical user interface defined by the networked information monitor template on the client computing device, to generate the request for the content that is transmitted to the first network location referenced by the definition of the first content element for the networked information monitor template, and to present the first content element received from the first network location within the viewer graphical user interface defined by the networked information monitor template.

Claim 12:

The method of claim 1, further comprising causing the networked information monitor to communicate with another networked information monitor.

Claim 13:

The method of claim 1, wherein the networked information monitor is configured to cause the client computing device to periodically request the first content element from the first network location referenced by the definition the first content element for the networked information monitor template and to present the received first content element within the viewer graphical user interface in an ongoing manner.

Claim 14:

The method of claim 1, wherein the network is the internet.

Claim 15:

15(Pre)

The method of claim 1, wherein the networked information template further comprising a definition of a second content element for the networked information monitor template, the definition of the second content element referencing a second network location from which the second content element for the networked information monitor template is served over the network, and wherein the method further comprises:

15(a)

responsive to instructions included in the requested networked information monitor template, transmitting over the network a second content request to the

second network location referenced by the definition of the second content element for the networked information monitor template;

15(b)

receiving, over the network, the second content element transmitted responsive to the second content request; and

15(c)

presenting the received second content element in the viewer graphical user interface defined by the networked information monitor template, wherein the definition of the viewer graphical user interface and/or the second content element define all controls for enabling a user to interact with the second content element through the viewer graphical user interface.

Claim 16:

16(Pre)

A computer-implemented method of obtaining and displaying content obtained over a network to a user on a client computing device, the method being implemented in the client computing device, the client computing device including

electronic storage, a display, and one or more processors configured to execute one or more computer program modules, the method comprising:

16(a)

executing on the client computing device client parser, wherein the execution of the client parser results in the client computing device:

16(a)(i)

transmitting over the network a first content request to a first network location referenced by a definition of a first content element in a networked information monitor template that is readable by the client parser;

16(a)(ii)

receiving, over the network, the first content element transmitted responsive to the first content request;

16(a)(iii)

presenting a viewer graphical user interface defined by the networked information monitor template on the display of the client computing device and wherein the viewer graphical user interface defined by the networked information monitor template is presented separate from and outside of any other graphical user interface that includes user controls for specifying the first network location from

which the first content element for the networked information monitor is served over the network; and

16(a)(iv)

presenting the received content element within the viewer graphical user interface defined by the networked information monitor template, wherein the definition of the viewer graphical user interface and/or the first content element define all controls for enabling a user to interact with the first content element through the viewer graphical user interface.

Claim 17:

The method of claim 16, wherein execution of the client parser further results in the client computing device determining that the first element content modifies the networked information monitor template and responsive to such determination, modifying the networked information monitor template prior to the step of presenting the graphical user interface.

Claim 18:

The method of claim 16, further comprising presenting an icon representing networked information monitor associated with the networked information monitor template on the display of the client computing device, and wherein execution of the client parser to perform one or more of the transmitting operation, the presenting the viewer graphical user interface operation, or presenting the first

content element operation is responsive to reception of selection by a user of the icon.

Claim 19:

The method of claim 16, further comprising invoking the client parser and initiating one or more of the transmitting operation, the presenting the viewer

graphical user interface operation, or presenting the first content element operation automatically during a start-up process of the client computing device.

Claim 20:

20(Pre)

The method of claim 19, wherein execution on the client computing device of the client parser further results in the client computing device:

20(a)

transmitting over the network a second content request to a second network location referenced by a definition of a second content element in a second networked information monitor template that is readable by the client parser;

20(b)

receiving, over the network, the second content element transmitted responsive to the second content request; and

20(c)

presenting a second viewer graphical user interface defined by the second networked information monitor template on the display of the client computing device, wherein the second viewer graphical user interface lacks user controls, wherein the definition of the second viewer graphical user interface and/or the

second content element define all controls for enabling a user to interact with the second content element through the second viewer graphical user interface; and

20(d)

presenting the second content element within the viewer second graphical user interface,

20(e)

wherein execution of the client parser to perform the transmitting the second content request, the presenting the second viewer graphical user interface operation, and the presenting the second content element is responsive to reception of a selection to initiate a second networked information monitor associated with the second networked information monitor template.

Claim 21:

The method of claim 16, wherein the network is the internet.

I, Loren Terveen, declare as follows:

I. INTRODUCTION AND QUALIFICATIONS

1. I am over the age of 21 and am competent to make this declaration. I make this declaration based on facts and matters within my own knowledge and on information provided to me by others, and, if called as a witness, I could and would competently testify to the matters set forth herein. A true and correct copy of my Curriculum Vitae, which provides further details about my background and experience, is appended to this Declaration.

A. Educational Background and Professional Experience

2. I received a B.A. in Computer Science, Mathematics, and History from the University of South Dakota in 1984. I received an M.S. in Computer Sciences from the University of Texas in 1988. I further received a Ph.D. in Computer Sciences from the University of Texas in 1991.

3. I am a Distinguished McKnight University Professor at the University of Minnesota in the Department of Computer Science and Engineering, and I have substantial experience with human computer interaction and user interfaces, including well before April 26, 1999, the date I have been informed is the date of invention for the '545 patent at issue in this matter. I was a Member of Technical Staff at AT&T Bell Laboratories from 1991 to 1996, and then a Principal Member

of Staff at AT&T Labs – Research from 1996 to 2002. I was honored by the Association for Computing Machinery (ACM) as a Distinguished Scientist in 2009 and served as the president of ACM’s Special Interest Group on Computer-Human Interaction (ACM SIGCHI) from 2015-2018, was elected to the ACM SIGCHI Academy in 2019, and received the SIGCHI Lifetime Service Award in 2023.

4. I have taught numerous courses at the University of Minnesota related to human-computer interaction and user interface design. Additionally, I have published over 150 peer-reviewed articles, a book, contributed chapters in six additional books, and have given over 50 presentations all across the United States and internationally. My published works revolve around the fields of human-computer interaction, user interface design, and social computing. I am also a named inventor on ten U.S. patents related to user interfaces, interactive data analysis, and methods for selecting and displaying information to users. My publications and patents have addressed many aspects of searching for information on the World Wide Web, including algorithms to gather information from the World Wide Web, additional algorithms to parse and analyze the HTML content of web pages, data structures to represent this information, and user interfaces that allowed people to access the information my systems collected. Much of my research also involved graphical user interface techniques, for example: enabling users to navigate large information structures (including the World Wide Web), specify multimodal

interfaces including for interactive voice systems, interact with online maps, and tailor the performance of recommender systems.

5. I have served as Chair of the leading conferences in Human-Computer Interaction, served on four different editorial boards, and have sat on well over 20 program committees, including well over a dozen times on the program committee for the ACM Conference on Human Factors in Computing Systems (the CHI Conference), the leading international conference in Human-Computer Interaction.

II. METHODOLOGY; MATERIALS CONSIDERED

6. I have relied upon my education, knowledge, and experience with the technology of the World Wide Web including the Hypertext Markup Language (HTML) and graphical user interfaces, as well as the other materials as discussed in this declaration in forming my opinions.

7. For this work, I have been asked to review U.S. Patent No. 9,369,545 (“’545 Patent”) (Ex. 1001) including the specification and claims, and the ’545 Patent’s prosecution history (“’545 File History”) (Ex. 1002). In developing my opinions relating to the ’545 Patent, I have considered the materials cited or discussed herein, including those listed below.

- U.S. Patent No. 9,369,545 (“’545 Patent”) (Ex. 1001)
- Prosecution History for the ’545 Patent (“’545 FH”) (Ex. 1002)
- U.S. Patent No. 6,062,695 (“*Slivka*”) (Ex. 1004)
- File History of U.S. Patent No. 6,062,695 (“*Slivka FH*”) (Ex. 1005)
- U.S. Patent No. 6,091,518 (“*Anabuki*”) (Ex. 1006)

- *HTML: The Complete Reference* by Thomas A. Powell (1998) (“*Powell*”) (Ex. 1013)
- U.S. Patent No. 6,397,217 (“*Melbin*”) (Ex. 1014)
- U.S. Patent No. 6,031,989 (“*Cordell*”) (Ex. 1015)

8. I have considered these materials from the viewpoint of a POSITA as of the priority date of the '545 Patent. For the purposes of this declaration, I have been asked to assume that the priority date of the '545 Patent is April 26, 1999. I note that my opinions provided in this declaration are made from the perspective of a POSITA as of this priority date of the '545 Patent, unless expressly stated otherwise. To the extent that I use any verb tense in this declaration that is present tense (e.g., “a POSITA would understand” instead of “a POSITA would have understood”), such verb tense should be understood to be my opinion as of the '545 Patent's priority date (again, unless expressly stated otherwise). I merely use the present verb tense for ease of reading.

III. OVERVIEW AND LEGAL STANDARDS

9. In formulating my opinions, I have been instructed to apply certain legal standards. I am not a lawyer. I do not expect to offer any testimony regarding what the law is. Instead, the following sections summarize the law as I have been instructed to apply it in formulating and rendering my opinions found later in this declaration. I understand that, in an *inter partes* review (“IPR”) proceeding, patent claims may be deemed unpatentable if it is shown that they were anticipated or rendered obvious in view of the prior art. I understand that prior art in an IPR review

is limited to patents or printed publications that predate the priority date of the patent at issue. I understand that questions of claim clarity (definiteness) and enablement cannot be considered as a ground for considering the patentability of a claim in these proceedings.

A. Person of Ordinary Skill in the Art

10. I understand that the '545 Patent, the record of proceedings at the Patent Office (which I understand is called the "File History" or "Prosecution History"), and the teachings of the prior art are evaluated from the perspective of a person of ordinary skill in the art ("POSITA"). I understand that the factors considered in determining the ordinary level of skill in the art include: (i) the levels of education and experience of persons working in the field; (ii) the types of problems encountered in the field; and (iii) the sophistication of the technology. I may also consider, if available, the education level of the inventor, prior art solutions to the problems encountered in the art, and the rapidity with which innovations are made in the relevant art.

11. I understand that a person of ordinary skill in the art is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors above. This hypothetical person has knowledge of all prior art in the relevant field as if it were arranged on a workshop wall and takes from each reference what it would teach to a person having the skills of a POSITA.

B. Obviousness

12. I understand that a claim may be invalid under 35 U.S.C. § 103(a) if the subject matter described by the claim as a whole would have been “obvious” to a hypothetical POSITA in view of a single prior art reference or in view of a combination of references at the time the claimed invention was made. Therefore, I understand that obviousness is determined from the perspective of a hypothetical POSITA. I further understand that a hypothetical POSITA is assumed to know and to have all relevant prior art in the field of endeavor covered by the patent in suit and all analogous prior art. I understand that obviousness in an IPR review proceeding is evaluated using a preponderance of the evidence standard, which means that the claims must be more likely obvious than nonobvious.

13. I also understand that an analysis of whether a claimed invention would have been obvious should be considered in light of the scope and content of the prior art, the differences (if any) between the prior art and the claimed invention, and the level of ordinary skill in the pertinent art involved. I understand as well that a prior art reference should be viewed as a whole. I understand that in considering whether an invention for a claimed combination would have been obvious, I may assess whether there are apparent reasons to combine known elements in the prior art in the manner claimed in view of interrelated teachings of multiple prior art references, the effects of demands known to the design community or present in the marketplace,

and/or the background knowledge possessed by a POSITA. I also understand that other principles may be relied on in evaluating whether a claimed invention would have been obvious, and that these principles include the following:

- A combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results;
- When a device or technology is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or in a different one, so that if a POSITA can implement a predictable variation, the variation is likely obvious;
- If a technique has been used to improve one device, and a POSITA would have recognized that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill;
- An explicit or implicit teaching, suggestion, or motivation to combine two prior art references to form the claimed combination may demonstrate obviousness, but proof of obviousness does not depend on or require showing a teaching, suggestion, or motivation to combine;
- Market demand, rather than scientific literature, can drive design trends and may show obviousness;

- In determining whether the subject matter of a patent claim would have been obvious, neither the particular motivation nor the avowed purpose of the named inventor controls;
- One of the ways in which a patent's subject can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims;
- Any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed;
- "Common sense" teaches that familiar items may have obvious uses beyond their primary purposes, and in many cases a POSITA will be able to fit the teachings of multiple patents together like pieces of a puzzle;
- A POSITA is also a person of ordinary creativity, and is not an automaton;
- A patent claim can be proved obvious by showing that the claimed combination of elements was "obvious to try," particularly when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions such that a POSITA

would have had good reason to pursue the known options within his or her technical grasp; and

- One should not use hindsight in evaluating whether a claimed invention would have been obvious.

14. I also understand that an obviousness determination includes the consideration of various factors such as: (1) the scope and content of the prior art, (2) the differences between the prior art and the asserted claims, (3) the level of ordinary skill in the pertinent art, and (4) the existence of secondary considerations such as commercial success, long-felt but unresolved needs, failure of others, and so forth.

15. I am informed that it is improper to combine references where the references teach away from their combination. I am informed that a reference may be said to teach away when a person of ordinary skill in the relevant art, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the patent applicant. In general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the patentee. I am informed that a reference teaches away, for example, if (1) the combination would produce a seemingly inoperative device, or (2) the references leave the impression that the product would not have the property

sought by the patentee. I also am informed, however, that a reference does not teach away if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.

16. I am informed that even if a *prima facie* case of obviousness is established, the final determination of obviousness must also consider “secondary considerations” if presented. In most instances, the patentee raises these secondary considerations of non-obviousness. In that context, the patentee argues an invention would not have been obvious in view of these considerations, which include: (a) commercial success of a product due to the merits of the claimed invention; (b) a long-felt, but unsatisfied need for the invention; (c) failure of others to find the solution provided by the claimed invention; (d) deliberate copying of the invention by others; (e) unexpected results achieved by the invention; (f) praise of the invention by others skilled in the art; (g) lack of independent simultaneous invention within a comparatively short space of time; and (h) teaching away from the invention in the prior art.

17. I am further informed that secondary considerations evidence is only relevant if the offering party establishes a connection, or nexus, between the evidence and the claimed invention. The nexus cannot be based on prior art features. The establishment of a nexus is a question of fact. While I understand that Patent

Owner here has not offered any secondary considerations at this time, I will supplement my opinions in the event that Patent Owner raises secondary considerations during the course of this proceeding.

C. Analogous Art

18. I have been informed that for a prior art reference to be proper for use in an obviousness analysis, the reference must be “analogous art” to the claimed invention. I have been informed that a reference is analogous art to the claimed invention if: (1) the reference is from the same field of endeavor as the claimed invention (even if it addresses a different problem); or (2) the reference is reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed invention). In order for a reference to be “reasonably pertinent” to the problem, it must logically have commended itself to an inventor’s attention in considering his problem. In determining whether a reference is reasonably pertinent, one should consider the problem faced by the inventor, as reflected either explicitly or implicitly, in the specification. I believe that all of the references that my opinions in this IPR are based upon are well within the range of references a person having ordinary skill in the art would consult to address the type of problems described in the Challenged Claims.

D. Claim Construction

19. I understand that the claim terms in this IPR will be construed according to their plain and ordinary meaning as understood in light of the claim language, the patent's description, and the prosecution history viewed from the perspective of a POSITA. I further understand that where a patent defines claim language, the definition in the patent controls, even if there are other definitions that might be understood by those working in the art.

1. Constructions Pursuant to 37 C.F.R. § 42.104(b)(3)

20. I have been informed that claims of the '545 Patent include claim terms that were construed in a previous IPR proceeding and that were later affirmed by the Federal Circuit. I have been instructed to adopt the constructions set forth below.

<i>Claim Term</i>	<i>Construction</i>
Networked Information Monitor (NIM) (Claims 1-21)	"a fully configurable frame with one or more controls, through which content is presented to the user"
Networked Information Monitor (NIM) Template (Claims 1-21)	"data structure which defines the characteristics of a NIM, including the NIM frame, view and control characteristics, and which excludes executable applications/compiled code"

IV. LEVEL OF A PERSON OF ORDINARY SKILL

21. Based on my review and analysis of the '545 Patent, the prior art cited herein, and the ordinary skill factors described in this section, a POSITA in the field of the '545 Patent at the time of the earliest possible priority date (April 26, 1999)

would have been knowledgeable regarding the field of computer graphical user interfaces. In my experience working in this field, most workers of ordinary skill in the art as of the earliest possible priority date of April 26, 1999, would have had a bachelor's degree in computer science, computer engineering, or a related field, and at least two years of experience related to the design or development of Internet technologies, or the equivalent. *See, e.g., '545 Patent* (Ex. 1001), 2:28-54. A person with less relevant practical experience but with additional education can also qualify as a POSITA in the field of the '545 Patent. When I refer to the understanding of a POSITA, I am referring to the understanding of such a person as of April 26, 1999.

22. As of April 26, 1999, I had more than ordinary skill in the art. I am, however, familiar with the skills and knowledge possessed by those I would have considered to be of ordinary skill in the art as of that date. For example, I knew people, and myself worked in the field while I spent time as a Member of Technical Staff at AT&T Bell Laboratories from 1991 to 1996, and then a Principal Member of Staff at AT&T Labs – Research from 1996 to 2002. I was also honored by the Association for Computing Machinery (ACM) as a Distinguished Scientist in 2009 and served as the president of ACM's Special Interest Group on Computer-Human Interaction (ACM SIGCHI) from 2015-2018, was elected to the ACM SIGCHI Academy in 2019, and received the SIGCHI Lifetime Service Award in 2023. Further, I have taught courses on graphical user interfaces for over 20 years as a

professor and I have contributed to creating a Coursera specialization on User Interface Design.

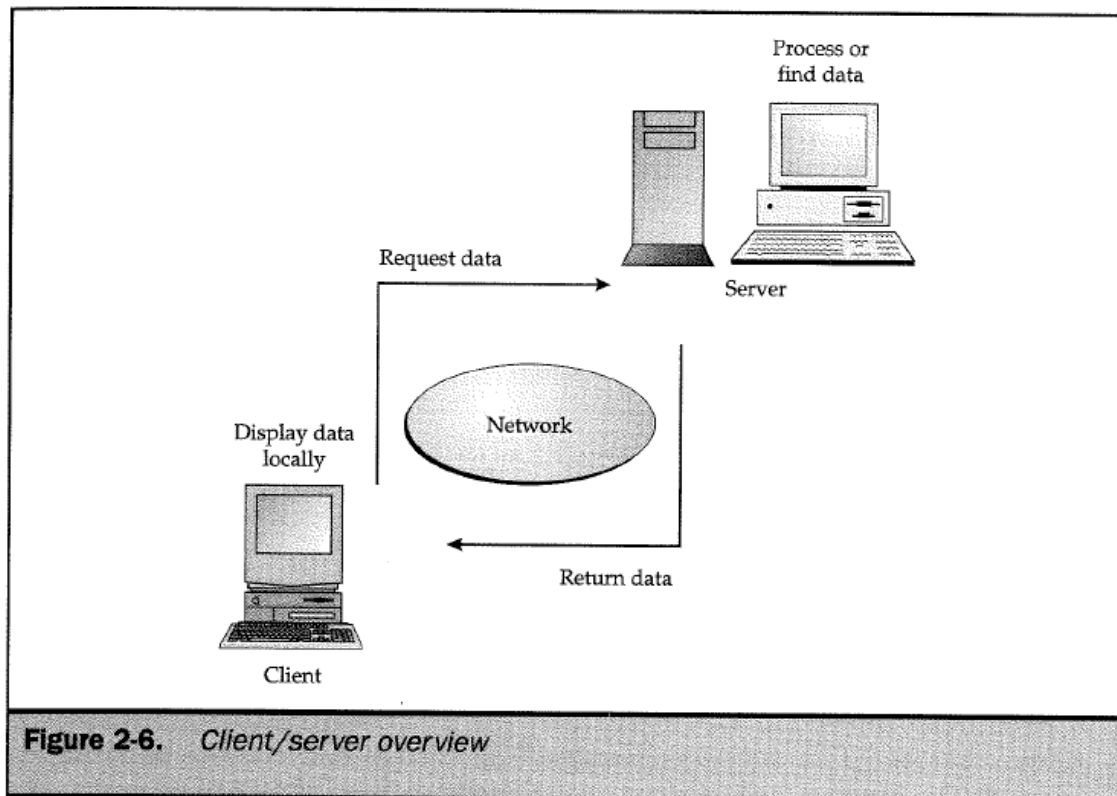
23. My opinions provided in this declaration would not change in view of minor modifications to this level of ordinary skill.

V. OVERVIEW OF THE TECHNOLOGY

24. I was asked to briefly summarize the background of the technology from the standpoint of a POSITA prior to April 26, 1999.

A. Client and Server Devices

25. Client and server computing devices were well known in the prior art before the priority date of the '545 Patent. For example, *Powell* teaches the well-known client/server architecture where a client device requests data from a server device, which returns data to said client device. *Powell's* Figure 2-6 depicts such a client/server overview:



Powell, 46. Powell teaches that such a client/server architecture is advantageous in that the workload is separated between a client and a server:

The advantage to the client/server architecture is that it separates the computing workload between the client machine-typically your local computer- and the remote server. This separation is important because it allows one server to talk to many different types of clients. For example, a Windows server could easily give out information to a Macintosh client (and vice versa). Furthermore, the client/server architecture scales very well since users don't have to be dependent on one monolithic system.

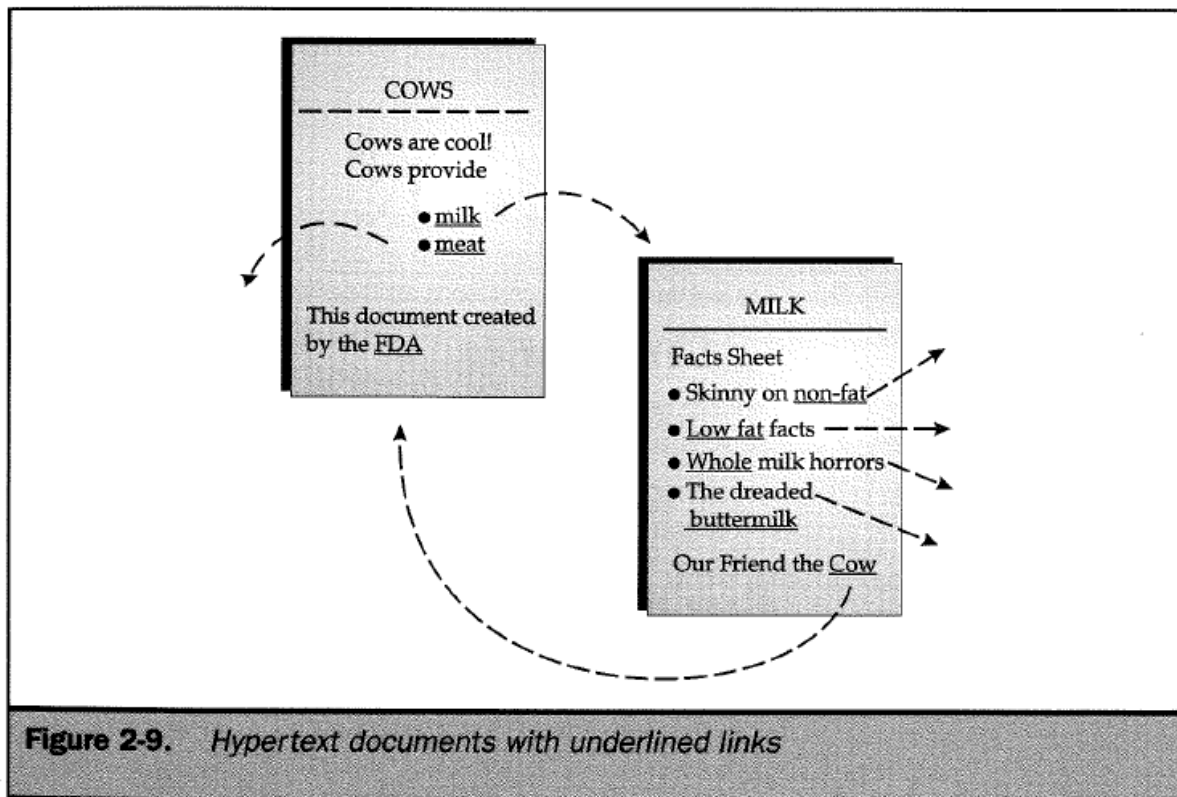
Powell, 46. Further, *Powell* teaches that “[o]ver the years, there have been a variety of Internet-based information retrieval schemes[.]” *Id.*

26. *Powell* also teaches that the TCP/IP (Transmission Control Protocol / Internet Protocol) protocol was a common protocol for connecting a client and server over a network. “The Internet is simply a particular internetwork—a large public internetwork that shares a common network protocol. The key to understanding this definition is TCP/IP.” *Powell*, 40. Additionally, *Powell* teaches that “*The Internet is the name given to the worldwide collection of data networks (an internetwork) that ‘speak’ the TCP/IP network protocol.*” *Id.* (italics original). *Powell* teaches that TCP “does exactly what its name indicates: it controls the transmission of data.” *Powell*, 43. *Powell* teaches the IP protocol portion “handles the addressing scheme on the Internet ... this would be read so that the data packet could be routed to the appropriate destination.” *Id.*, see also *Powell*, 62 (“In summary, the Web uses a client/server model. The browser (client) requests pages from a Web server over a network like the Internet. The discussion is handled by the HTTP protocol. The actual transmission of data is handled by TCP/IP. The addressing of data objects to request takes the form of a Uniform Resource Locator (URL)[.]” *Powell*, 62.

B. Hypertext Documents

27. *Powell* also teaches that the Web “presented a method to organize information on the Internet as a collection of linked documents called hypertext[.]”

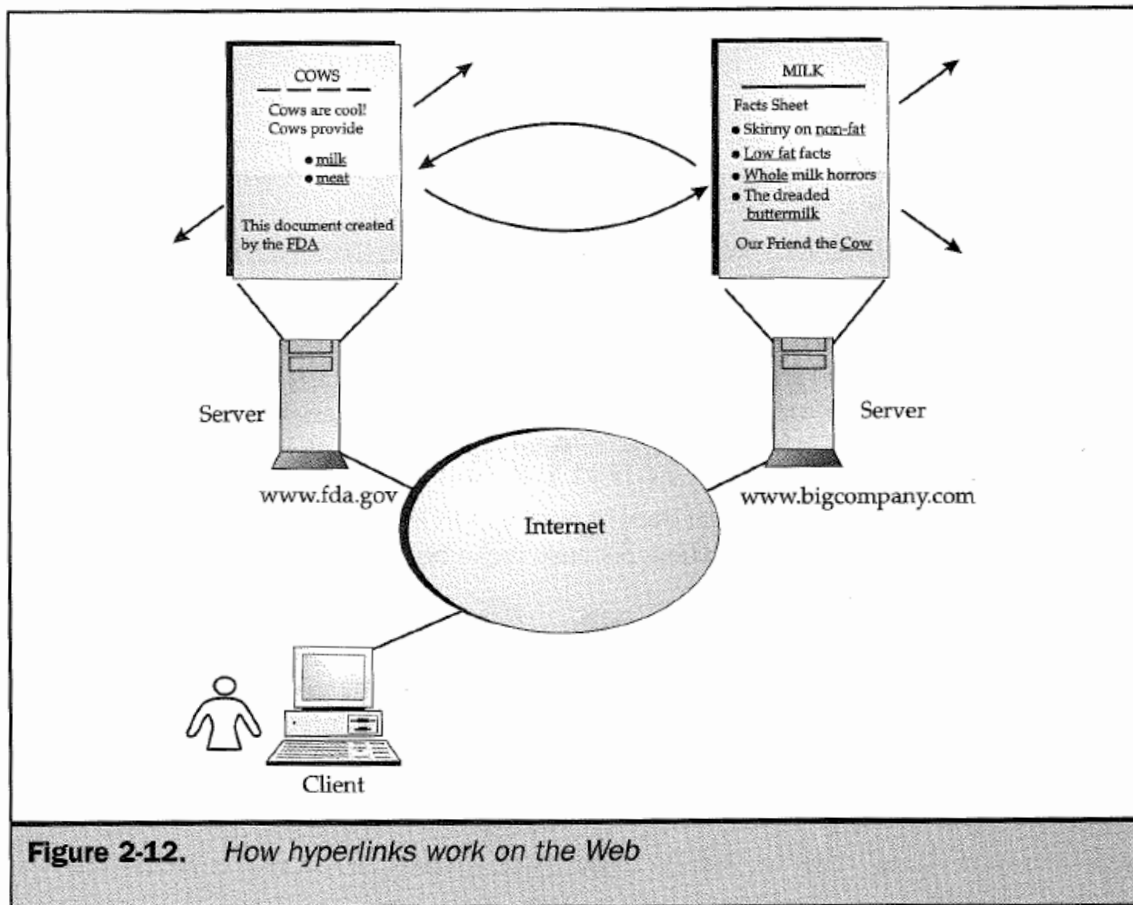
Powell, 48. *Powell* teaches that a hypertext document “is an electronic document that contains links to related pieces of information. It could be characterized as providing generalized footnotes. For example, a hypertext document about cows may feature a link from the word ‘milk,’ which, when followed, sends the reader to other documents about the types of milk, as shown in Figure 2-9.” *Powell*, 50. *Powell* further teaches that hypertext “is a nonlinear way to access information. Many people find it similar to the way they think about problems.” *Id.* *Powell* teaches an example of hypertext documents in Figure 2-9 below:



Powell, 50. *Powell* additionally teaches that the concept of hypertext “is nearly 50 years old” and that “[s]erious research in hypertext theory has been done for nearly

35 years. The term ‘hypertext’ was coined in the mid-sixties by Ted Nelson.” *Powell*, 32.

28. It was also known that the World Wide Web, also referred to as the Web, “is the name given to the collection of hypermedia documents spread out on machines all over the Internet. The links in these documents transcend the machine where the document is located.” *Powell*, 52. Referring to the example of the cow and milk, *Powell* teaches that “the general COWS document might reside on a machine in the United States, while the MILK document might reside on a machine in England. When a user clicks on the ‘milk’ hyperlink, he or she fetches the milk information from the British machine over the Internet.” *Powell*, 52-53. *Powell* depicts such a process in Figure 2-12 below:



Powell, 53.

29. In another example, *Cordell* teaches “‘client’ applications that accept commands from the user and obtain Internet data and services by sending requests to ‘server’ applications on other computers at other locations on the Internet.” *Cordell*, 1:23-27.

C. HTML

30. *Powell* teaches that HTML is the “not-so-behind-the-scenes markup language that you use to tell Web browsers how to display Web pages.” *Powell*, 22.

For example, *Powell* teaches “markup commands directed to your Web-based content tell the browser software the structure of the document, and where possible, how you want it to be displayed. If you wished to display a section of text in boldface, you would surround the corresponding text with the boldface markup tags `<B>` and `</B>`[.]” *Powell*, 22.

31. Further, an “HTML document is simply a text file that contains the information you want to publish. It also contains embedded instructions, called *elements*, that indicate how a Web browser should structure or present the document.” *Powell*, 23. *Powell* teaches that a “markup language like HTML is simply a collection of codes—*elements* in this case—that are used to indicate the structure and format of a document. The codes have meaning that is interpreted by a formatting program, often a Web browser, that renders the document. Elements in HTML consist of alphanumeric tags within angle brackets.” *Powell*, 28-29. In this way, HTML instructions are used as input to render a web page or other HTML frame. *Powell* further teaches that software and hardware serve up Internet pages, and browsers render the pages. *Powell*, 63.

32. It was known before the priority date of the '545 Patent that HTML is not a programming language; HTML is a markup language. *Powell* teaches that “HTML is unlike programming in that it does not specify logic. It specifies only the

layout and structure of a document.” *Powell*, 33, 34 (“HTML is not a programming language[.]”).

33. *Powell* further teaches HTML is a tool for disseminating information and that this “information can be any message you wish to communicate to another individual and is not limited to text forms. It can be expressed as images, sound, movies, and just about any other form you can imagine. This information is distributed through a networked environment called the World Wide Web.” *Powell*, 37.

34. It was also known to embed controls in HTML. For example, *Powell* teaches embedding ActiveX controls and using the <OBJECT> element to “insert an ActiveX control in a page.” *Powell*, 272-273, 282-285 (teaching using a LiveAudio plug-in with controls for playing audio), 294-298 (teaching using QuickTime for playing text, images, video, and sound), 360 (teaching frames may “provide a scroll bar or other controls to manipulate the size of the frame.”).

35. Regarding URLs (uniform resource locators) in particular, *Powell* teaches a URL is broken up into a protocol, site address, directory, and file name, as depicted below:

 protocol://site address/directory/file name

Powell, 155-167. In a particular example, *Powell* teaches a URL to link to a specific HTML file via a URL:



Formula: `http://<server>/<file>`
Example: `http://www.company.com/hello.htm`

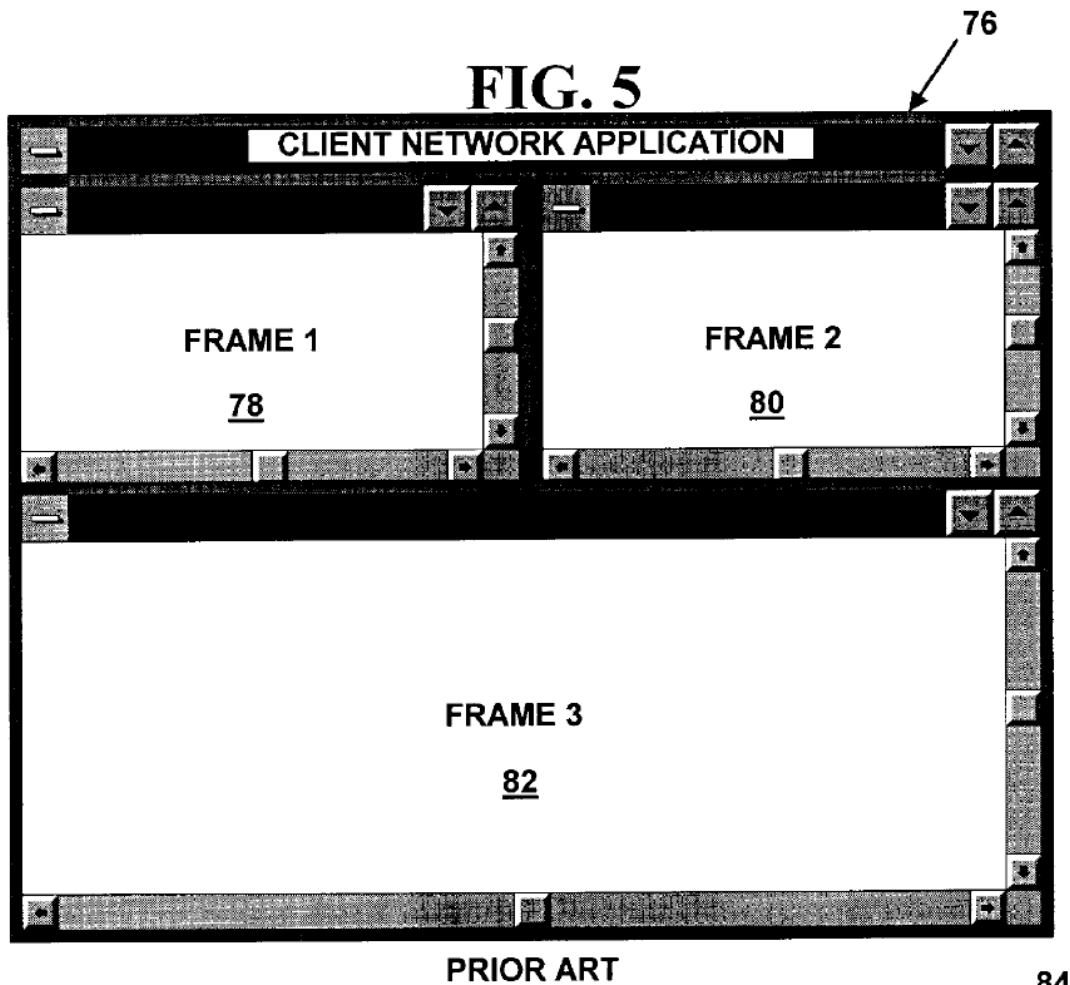
Powell, 165. *Powell* also teaches URLs point to objects, such as images. *Powell*, 155 (“A URL is a standard, or, more appropriately, a uniform way to refer to objects and services on the Internet.”), 155 (“[T]he URL simply describes where something is and how it will be retrieved. The ‘how’ is specified by the protocol, for example, HTTP. The ‘where’ is specified by a machine name, directory name, and filename. Slashes and other characters are used to separate the parts of the address into machine parseable pieces.”), 166 (“In addition to referring to HTML documents, an HTTP URL can request any type of file. For example, <http://www.company.com/images/logo.gif> would retrieve a GIF image from a server rather than an HTML file.”).

D. HTML Frames

36. HTML frames were well known before the priority date of the ’545 Patent. *Cordell* teaches that “HTML allows the author of a document to split the information displayed by a network browser into a number of rectangular areas called ‘frames.’ HTML frames are created with the HTML <FRAME> and <FRAMESET> tags which are known to those skilled in the art.” *Cordell*, 1:57-61.

Thus, each “frame can then separately display a HTML document or other HTML object (e.g., a photographic image) specified by a separate URL.” *Cordell*, 1:64-67. *Cordell* teaches an example where “an author can create multiple frames to display text in one frame, a photographic image in another, and an animated sequence in a third frame.” *Cordell*, 1:67-2:2. Further, *Cordell* teaches that “Authors can also specify a frame specifically for the purpose of navigational elements such as graphical toolbars. Clicking on the graphical toolbar frames with a mouse or other pointing device will update the content of other frames displayed.” *Cordell*, 2:2-2:7.

37. *Cordell* teaches an example of a prior art frameset with three separate frames in Fig. 5 below:



Cordell, Fig. 5.

VI. OVERVIEW OF THE '545 PATENT

38. I have reviewed the '545 Patent (Ex. 1001). Descriptions of the '545 Patent that may be pertinent to my analysis are provided herein, and my descriptions of the '545 Patent are intended only as a summary of the '545 Patent and/or intended as being pertinent to the Challenged Claims of the '545 Patent. My opinions provided herein are not intended as a discussion of my entire understanding of the '545 Patent or any other claims in any related patent to the '545 Patent.

39. The '545 Patent describes conveying internet content to a user via “Dots” or “NIMs.” *'545 Patent*, 2:28-34. Said Dots or NIMs are software components that a Viewer application processes to present internet content to a user in a frame where the frame is distinguished from a browser. *'545 Patent*, 4:59-63, 25:65-26:5. Additionally, the '545 Patent describes “NIM templates” that provide characteristics for “NIMs” including viewer and control characteristics and that work to render a NIM with content. *'545 Patent*, 6:34-37.

VII. THE PROSECUTION HISTORY OF THE '545 PATENT

40. I have reviewed the prosecution history for the '545 Patent (Ex. 1002). Pertinent aspects of the prosecution history of the '545 Patent are described below.

A. Prosecution History of the '545 Patent

41. The '545 Patent issued from an application that was filed on August 23, 2013. *'545 Patent*. The '545 Patent also is a continuation of Application 09/558,925 that was filed on April 26, 2000. *Id.* The '545 Patent also claims priority to several provisional applications, with the earliest filing date of April 26, 1999. *'545 Patent*, 1:7-20. I note that during prosecution of the application that issued as the '545 Patent, the examiner issued a first office action rejecting the claims. *'545 FH*, 176-180. The applicant filed a terminal disclaimer. *'545 FH*, 146-151. A Notice of Allowance was subsequently issued. *'545 FH*, 137.

VIII. SUMMARY OF UNPATENTABILITY

Proposed Grounds of Unpatentability	
<u>Ground 1</u>	Claims 1-4 and 6-21 are obvious under pre-AIA 35 U.S.C. § 103(a) over <i>Slivka</i> in view of <i>Anabuki</i> and <i>Powell</i>
<u>Ground 2</u>	Claim 5 is obvious under pre-AIA 35 U.S.C. § 103(a) over <i>Slivka</i> in view of <i>Anabuki</i> , <i>Powell</i> and <i>Melbin</i>

42. I have reproduced the Proposed Grounds of Unpatentability from the Petition for ease of reference.

43. As I opine below, *Slivka* in view of *Powell* and *Anabuki* renders obvious every limitation of claims 1-4 and 6-21. Specifically, *Slivka* teaches sets of HTML instructions (“NIM templates”) and HTML frames for presenting content to a user (“NIMs”). *Powell*, another prior art reference, teaches specific aspects about the set of HTML instructions such as a definition of a first content element and various visual modifications to the HTML frames such as a definition of at least one control effective for controlling aspects of the viewer graphical interface, such as location at which the user interface is rendered on a display device (*see* Claim 3) and the size of the user interface when presented on the display (*see* Claim 4).. Further, as I opine below, *Anabuki*, another prior art reference, also teaches HTML instructions and requesting and downloading HTML templates for formatting and presenting content on a display device. *Slivka* in view of *Powell* and *Anabuki* thus teach or render obvious claims 1-4 and 6-21.

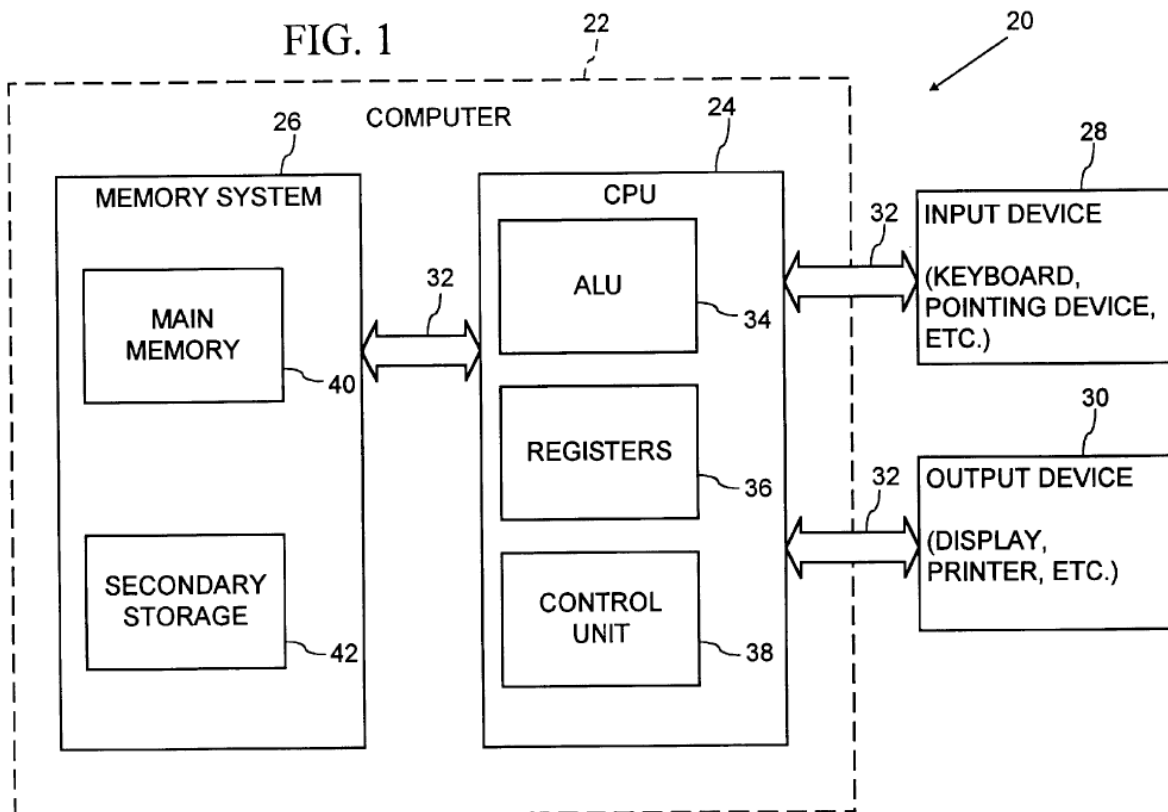
44. *Melbin*, another prior art reference, teaches templates with instructions for how a content server should process certain contents of a page and elements for

both layout and logic of a page. *Melbin* further teaches using both HTML and XML (extensible markup language).

IX. OVERVIEW OF THE PRIOR ART

A. Overview of Slivka

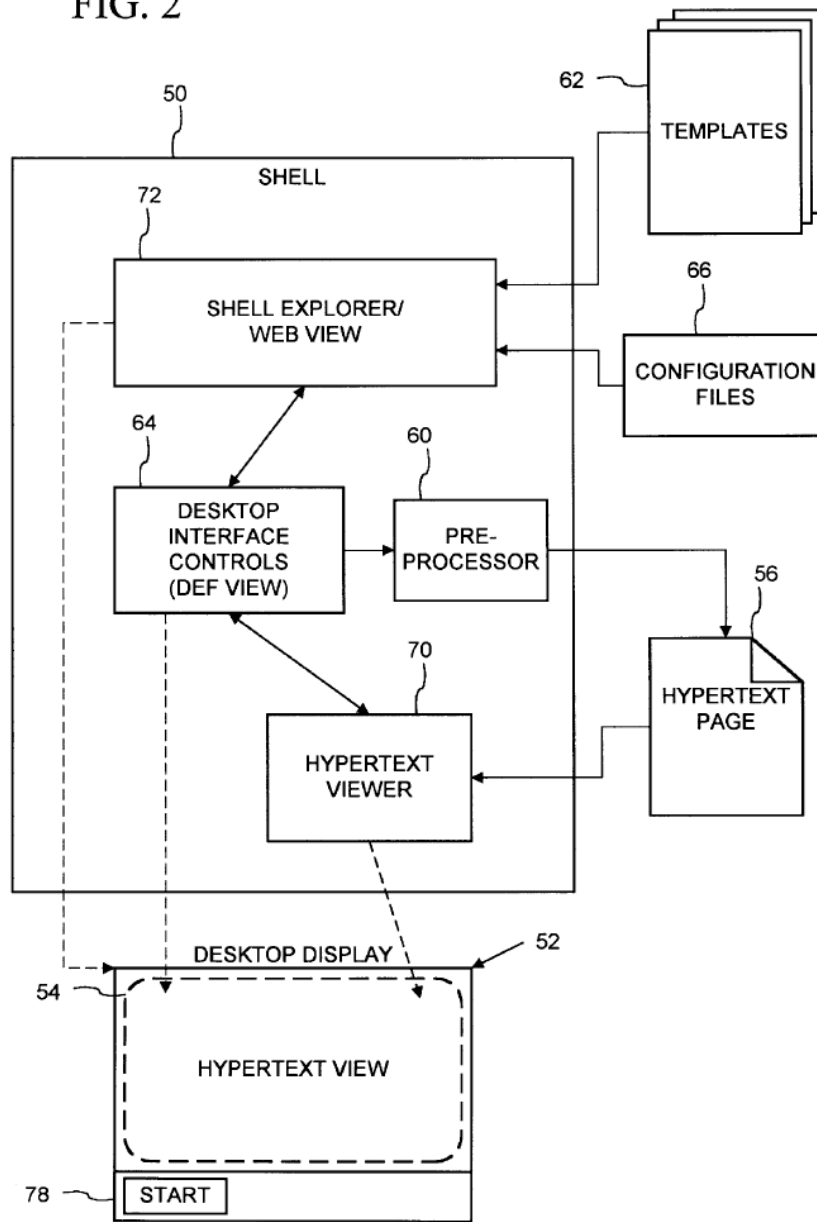
45. *Slivka* teaches a computer system 20 including a computer 22, output device 30 (including display), memory system 26, and CPU 24. *Slivka* (Ex. 1004), 4:63-5:57. *Slivka* teaches said computer system 20 includes other input or output devices such as a “network interface or a modem[.]” *Id.* *Slivka*’s Fig. 1 below depicts said components, among others:



Slivka, Fig. 1.

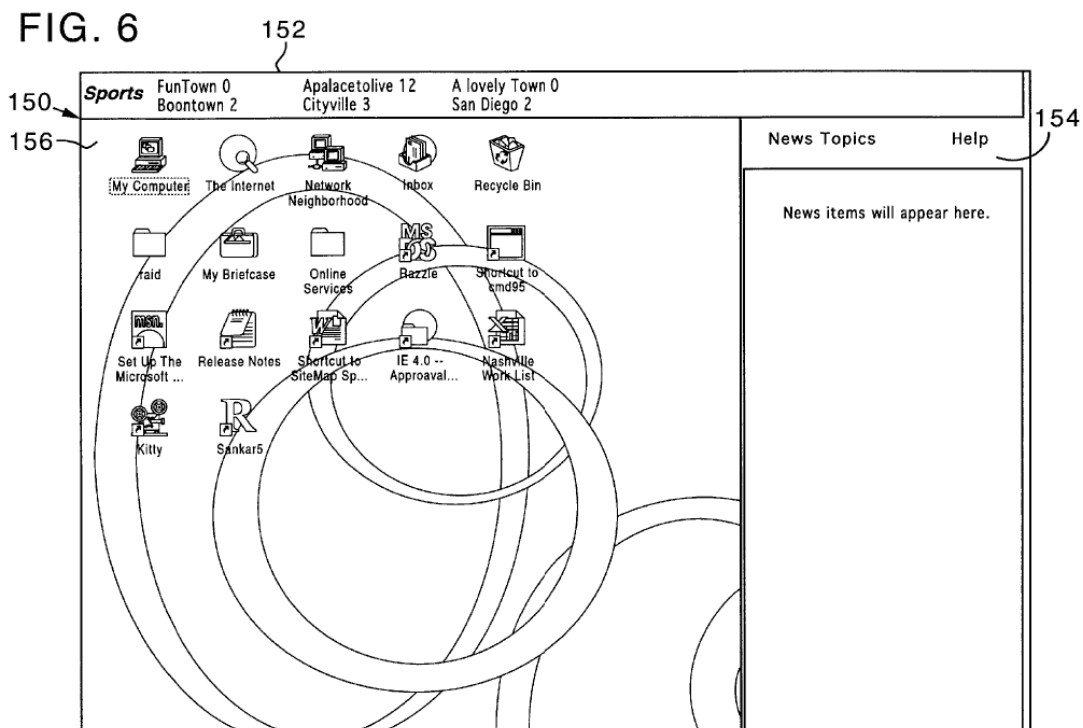
46. *Slivka* also teaches a shell 50 for an operating system of the computer system 20 where the shell 50 “provides a graphical user interface for a user of the computer to interact with the operating system.” *Slivka*, 5:59-62. *Slivka*’s graphical user interface also includes desktop display 52 (presented by shell 50) that is presented on output device 30. *Slivka*, 5:63-66, 6:4-38, 6:54-67, 10:7-39. I note that *Slivka*’s Fig. 2 depicts said shell 50 and desktop display 52.

FIG. 2



Slivka, Fig. 2.

47. *Slivka* also teaches that independent frames for displaying content to a user are presented on the desktop display. *Slivka*, 18:49-19:11,¹ Fig. 6. Fig. 6 below depicts ticker 152 for displaying sports or stock content retrieved from the Internet and news pane 154 depicts news content retrieved from the Internet. *Slivka*, 18:49-19:11.



¹ I note that a POSITA would have understood that *Slivka* has a typographical error at 18:49, where “FIG. 5” should read “FIG. 6.” *Slivka*, 18:49. A POSITA would have understood from *Slivka*’s teachings at 18:49-19:18 that Fig. 6 is described rather than Fig. 5 because element numbers 150, 152, 154, and 156 do not appear in Fig. 5 but do appear in Fig. 6. In particular, *Slivka*’s teachings regarding ticker 152 and news pane 154 are not depicted in FIG. 5. Similarly, a POSITA would have understood or found obvious that *Slivka* at 19:20 “FIG. 6” is a typographical error that should read “FIG. 7” because elements 170, 172, 176, 178, and 180 are depicted in Fig. 7 and not in Fig. 6. *Slivka*, 19:20-20:7.

Slivka, Fig. 6.

48. *Slivka* also teaches synthesizing a hypertext page from various sources, such as templates, stored hypertext pages, and/or HTML format files, where said synthesized hypertext page ultimately comprises sets of HTML instructions which define separate HTML frames on the desktop display. *Slivka*, 3:14-30, 18:49-19:11, Fig. 6. I note that *Slivka* also teaches Appendices that comprise exemplary HTML instructions for said HTML frames, and where there are separate frames defined for “tickerframe,” “infopane” (news), and “icons” (all of which are displayed in Fig. 6, above). See *Slivka FH*, 69-77. An example of said HTML instructions is depicted below in an annotated figure I have reproduced from the Petition, where DESKTOP.HTM (“Appendix A”) references Appendices E-F for ticker 152 and Appendices C-D for news pane 154:

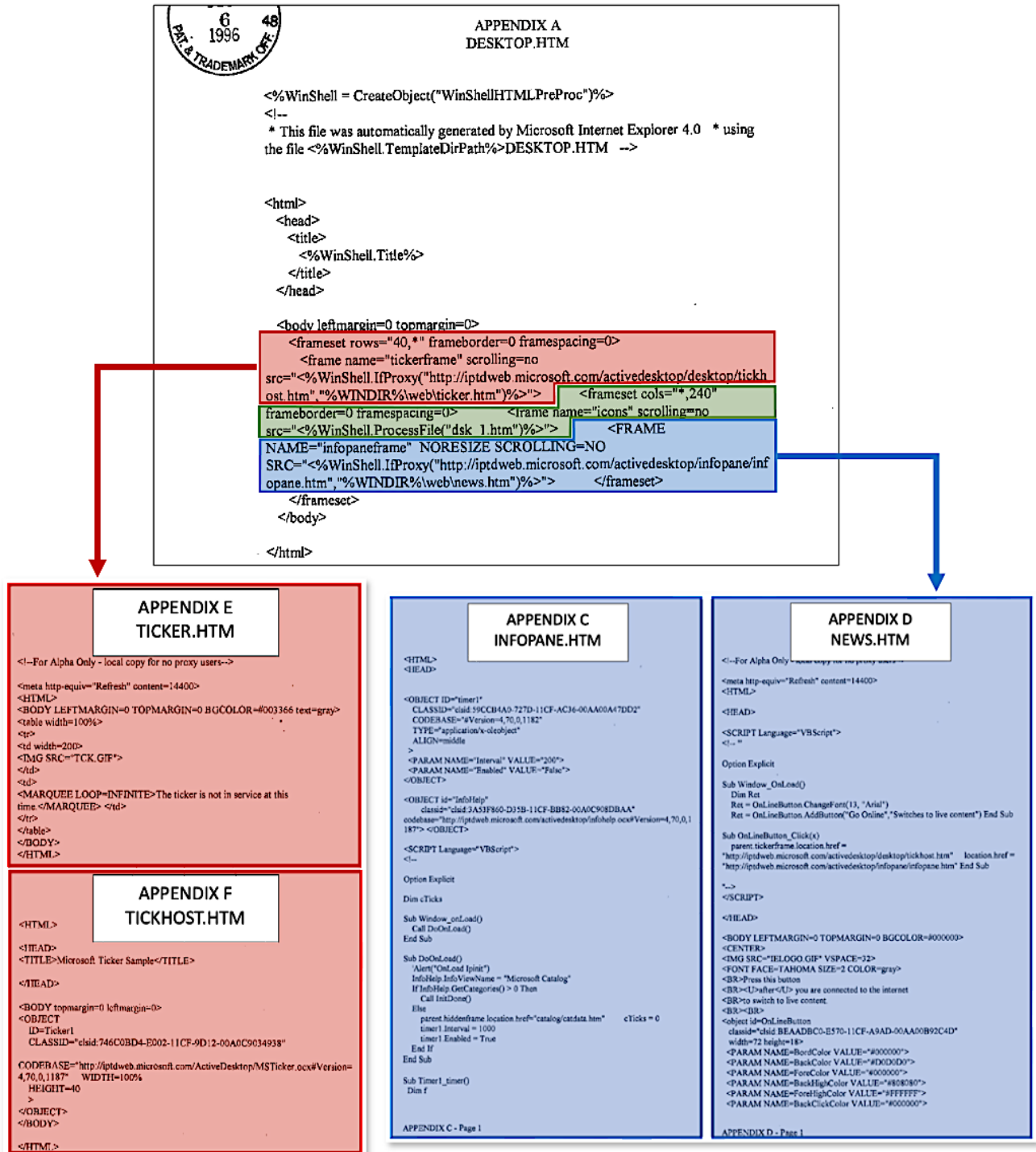
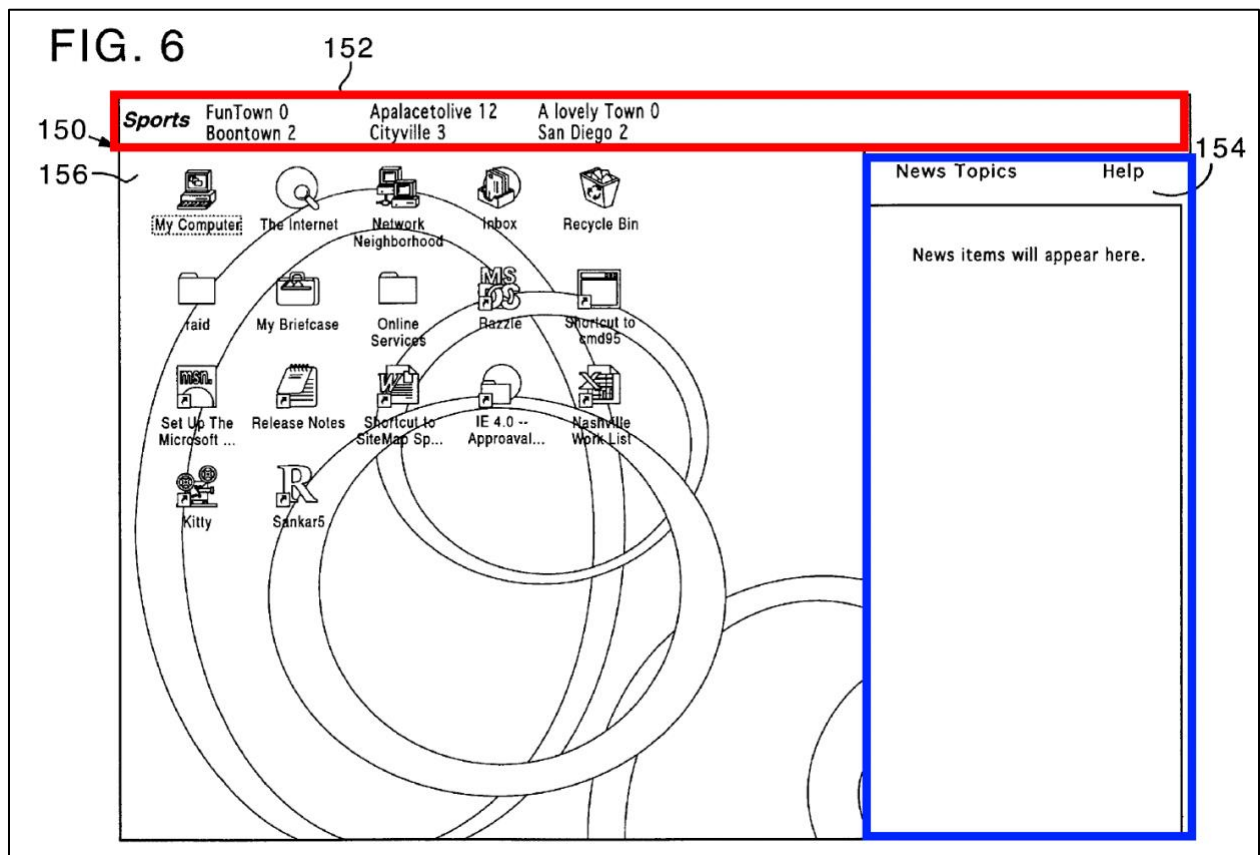


Figure A; *Slivka FH*, 69-70, 72-77 (excerpt, annotated). Thus, I note that each frame is defined by a set of HTML instructions that are within a larger synthesized hypertext page. As seen above, each set of HTML instructions includes information

necessary for generating a corresponding HTML frame and presenting content for said frame. *Slivka* teaches that there are various sources for said sets of HTML instructions, including “templates” and “HTML format files.” *Slivka*, 3:31-34, 18:52-67. A POSITA would have understood that *Slivka*’s synthesized hypertext page would have included all the necessary sets of HTML instructions, to produce (for example) the graphical user interface (“hypertext desktop view 150”) *Slivka*, 18:49) shown in Fig. 6. *Slivka* teaches the resulting desktop comprises HTML frames such as ticker 152 and news pane 154, as depicted in annotated Fig. 6 below (which I have reproduced from the Petition):

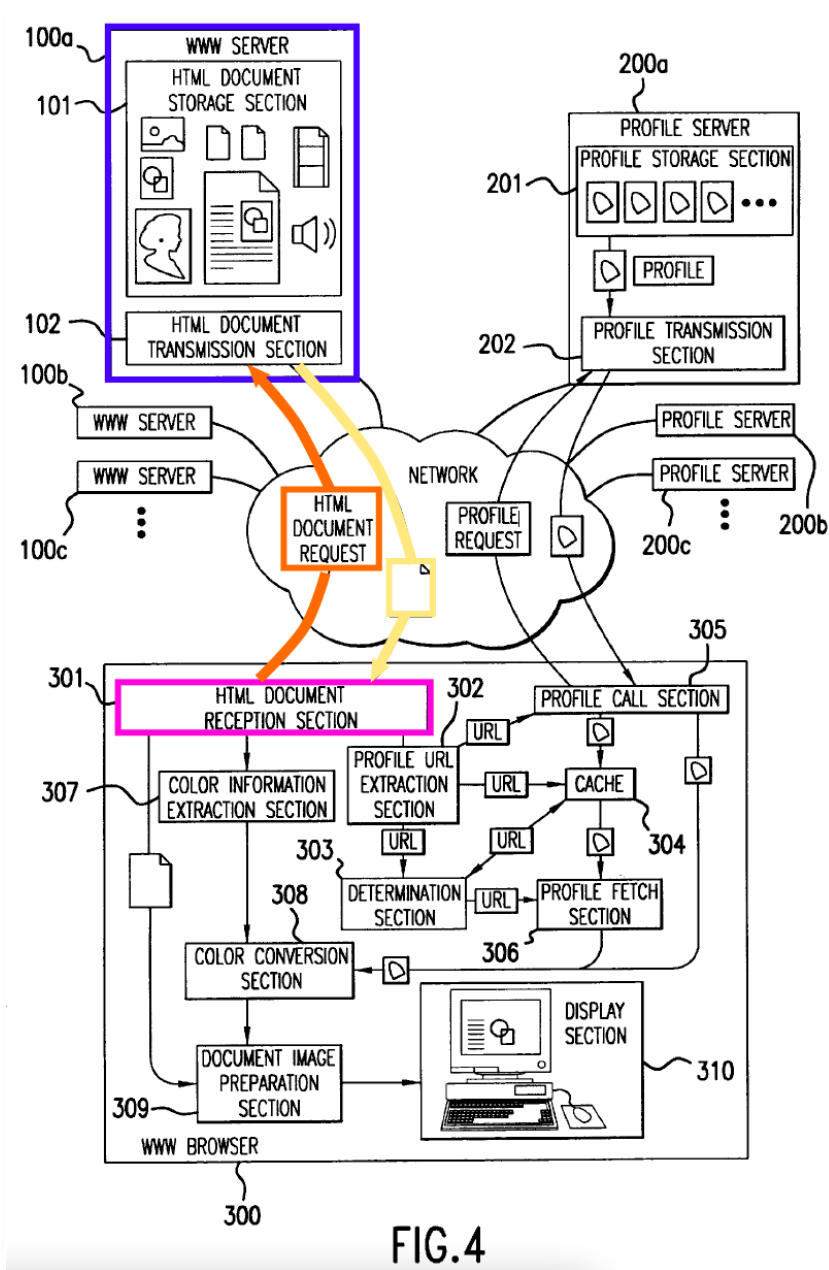


Slivka, Fig. 6 (annotated).

49. In my opinion, both *Slivka* and the '545 Patent are directed to systems and methods for presenting Internet content to a user and therefore *Slivka* is in the same field of endeavor as the '545 Patent. *Compare, Slivka*, Abstract, 11:54-65, 18:49-19:17, Figs. 1, 2, 6 *with '545 Patent*, Abstract, 4:29-40. Further, because *Slivka* is directed to a problem of enhancing a graphical user interface and *Slivka* teaches presenting HTML frames that receive content from the Internet on a user interface, *Slivka* is reasonably pertinent to a problem faced by the inventors of the '545 Patent. *Compare Slivka*, 3:14-16, 11:54-65, 18:49-19:17, Fig. 6 *with '545 Patent*, Abstract, 4:29-40.

B. Overview of Anabuki

50. *Anabuki* teaches HTML documents that are stored at a server and that a user can request and retrieve. *Anabuki* (Ex. 1006), 10:4-13, 11:54-12:24, 13:17-19. In particular, annotated FIG. 4 below depicts such a request and receipt of an HTML document.



Anabuki, Fig. 4 (annotated).

51. In my opinion, both *Anabuki* and the '545 Patent are directed to systems and methods for presenting Internet content to a user and therefore, *Anabuki* is in the same field of endeavor as the '545 Patent. *Compare* '545 Patent, 4:29-40, Abstract, with *Anabuki*, 10:4-13, 11:54-12:24, 13:17-19, Fig. 4. Similarly, both *Anabuki* and

the '545 Patent recognize challenges involved in displaying internet content to a user and to present content on a GUI. Thus, *Anabuki* is reasonably pertinent to a problem described in the '545 Patent. *Compare Anabuki*, 10:4-13, 11:54-12:24, 13:17-19, Fig. 4, *with '545 Patent*, 4:29-40, Abstract.

C. Overview of Powell

52. *Powell* teaches well known HTML instructions including techniques for presenting content on a display using HTML instructions. For example, *Powell* teaches using a URL to retrieve any type of file, such as image files. *Powell* (Ex. 1013), 166 (“In addition to referring to HTML documents, an HTTP URL can request any type of file. For example, <http://www.company.com/images/logo.gif> would retrieve a GIF image from a server rather than an HTML file.”).

53. In my opinion, both *Powell* and the '545 Patent are directed to systems and methods for presenting Internet content to a user. *Compare '545 Patent*, 4:29-40, Abstract, *with Powell*, 58, 62, 152-156, 164-167, 174-178. As such, *Powell* is in the same field of endeavor as the '545 Patent. Further, both *Powell* and the '545 Patent recognize challenges involved in displaying internet content to a user and to present content on a GUI; therefore, *Powell* is reasonably pertinent to a problem described by the '545 Patent. *Powell*, 9, 68, 155-167, 174-184, 245-250, 255-256, 260-262, 267-268, 336, 361-362, 372-376; '545 Patent, 4:29-40, Abstract.

D. Overview of Melbin

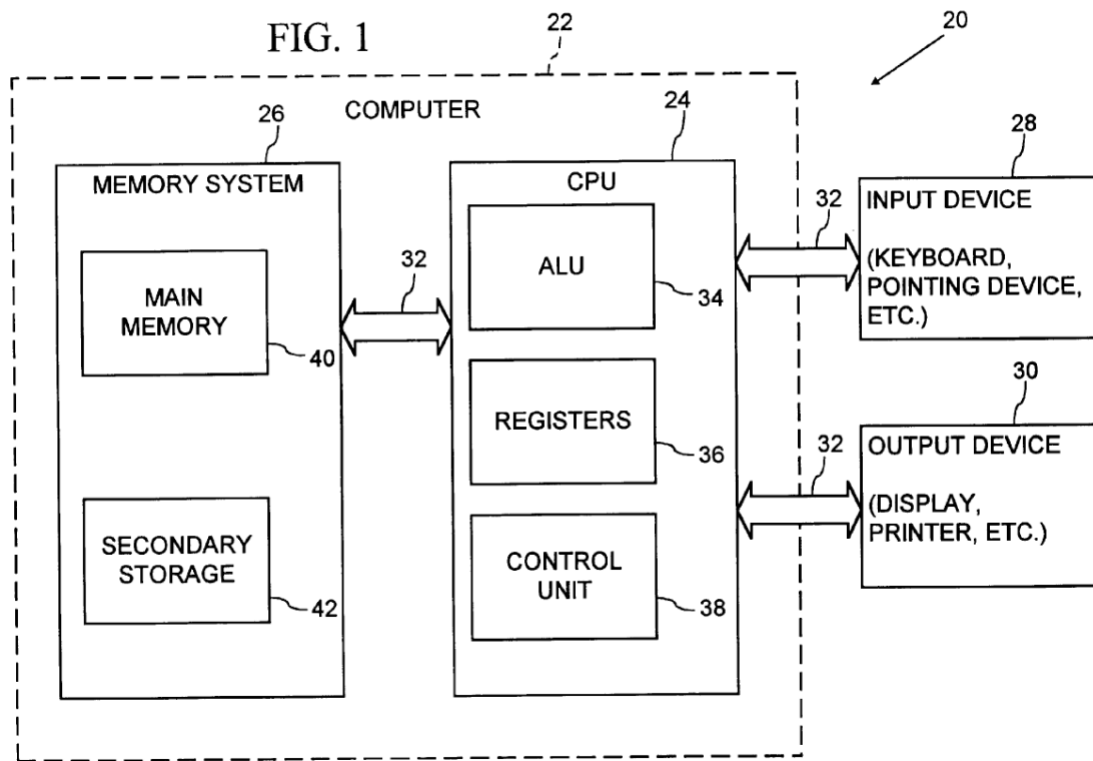
54. Both *Melbin* and the '545 Patent are directed to systems and methods for presenting Internet content to a user and therefore *Melbin* is in the same field of endeavor as the '545 Patent. *Compare* '545 Patent, 4:29-40, Abstract, with *Melbin* (Ex. 1014), 2:32-50, 6:10-44, Abstract. Further, both *Melbin* and the '545 Patent recognize the challenges with utilizing markup language to specify content to be retrieved from a server for presentation on a display; therefore, *Melbin* is reasonably pertinent to a problem described by the '545 Patent. *Melbin*, 2:32-50, 6:10-44, Abstract; '545 Patent, 23:55-60.

X. OPINIONS REGARDING GROUND 1: CLAIMS 1-4 AND 6-21 ARE OBVIOUS OVER *SLIVKA* IN VIEW OF *ANABUKI* AND *POWELL*

A. Claim 1(Pre): “A computer-implemented method of obtaining content over a network and displaying the content to a user, the method being implemented in a client computing device in operative communication with a server over a network, the client computing device including electronic storage, a display, and one or more processors configured to execute one or more computer program modules, the method comprising:”

55. In my opinion, to the extent the preamble is limiting, *Slivka* teaches a computer-implemented method of obtaining content (e.g., images, text) over a network (e.g., the Internet) and displaying the content to a user (e.g., on a display device). *Slivka* further teaches a client computing device in operative communication with a server over a network, as claimed. For example, *Slivka* teaches a computer system 20 (i.e., client computing device) that includes a

computer 22, memory system 26 (i.e., electronic storage), CPU 24 (i.e., one or more processors), input device 28, and output device 30 (including a display). *Slivka*, 4:63-5:57. In particular, *Slivka* teaches computer system 20 includes components for accessing a computer network. For example, *Slivka* teaches utilizing a “network interface or a modem” “as input and/or output devices.” *Slivka*, 5:29-31. Fig. 1 below depicts *Slivka*’s computer system 20 including computer 22:



Slivka, Fig. 1.

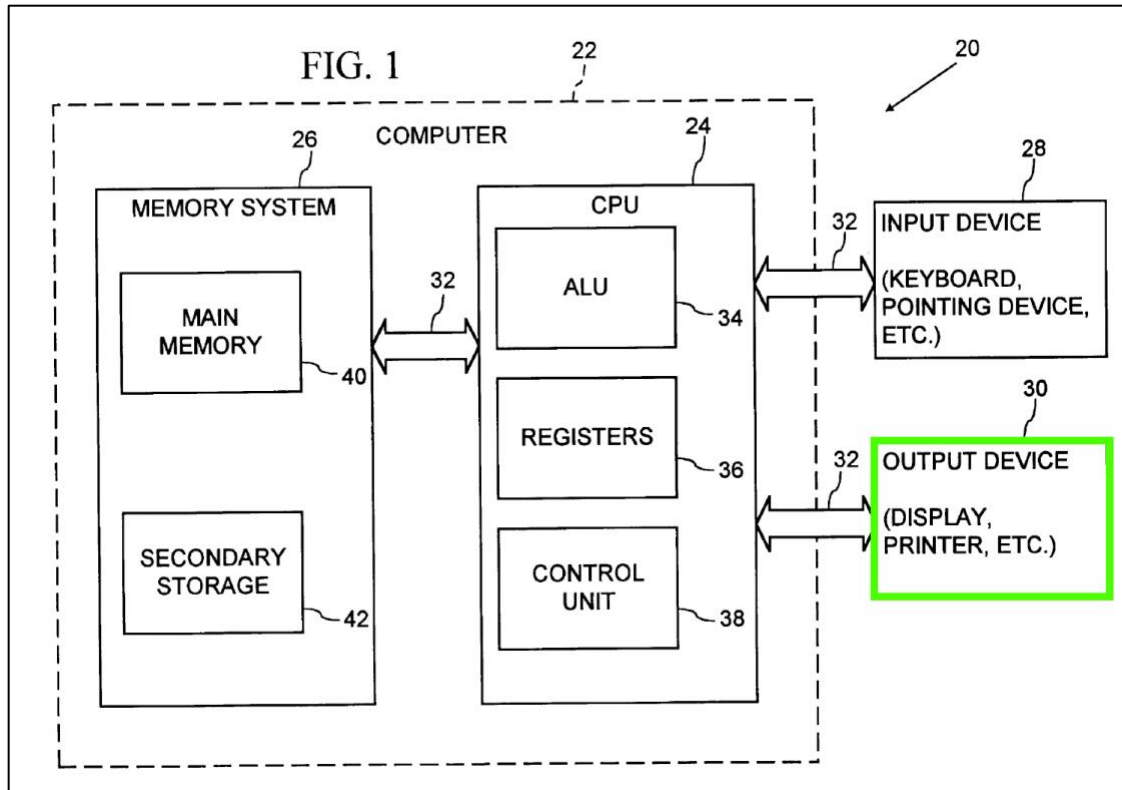
56. In my opinion, *Slivka*’s computer system 20 is a “client computing device” as claimed because computer system 20 includes a computer 22 and because said computer system 20 accesses and retrieves content from at least one online

server. For example, *Slivka* teaches that computer system 20 receives content over the Internet, including images and text related to sports and news. *Slivka*, 18:49-19:11 (“The ticker 152 presents scrolling HTML format information retrieved from the Internet, such as stock quotes and sports scores. The news pane 154 also presents HTML format information retrieved from the web, such as images and text relating to news events.”), 6:21-38, 3:4-7, 4:25-30, 17:14-19. As I discussed above, it was well known in the prior art that a server stores content for a client to access and retrieve. See Section V.A (discussing *Powell* in the Overview of the Technology). A POSITA would have understood or found obvious that *Slivka*’s ticker 152 and news pane 154 are HTML frames that present HTML format information retrieved from at least one server over a network such as the Internet. *Slivka*, 18:49-19:11.

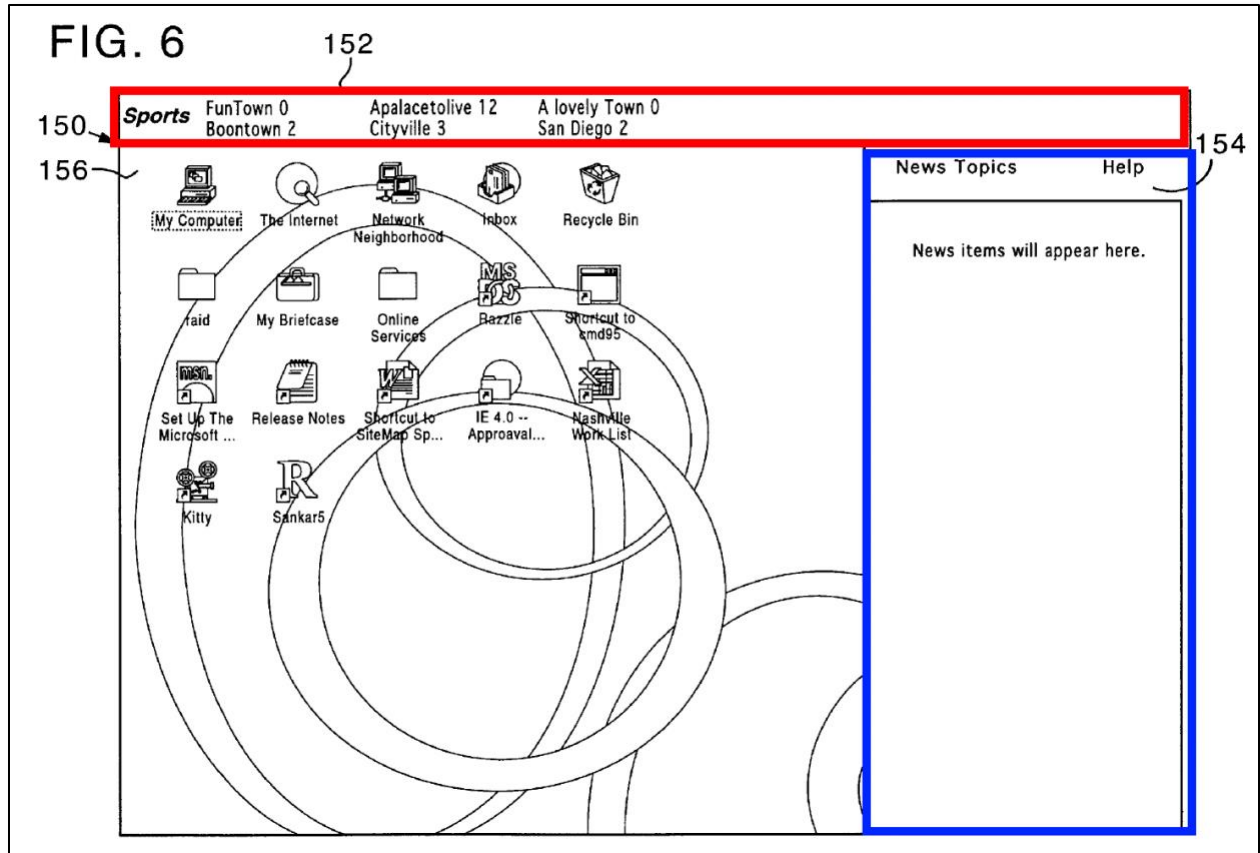
57. Therefore, in my opinion, a POSITA would have understood or at least found obvious that *Slivka* teaches a client computing device, as claimed, because *Slivka*’s computer system 20 accesses and retrieves content from at least one server over a network, such as the Internet.

58. Regarding the claimed display, it is my opinion that *Slivka* teaches an electronic display. *Slivka* teaches computer system 20 includes an output device 30 and that output device 30 includes a video screen. *Slivka*, 5:25-31, 5:59-66, 11:54-57, 19:20-23 (teaching a video screen of computer 20), 1:15-67, 4:16-33. I have

reproduced annotated Fig. 1 of the Petition below, which depicts output device 30 including (among other devices such as a printer) a display:



Slivka, Fig. 1 (annotated). Additionally, *Slivka* teaches a “view of a desktop display presented by the shell of FIG. 2” as depicted in FIG. 6. *Slivka*, 4:55-56, 4:45-47. I have reproduced annotated Fig. 6 from the Petition below:



Slivka, Fig. 6 (annotated). Therefore, in my opinion, *Slivka* teaches an electronic display, as claimed.

59. Regarding the claimed electronic storage, in my opinion, *Slivka* teaches computer system 20 includes both volatile and non-volatile memory. As I discuss below, a POSITA would have understood that either type of memory (volatile or non-volatile) would have been “electronic storage,” as claimed. As I discuss further below, *Slivka* teaches storing sets of HTML instructions (“networked information monitor templates,” “NIM templates”) defining a plurality of HTML frames

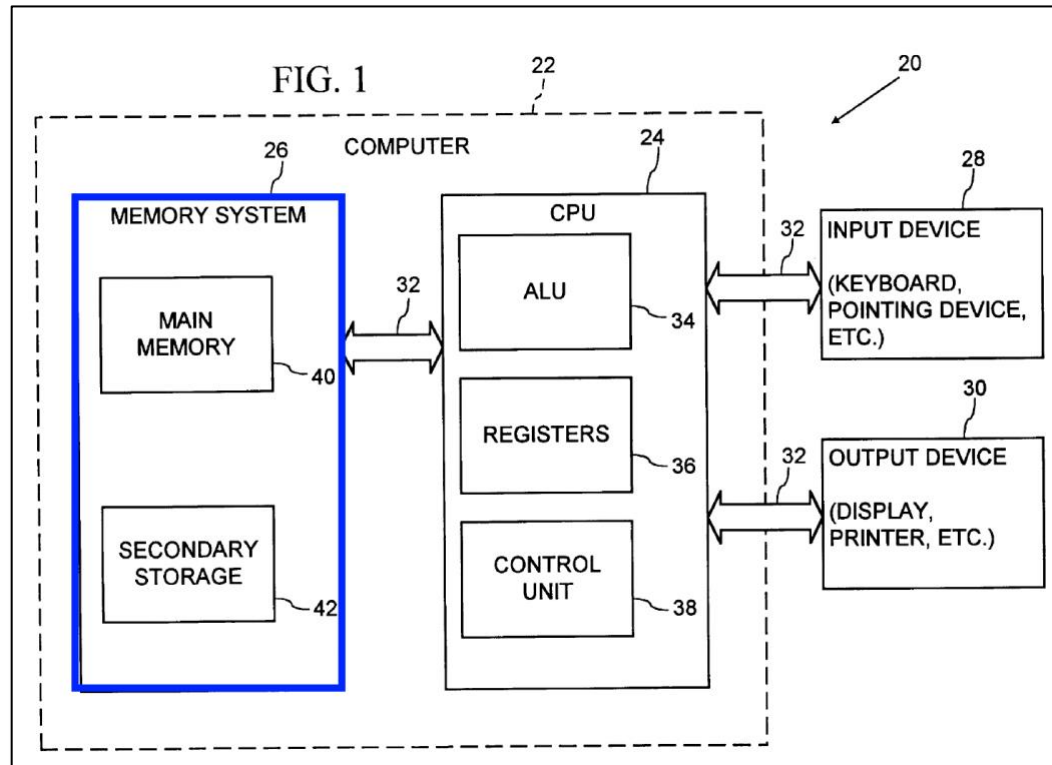
(“networked information monitors,” “NIMs”) in memory system 26 (“electronic storage”). See Claim 1(a) (Section X.B.3).

60. *Slivka* teaches computer system 20 includes a memory system 26. *Slivka*, 4:63-67 (“Referring to FIG. 1, an operating environment for an illustrated embodiment of the present invention is a computer system 20 with a computer 22 that comprises at least one high speed processing unit (CPU) 24, in conjunction with a memory system 26[.]”). *Slivka* also teaches that memory system 26 includes both main memory 40 with high-speed memory and secondary storage 42 for long-term storage:

The memory system 26 generally includes high-speed main memory 40 in the form of a medium such as random access memory (RAM) and read only memory (ROM) semiconductor devices, and secondary storage 42 in the form of long term storage mediums such as floppy disks, hard disks, tape, CD-ROM, flash memory etc. and other devices that store data using electrical, magnetic, optical or other recording media. The main memory 40 also can include video display memory for displaying images through a display device. Those skilled in the art will recognize that the memory 26 can comprise a variety of alternative components having a variety of storage capacities.

Slivka, 5:12-24. A POSITA would have understood from *Slivka*’s teachings that memory system 26 includes both volatile memory (e.g., RAM) and non-volatile memory (e.g., ROM, floppy disks, hard disks, tape, CD-ROM, flash memory, and

Slivka's other long term storage mediums such as "other devices that store data using electrical, magnetic, optical or other recording media"). I have reproduced annotated Fig. 1 of *Slivka* from the Petition below, which depicts both main memory 40 and secondary storage 42 as part of memory system 26 (blue):



Slivka, Fig. 1 (annotated).

61. *Slivka* also teaches that memory system 26 stores both an operating system that "is the set of software which controls the computer system's operation and the allocation of resources" and at least one application program that "is the set of software that performs a task desired by the user, using computer resources made available through the operating system." *Slivka*, 5:32-40. Further regarding

computer system operations, *Slivka* teaches computer-executed operations including involving memory system 26. *Slivka*, 5:41-57. Therefore, in my opinion, a POSITA would have understood or found obvious that *Slivka* teaches storing application programs, an operating system, and other electronic information in memory system 26 and executing such programs. Thus, *Slivka* teaches the claimed “one or more processors configured to execute one or more computer program modules, as claimed.

B. Claim 1(a): “transmitting a request to the server over the network, the request requesting networked information monitor template;”

1. NIM Template and Associated NIM

62. I was informed that “networked information monitor template” (“NIM template”) was previously construed as “data structure which defines the characteristics of a NIM, including the NIM frame, view and control characteristics, and which excludes executable applications/compiled code.” See Section III.C. I was further informed that “networked information monitor” (“NIM”) was previously construed as “a fully configurable frame with one or more controls, the frame through which content is presented to the user.” *Id.* I have applied these constructions in my analysis.

63. I note that I discussed above how HTML instructions are processed and how HTML instructions result in an “HTML page” or HTML frame. See Section V; *Slivka*, 3:16-26. In my opinion, a POSITA would have understood that *Slivka* teaches

hypertext pages that contain HTML instructions (also referred to synonymously as HTML data or HTML elements) and that said HTML instructions may originate from various sources including templates 62 that are stored locally and pre-processed. *Slivka*, 6:53-67, Fig. 2. A POSITA would have understood or found obvious that “HTML instructions” and “HTML data”/“HTML elements” would have been understood to be synonymous terms describing instructions written in HTML format, and that a set of such instructions was thus a “set of HTML instructions.” See Section V. *Slivka* also teaches sets of HTML instructions from “HTML format files.” *Slivka*, 3:31-34, 18:52-67. Regardless of the source, *Slivka* teaches sets of HTML instructions that are processed by hypertext viewer 70 (and shell 50) and displayed to a user on a display device, specifically as a plurality of HTML frames (e.g., ticker 152, news pane 154) that are presented on said display device. *Slivka*, 6:53-67, 11:54-65, 18:49-19:11, 5:25-29 (teaching an output device such as a display), 5:59-66, Figs. 1, 2, 6.

64. Specifically, I refer to “sets” of HTML instructions to describe HTML instructions contained within a single HTML frame element (i.e., <FRAME>) that together generate (or customize) HTML frames. As I explain in detail below, *Slivka* teaches synthesizing various sources of HTML instructions and elements into a single hypertext page for an entire desktop view (including multiple separate HTML frames). As such, when performing such processing, a POSITA would have

understood or found obvious that all relevant and necessary HTML instructions to generate the complete and entire desktop view (including a plurality of separate HTML frames) would have been present within said hypertext page. Prior to synthesizing said hypertext page, *Slivka* teaches storing said various sources of HTML instructions in various locations (e.g., at a server, in a local directory). See Claim 1(a). However, a POSITA would have understood or found obvious that each set of HTML instructions within a single FRAME element would have contained all the information necessary to generate an HTML frame within which content is presented to a user. Thus, a POSITA would have understood or found obvious that each set of HTML instructions thus constitutes a NIM template and that when parsed, each set of HTML instructions also generates a corresponding HTML frame (“NIM”).

65. For example, a “set” of HTML instructions may be contained within a single HTML document (or multiple HTML documents) and which, when parsed, result in an HTML frame generated (and/or customized) on a user’s display device. A single hypertext page may contain multiple sets of HTML instructions for generating multiple HTML frames or may contain a single set of HTML instructions for generating a single HTML frame. Thus, a POSITA would have understood or at least found obvious that a single hypertext page, which contains multiple sets of HTML instructions, meets the claimed plurality of NIM templates. For example,

Slivka teaches exemplary HTML instructions in its File History where Appendix A (DESKTOP.HTM file) defines multiple sets of HTML instructions that correspond to, in part, news frame 154 and ticker 152. I have reproduced Figure A from the Petition below, which depicts multiple sets of HTML instructions and the Appendices in which they appear:

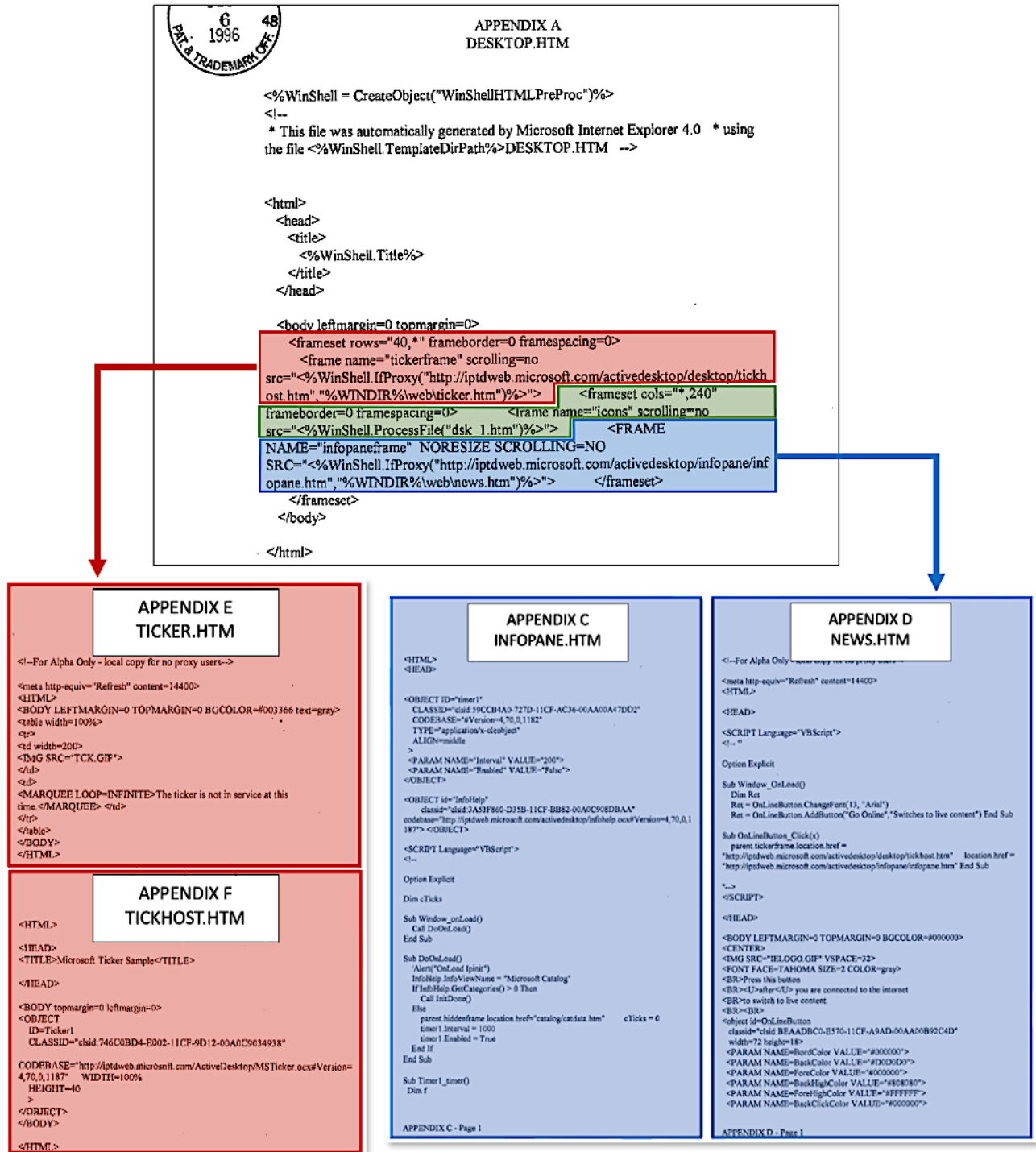


Figure B; *Slivka FH*, 69-70, 72-77 (excerpt, annotated).

66. In another example, HTML instructions may be sourced from multiple HTML documents, where HTML instructions for frame characteristics such as a

background color for a particular HTML frame are contained within one HTML document and HTML instructions specifying a codebase for a portion of an HTML frame are contained within another HTML document. For example, *Slivka* teaches exemplary HTML instructions in individual HTML documents, such as Appendices C-F (INFOPANE.HTM, NEWS.HTM, TICKER.HTM, TICKHOST.HTM), where each appendix (either separately or together) includes different types of HTML instructions for generating or customizing HTML frames. *See Slivka FH*, 72-77. Indeed, as I discuss below, some of *Slivka*'s HTML instructions are utilized for formatting (e.g., size, color) an HTML frame. A POSITA would have understood or found obvious that such "divisions" between the sources of HTML instructions are largely unimportant for *Slivka*, because *Slivka* teaches incorporating all necessary and relevant sources of HTML instructions into a synthesized hypertext page to generate a desktop view.

67. I note that *Slivka* teaches generating a hypertext page that incorporates multiple sets of HTML instructions for multiple HTML frames, such as news pane 154 and sports ticker 152. *Slivka*, 18:49-19:11. In my opinion, each set of HTML instructions that corresponds to each generated HTML frame (e.g., news pane 154, sports ticker 152) meets the claimed "NIM template." Thus, in my opinion, *Slivka* teaches a plurality of "NIM templates" for a plurality of "NIMs."

a) *Slivka*'s Set of HTML Instructions (NIM Template)

68. As I discussed above, I was informed that “networked information monitor template” (“NIM template”) was previously construed as a “data structure which defines the characteristics of a NIM, including the NIM frame, view and control characteristics, and which excludes executable applications/compiled code.” See Section III.D.

69. A POSITA would understand that a data structure consists of a set of data values, relationships between the values, and functions for operating on those values. HTML instructions fit this definition. The HTML language defines the data structures that produce Web pages. Specifically, the HTML language defines a set of *elements*, and further properties and behavior of each element may be specified by some number of defined *attributes*. For example, the *anchor* element <a> is used to create hyperlinks between documents, and its *href* attribute specifies the web page that the hyperlink refers to, and web browsers (or other applications) know how to display this data (e.g., by underlining and coloring blue the hyperlink text) and that if a user selects the link (e.g., by clicking or tapping on it), the browser (or application) will navigate to the referred-to web page.

70. In my opinion, a POSITA would have understood or found obvious that *Slivka*’s set of HTML instructions meets the claimed NIM template. First, in my opinion, a set of HTML instructions is a data structure. *Slivka*’s HTML instructions are written in HTML, which is a markup language, and which is parsed by a

processor (e.g., CPU 24). *See* Section V. Additionally, *Slivka's* sets of HTML instructions are stored in memory system 26 (whether in RAM, ROM, or long-term storage). *See* Claim 1(a). Further, HTML instructions contain “elements,” which inform the processor how to present or structure the HTML instructions on the display. *Powell*, 23-25; *see* Section V. Additionally, *Slivka* teaches sets of contiguous HTML instructions, as depicted in Figure A below, which I have reproduced from the Petition:

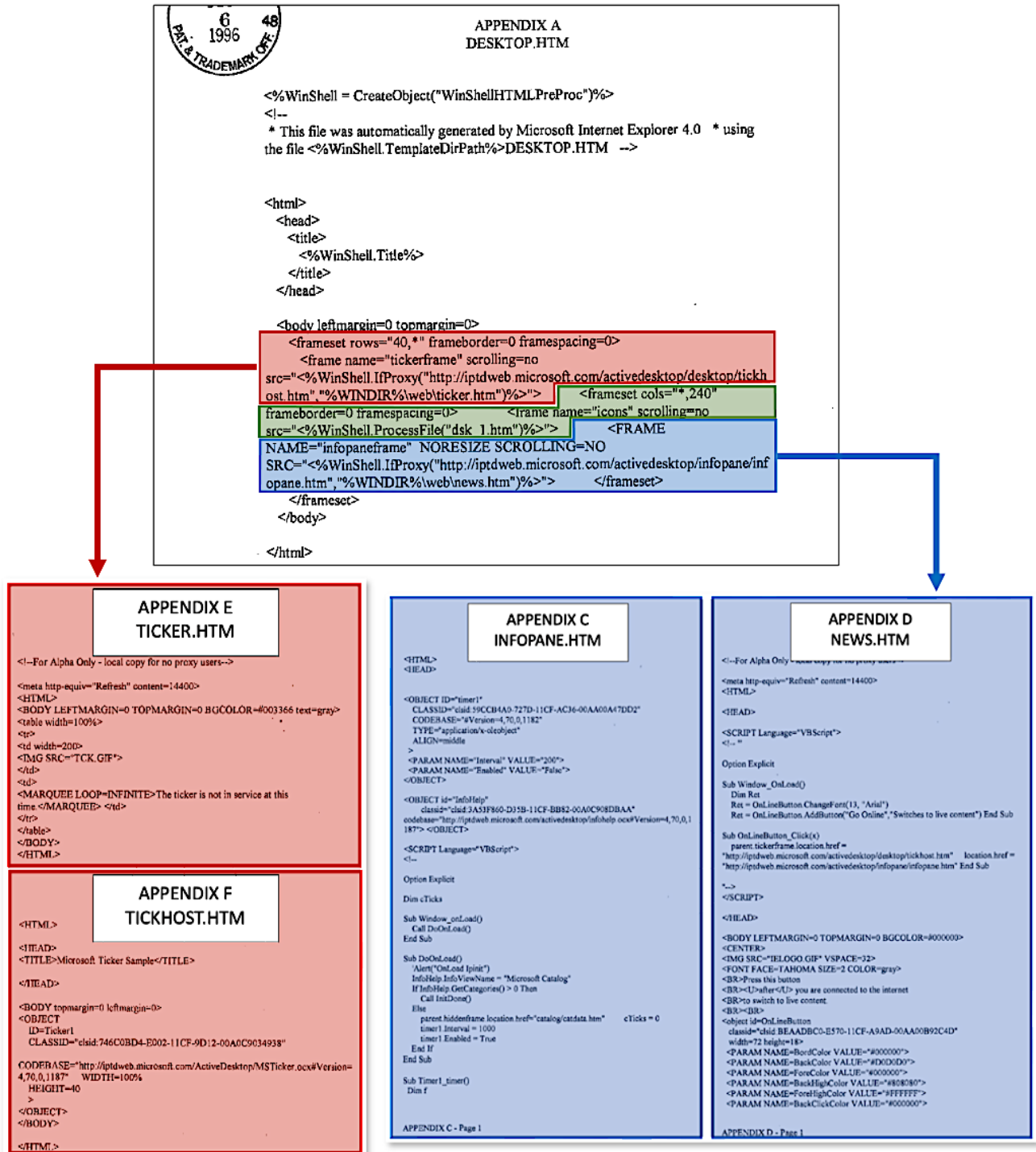
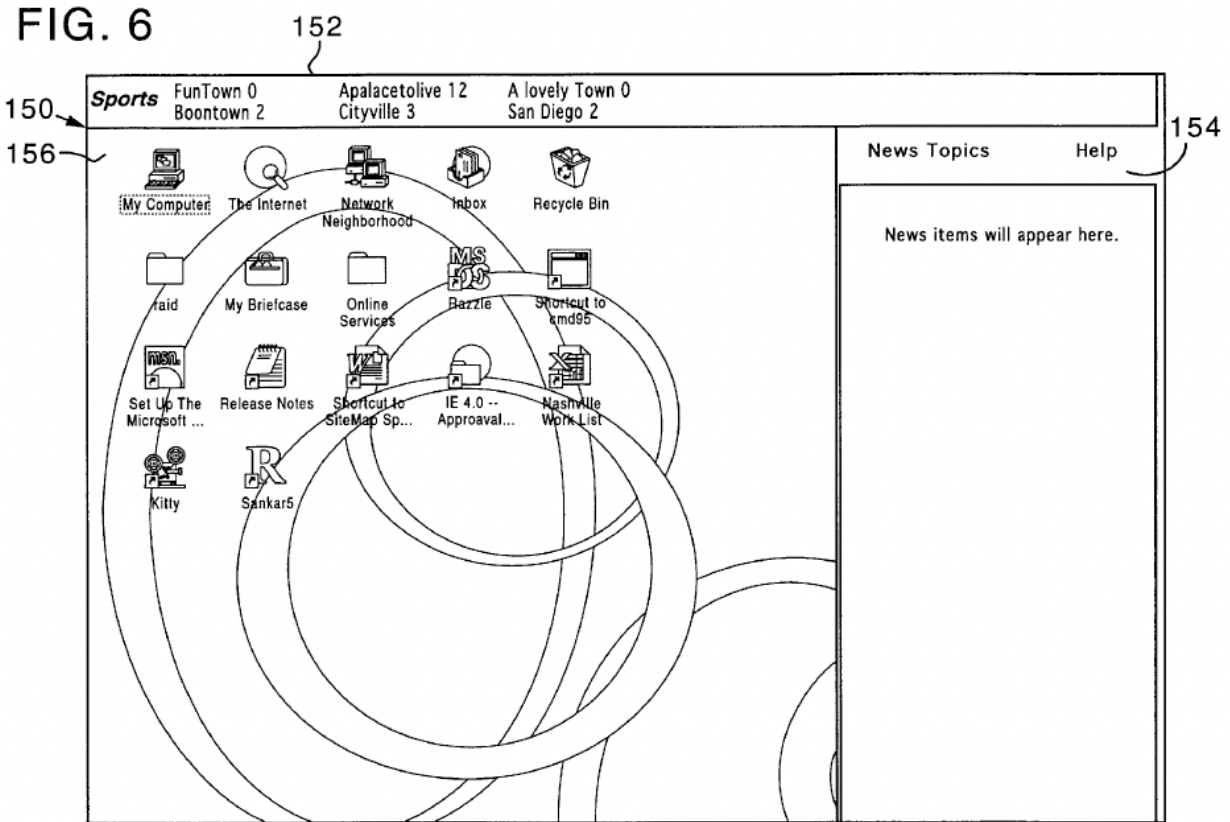


Figure C; *Slivka FH*, 69, 72-77 (excerpt, annotated). As depicted in Figure A, sets of HTML instructions are utilized for generating an HTML frame ticker 152 and HTML frame news pane 154. Therefore, a POSITA would have understood or found

obvious that that *Slivka's* sets of HTML instructions are thus a data structure. For example, all the instructions for generating the HTML frame ticker 152 would be contained within the HTML FRAME element, with its various attributes defining the content to be displayed in the frame, how to display it, and controls for operating on the content.

71. It is my opinion that *Slivka's* sets of HTML instructions define the characteristics of a NIM, including the NIM frame, view and control characteristics.” For example, *Slivka* teaches HTML frames include view characteristics (*Slivka*, 20:16-21, teaching multi-media elements implemented using HTML tags such as HTML frames, tables, fonts, hypertext links, embedded images, and sounds)) and control characteristics (*Slivka*, 11:51-53, Fig. 6; *Slivka FH*, 72-77). In another example, as I discuss below, *Slivka's* sets of HTML instructions define NIM characteristics, including the NIM frame, such as background color. See Claim 1(a)(ii).

72. Further regarding view and control characteristics, *Slivka* teaches examples of control characteristics, such as an online button and a help button. For example, Fig. 6 below depicts a help button in news pane 154:



Slivka, Fig. 6. *Slivka* also teaches an “OnLineButton” in the exemplary HTML instructions for NEWS.HTM, where said OnLineButton switches to “live content” after being pressed (and after a user connects to the Internet):

```
</HEAD>

<BODY LEFTMARGIN=0 TOPMARGIN=0 BGCOLOR=#000000>
<CENTER>
<IMG SRC="IELOGO.GIF" VSPACE=32>
<FONT FACE=TAHOMA SIZE=2 COLOR=gray>
<BR>Press this button
<BR><U>after</U> you are connected to the internet
<BR>to switch to live content.
<BR><BR>
<object id=OnLineButton
  classid="clsid:BEAADBC0-E570-11CF-A9AD-00AA00B92C4D"
  width=72 height=18>
  <PARAM NAME=BorderColor VALUE="#000000">
  <PARAM NAME=BackColor VALUE="#D0D0D0">
  <PARAM NAME=ForeColor VALUE="#000000">
  <PARAM NAME=BackHighColor VALUE="#808080">
  <PARAM NAME=ForeHighColor VALUE="#FFFFFF">
  <PARAM NAME=BackClickColor VALUE="#000000">
```

Slivka FH, 74 (excerpt, annotated).

73. While *Slivka* teaches such controls and control characteristics for the news pane 154, *Slivka* does not expressly teach such for ticker 152. A POSITA would have been motivated and found it obvious to modify *Slivka*'s ticker 152 to include such controls. Modifying ticker 152 to include controls such as "OnLineButton" or "help" would have advantageously been use of a known technique to improve *Slivka*'s ticker 152 in the same way as news pane 154. Indeed, *Slivka* already teaches that such controls and characteristics for controls (e.g., button colors, border colors) were known, and a POSITA would have been motivated and found it obvious to modify ticker 152 to include such controls and control characteristics in the same way as news pane 154. For example, such a modification

would have provided a similar “OnLineButton” for a user to press after connecting to the Internet to present live sports content in the same way as the OnLineButton for news pane 154 provides live news content. Further, a POSITA would have been motivated and found it obvious to include other controls for a user to control both news pane 154 and ticker 152, such as resizing button, pause button, or even content selection button(s) (e.g., for a particular region, local or national coverage, or particular sport). Additionally, adding such a control would have allowed a user to obtain more information about a particular item in ticker 152, such as information on a recap story for a completed sports game or a full box score instead of only the current score, for example. A POSITA would have appreciated that such a modification would have had a reasonable expectation of success because implementing controls in HTML was well known and would have required only straightforward modifications to HTML instructions. Indeed, *Slivka* teaches that “synthesizing the desktop and other displays from templates further allows the multi-media enhancements to be easily and flexibly added and changed.” *Slivka*, 4:3-5. It is also my opinion that such modifications would not have required undue experimentation because implementing such features in HTML was well known.

74. It is also my opinion that *Slivka*’s sets of HTML instructions exclude “executable applications/compiled code.” Indeed, a POSITA would have understood or found obvious that HTML is a markup language (“hypertext markup language”)

not a programming language. *See* Section V (discussing *Powell*). A POSITA would have understood that while such HTML instructions may *refer* to executable applications or compiled code, the HTML instructions themselves are not executable applications or compiled code. In other words, while *Slivka's* HTML instructions may include embedded VBScript or *references* to Active-X controls, a POSITA would have understood or at least found obvious that such HTML instructions are not executable applications nor are they compiled code.

75. Therefore, a POSITA would have understood or found obvious that a set of HTML instructions constitutes a “NIM template,” as claimed.

b) *Slivka's* HTML Frame (NIM)

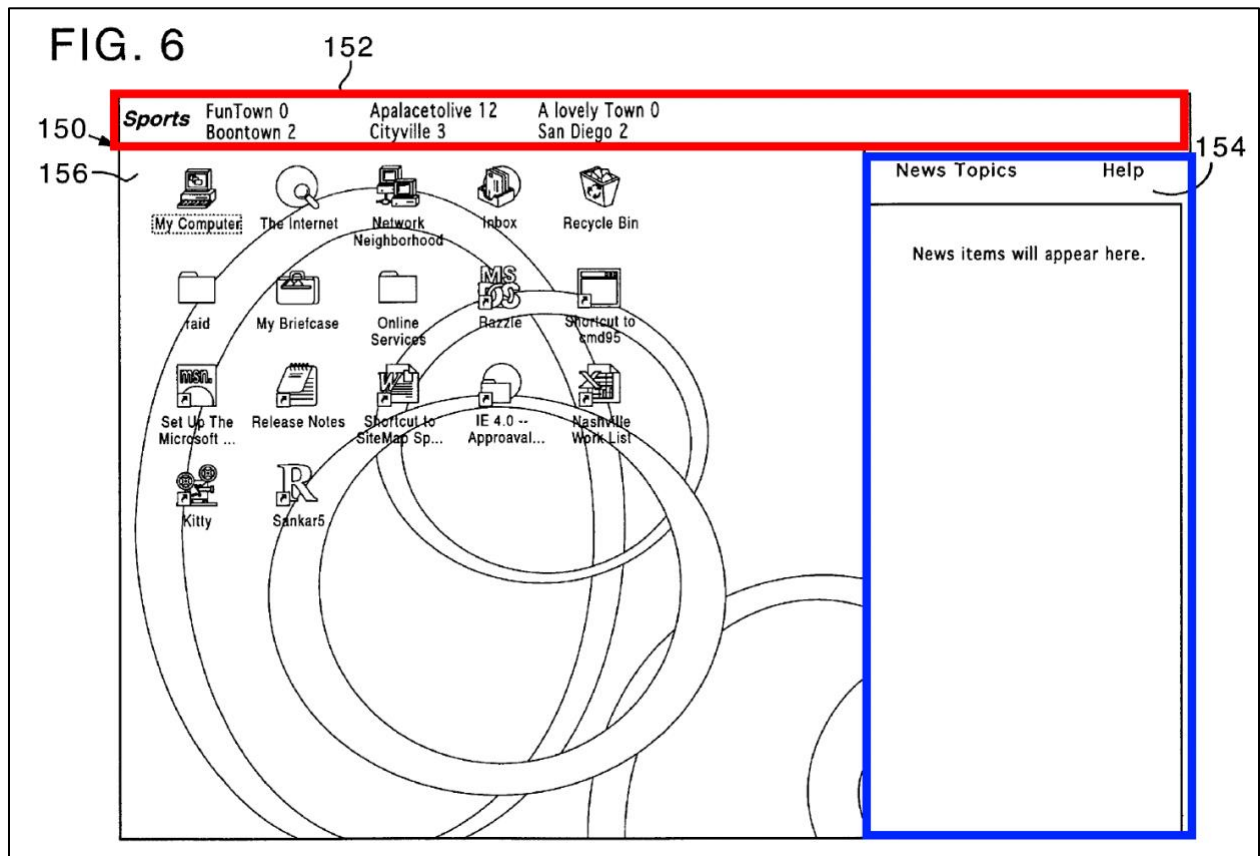
76. As I discussed above, I was informed that “networked information monitor” (“NIM”) was previously construed as “a fully configurable frame with one or more controls, the frame through which content is presented to the user.”

77. In my opinion, a POSITA would have understood that *Slivka's* HTML frames, such as news pane 154 and ticker 152 each would have met the claimed “NIM.” Further, I note that *Slivka* teaches a plurality of such NIMs (i.e., news pane 154 *and* ticker 152). *Slivka's* HTML frames are “fully configurable” based on sets of HTML instructions (“NIM templates”) used to configure said HTML frames. Additionally, as I discussed above, *Slivka* either teaches “one or more controls” (in the case of news pane 154) or it would have been obvious to a POSITA to modify

Slivka's ticker 152 HTML frame to include one or more controls. See Claim 1(a).

Slivka also teaches that the HTML frames such as news pane 154 and ticker 152 are frames through which content (e.g., news, sports, stocks) are presented to a user.

Slivka, 18:49-19:11. Fig. 6 below (reproduced from the Petition) depicts frames where sports and news content are presented to a user:



Slivka, Fig. 6 (annotated). I note that while *Slivka* does not expressly provide examples of news content, a POSITA would have understood or found obvious from *Slivka*'s teaching of "News items will appear here" that news items appear in the news pane 154 HTML frame after news content is retrieved from the Internet. *Slivka*,

18:49-19:11 (teaching presenting news and sports/stocks content to a user in HTML frames).

78. Therefore, it is my opinion that *Slivka* teaches a plurality of “NIMs” (i.e., ticker 152 *and* news pane 154) because such HTML frames are frames through which content is displayed and said HTML frames are fully configurable because HTML instructions specify size, color, position, embedded controls, for example. *Slivka*, 4:4-15 (teaching multi-media enhancements with user interface elements in the GUI), 6:20-26, 6:42-52, 11:54-65, 12:36-40, 18:49-19:11, 20:35-37. Furthermore, I note that *Slivka* teaches HTML is a web browser-readable language. *Slivka*, 11:54-65, 20:12-16; *Powell* also discloses the same. See Section V.C.

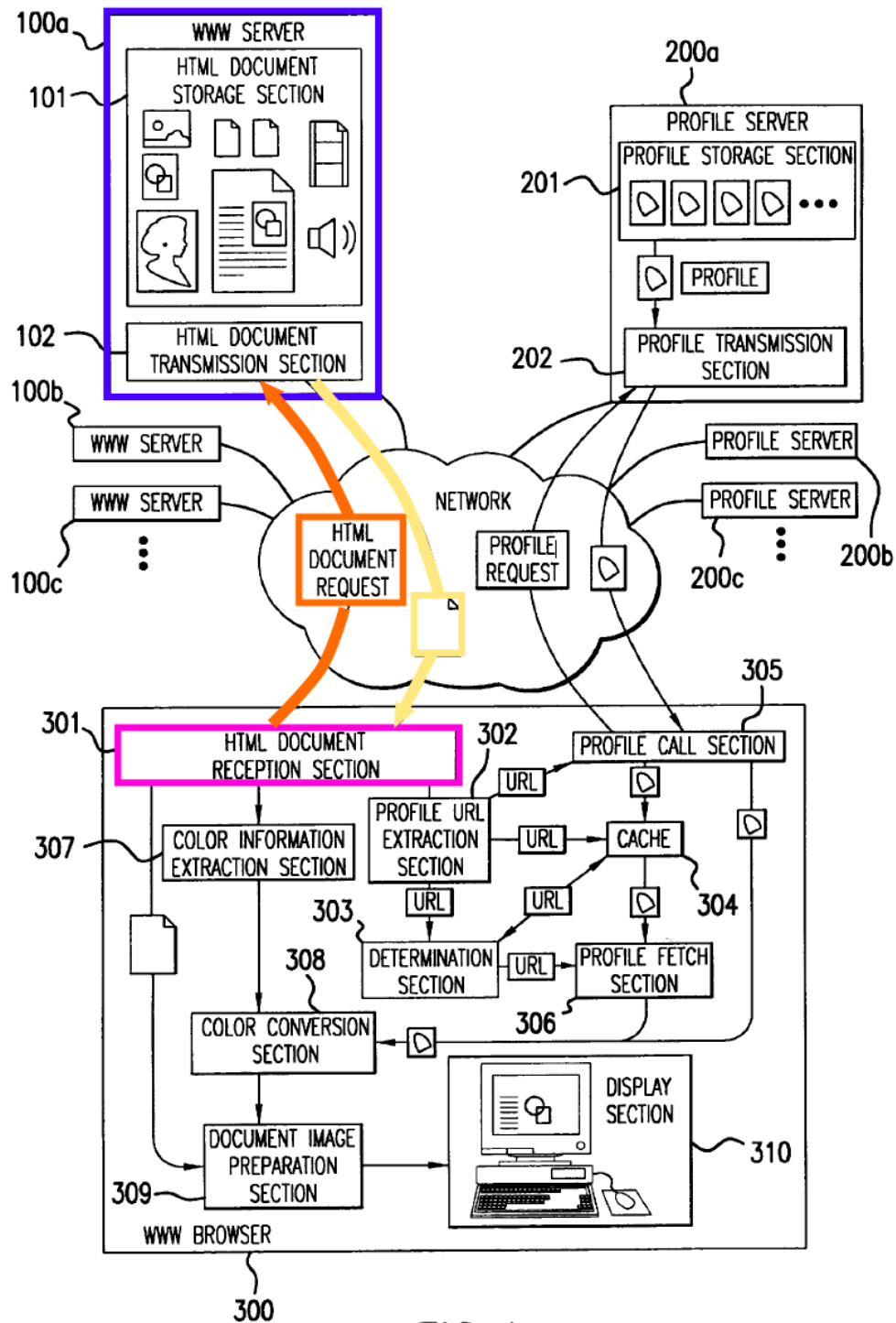
2. Transmitting Request for NIM Template

79. I note that *Slivka* does not expressly teach transmitting a request to a server over a network for a NIM template, as claimed. In my opinion, *Anabuki* teaches a user requests an HTML document that is stored at a server and the remote server transmits the requested HTML document back to the requesting user.

80. *Anabuki* teaches a server 100a that stores HTML documents and data embedded in said documents (e.g., images, moving pictures, voice, objects) and that the “locations of the documents and data stored in the HTML document storage section 101 can be specified uniquely by URLs.” *Anabuki*, 10:4-10. *Anabuki* further teaches that “[w]hen a request for transmitting an HTML document and its attached

data comes through the network, an HTML document transmission section 102 transmits the requested document and data to the requestor.” *Anabuki*, 10:10-13, 11:54-12:24, 13:17-19.

81. For example, annotated Fig. 4 (which I copied from the Petition) below depicts *Anabuki*’s HTML document request (orange) to a remote server (blue) that stores HTML documents and wherein said remote server (blue) transmits an HTML document (yellow) back to the requesting device’s HTML document reception section (pink):



Anabuki, Fig. 4 (annotated).

82. In my opinion, a POSITA would have been motivated and found it obvious to modify *Slivka* to store sets of HTML instructions at a server to be downloaded by a user upon request to generate corresponding HTML frames. I note that *Slivka* itself already teaches or renders obvious downloading resources from a server over the Internet/web, such as images and text. *Slivka*, 18:49-19:11. I note that while *Slivka* does not expressly teach downloading sets of HTML instructions, a POSITA would have been motivated and found it obvious to make such a modification in light of *Anabuki*'s teachings. Indeed, *Anabuki* teaches requesting an HTML document from a remote server and then receiving said HTML document from said server. *Anabuki*, 10:10-13, 11:54-12:24, 13:17-19, Fig. 4 (reproduced above).

83. In my opinion, such a modification to *Slivka* in light of *Anabuki*'s teachings would have advantageously improved *Slivka*'s system to allow a user to request a new or updated set of HTML instructions to display a new or updated HTML frame. For example, such a modification would have allowed a user to update to a newer version of an HTML frame (e.g., ticker 152, news pane 154) or to acquire a new HTML frame (e.g., weather, conditions, stock market information, or some other HTML frame for displaying additional content). There are multiple types of information displays a user would be interested in, but to avoid ending up with an overly cluttered display, a POSITA would understand it would be advantageous for

the user to be able to customize the actual displays they wanted to see (e.g., one user is interested in weather, another is not), and therefore would want to enable users to request the NIMs they wanted, thus requiring the retrieval of the appropriate NIM template(s) from a library of templates on a server. Such a modification would have been use of a known technique of requesting and receiving an HTML document or set of HTML instructions per *Anabuki's* teachings and would have advantageously improved *Slivka's* system in the same way as *Anabuki's* system. Further, it is my opinion that a POSITA would have had a reasonable expectation of success when making such a modification because storing sets of HTML instructions or HTML documents in electronic storage (e.g., at a server) was known, requesting said HTML documents or sets of HTML instructions was well known, and client-server interactions were already well known. See V.A above. Indeed, modifying *Slivka* (*Slivka-Powell*) would have been straightforward, requiring only storing sets of HTML instructions or HTML documents at a server and configuring *Slivka* to allow a user to request and download/receive such sets of HTML instructions. Such functions of storing content and transmitting content to a client were well known server functions. See Section V.A. I note that *Slivka* already teaches retrieving images and text content over the Internet, such that modifying *Slivka* to also retrieve sets of HTML instructions would have been straightforward. Furthermore, modifying *Slivka* (or *Slivka-Powell*) to store an additional set or sets of HTML

instructions would not have required a large amount of additional memory or storage capacity because a set of HTML instructions such as taught by *Slivka* would have required only a small amount of storage capacity. *See Slivka FH*, 69-80 (where the HTML files are not overly lengthy and thus would not require excessive storage capacity to store). Thus, a POSITA would have had a reasonable expectation of success when making such a modification and said modification would not have required undue experimentation. Indeed, such a modification to *Slivka* would not have required adding extensive amounts of additional memory or file storage capacity because a set of HTML instructions, such as those taught by *Slivka*, took only a trivial amount of storage space. Indeed, *Slivka's* exemplary HTML instructions are each on the order of a few dozen “lines” long. *See Slivka FH*, 69-80. Further, a POSITA would have understood that such modifications would have applied the same to *Slivka-Powell* because *Slivka's* modifications regarding *Powell's* URL content reference would not have impacted the retrieval of sets of HTML instructions from a server.

C. Claim 1(b): “receiving the requested networked information monitor template from the server over the internet, the requested networked information monitor template having been transmitted from the server over the network responsive to the transmitted request, the networked information monitor template comprising”

84. As I discussed above for Claim 1(a), a POSITA would have been motivated and found it obvious to modify *Slivka* to store sets of HTML instructions

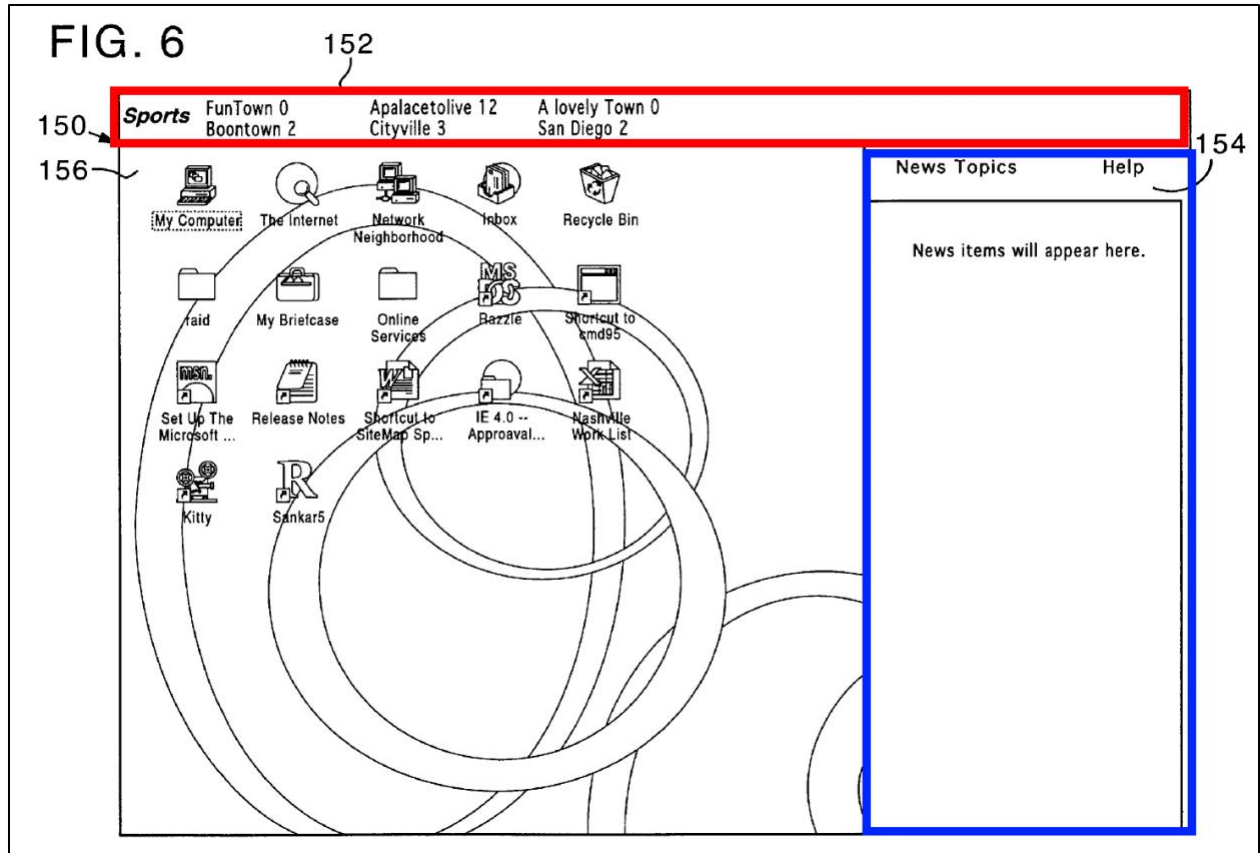
at a server to be downloaded by a user upon request to generate corresponding HTML frames. *See* Claim 1(a). Further, a POSITA would have understood or found obvious that in response to a user's request for a set of HTML instructions from a server, said set of HTML instructions would have been downloaded from said server and received at *Slivka's* client computing device. *See* Claim 1(a). Indeed, *Anabuki* teaches such. As I opined above, a POSITA would have been motivated and found it obvious to modify *Slivka* in light of *Anabuki's* teachings, such that the modified *Slivka* would have received the requested set of HTML instructions ("NIM template") in the same way as *Anabuki*. *See* Claim 1(a).

D. Claim 1(b)(i): "a definition of a viewer graphical user interface within which content in a web browser-readable language may be presented on the display of the client computing device; and"

85. In my opinion, *Slivka* teaches at least one set of HTML instructions that generates an HTML frame on a display device. *See* Claims 1(Pre), 1(a), 1(b). As I discussed above, news pane 154 and ticker 152 are examples of such HTML frames that present content (e.g., images and text related to news, sports, stocks) retrieved from the Internet/web. *Id.*; *Slivka*, 18:49-19:11, 6:53-56, Fig. 6.

86. In my opinion, a POSITA would have understood or found obvious that a set of *Slivka's* HTML instructions that defines an HTML frame would have contained a definition of a viewer GUI of a NIM. For example, *Slivka's* Fig. 6 depicts a GUI for ticker 152 and a GUI for news pane 154. Further, *Slivka* teaches using the

Windows 95 operating system, which was well known for including a desktop GUI including icons. *Slivka*, 6:4-19, 7:45-47, 8:8, 9:28-35, 11:42-47, 15:25-48, 16:4-9, 16:23-57 (describing the Windows® 95 shell framework is modified and utilized in *Slivka*), 18:49-19:18, 19:41-44, 19:66-20:7. Thus, in my opinion, a POSITA would have understood or found obvious that in a computer system (i.e., client computing device) utilizing a graphical user interface for a desktop, such as taught by *Slivka*, the HTML frames generated and presented on the display (e.g., *Slivka*'s display device) would have included a definition of a viewer GUI for presenting content in a web browser-readable language (such as HTML). I have reproduced annotated Fig. 6 from the Petition below, which depicts ticker 152 (red) and news pane 154) blue:



Slivka, Fig. 6 (annotated).

- E. **Claim 1(b)(ii): “a definition of a first content element for the networked information monitor template, the definition of the first content element referencing a first network location from which the first content element for the networked information monitor template is served over the network;”**

1. *Slivka*

87. As I opined above, *Slivka* teaches a set of HTML instructions for news pane 154 and a set of HTML instructions for ticker 152. *Slivka*, 18:49-19:11; *Slivka FH*, 69-77; *see* Claims 1(Pre), 1(a). Further as I opined above, a POSITA would have understood or found obvious that *Slivka*’s set of HTML instructions meet the

claimed “NIM template” and either of *Slivka*’s HTML frames (news pane 154 and ticker 152) meets the claimed “NIM.” See Claims 1(Pre), 1(a).

88. It is my opinion that *Slivka* teaches retrieving images and text content from the Internet for display in, for example, news pane 154. *Slivka*, 19:1-11. Put simply, the news items would have been retrieved from the internet. A POSITA would have understood or found obvious that *Slivka* thus would have had HTML instructions including a definition of a first content element for the NIM template, the definition of the first content element referencing a first network location from which the first content element for the NIM template is served over the network, as claimed. Indeed, a POSITA would have understood that such was common and was the typical way a hypertext document and HTML functioned, as I discussed above regarding the Overview of the Technology. See Section V. Thus, to the extent it is argued that *Slivka*’s exemplary HTML instructions do not include specific URLs for content, a POSITA would have understood or found obvious that *Slivka* would have utilized such a definition of a content element (e.g., URLs aka uniform resource locators) to retrieve the content *Slivka* teaches is retrieved from the Internet. Further, assuming it is argued *Slivka*’s exemplary HTML instructions do not include specific URLs, a POSITA would have been motivated and found it obvious to include such a definition of a first content element in *Slivka*’s HTML instructions. Such would have been merely use of a known technique that was common in HTML, as I opined

above. *See* Section V. Further, such would have advantageously provided URLs to specific content to be retrieved, which would have been use of a known technique to advantageously improve *Slivka's* exemplary HTML instructions in a known manner. *Id.*

2. *Slivka* in View of *Powell*

89. In my opinion, a POSITA would have been motivated and found it obvious to modify *Slivka* to include a definition of a first content element such as a URL (uniform resource locator) in *Slivka's* sets of HTML instructions in light of *Powell's* teachings.

90. *Powell* teaches the well-known HTML technique of using the SRC (source) attribute to include a URL from which to retrieve content for presentation within the frame defined by said set of HTML instructions. *Powell*, 9 (“HTML elements often have attributes that affect the rendering of the element’s content by modifying the function of the element. Attributes are very common with complex elements such as , which specifies an image to load into a Web page. The name and location of the image in question are set via the SRC attribute, which indicates the ‘source’ of the image file. tells the browser to display the file called logo.gif.”)

Attribute Name	Possible Value(s)	Description
SRC	URL	References the source (URL) of an image file (GIF or JPG)
ALIGN	ABSBOTTOM, ABSMIDDLE, BASELINE, BOTTOM, LEFT, and MIDDLE	Sets alignment for the image within the page relative to text
ALT	"Alternative text description"	Provides a text alternative to the image

Table 6-3. Complete Syntax of ****

Powell, 255 (“Table 6-3,” excerpt), 155 (“A URL Is a standard, or, more appropriately, a uniform way to refer to objects and services on the Internet.”), 155 (“[T]he URL simply describes where something is and how it will be retrieved. The ‘how’ is specified by the protocol, for example, HTTP. The ‘where’ is specified by a machine name, directory name, and filename. Slashes and other characters are used to separate the parts of the address into machine parseable pieces.”), 368 (“the SRC attribute, which indicates the URL of the frame content[.]”), 370 (“The SRC attribute specifies the URL of the document to load into the given frame. It is not allowed to use a local target, such as #area1 and point to a location within a document. The URL should be a relative or complete URL to an outside document.”). Powell also teaches that using a URL is “the address of an object; it specifies where and how to retrieve or activate that object. Users should already be familiar with URLs like <http://www.toyota.com/>, as they are bombarded by them on a daily basis in

advertisements on the Web.” *Powell*, 58, 62 (“The addressing of data objects to request takes the form of a Uniform Resource Locator (URL)[.]”). *Powell* depicts the basic structure of a URL below:

`protocol://site address/directory/file name`

Powell, 155, *see generally* 155-167 (including teaching linking to images such as JPEG and GIF). *Powell*, 166 (“In addition to referring to HTML documents, an HTTP URL can request any type of file. For example, <http://www.company.com/images/logo.gif> would retrieve a GIF image from a server rather than an HTML file.”). Therefore, in my opinion, a POSITA would have found it obvious to use a URL for referencing content such as an image to retrieve from the Web and present in an HTML frame on a display device, such as *Slivka*’s.

91. As I discussed above, *Slivka* teaches receiving images and text content in news pane 154 from the Internet. A POSITA would have been motivated to modify *Slivka*’s sets of HTML instructions to advantageously utilize standard, well-known URLs for retrieving content, such as from the Internet. Such a modification would have been use of the known technique of using HTML instructions including a URL to reference content to be retrieved over a network, such as the Internet and would have modified *Slivka*’s similar sets of HTML instructions in the same manner as *Powell*’s HTML instructions. Indeed, URLs were already well known and used,

with *Powell* teaching users are “bombarded” with URLs on a daily basis. *Powell*, 58.

92. Further, such a modification would have been straightforward, requiring only minor modifications to *Slivka*’s exemplary sets of HTML instructions for HTML frames, such as news pane 154 and would not have required hardware changes or complex system changes. A POSITA would have had a reasonable expectation of success when making such a modification because such would have been straightforward and would have utilized well-known and understood HTML instructions.

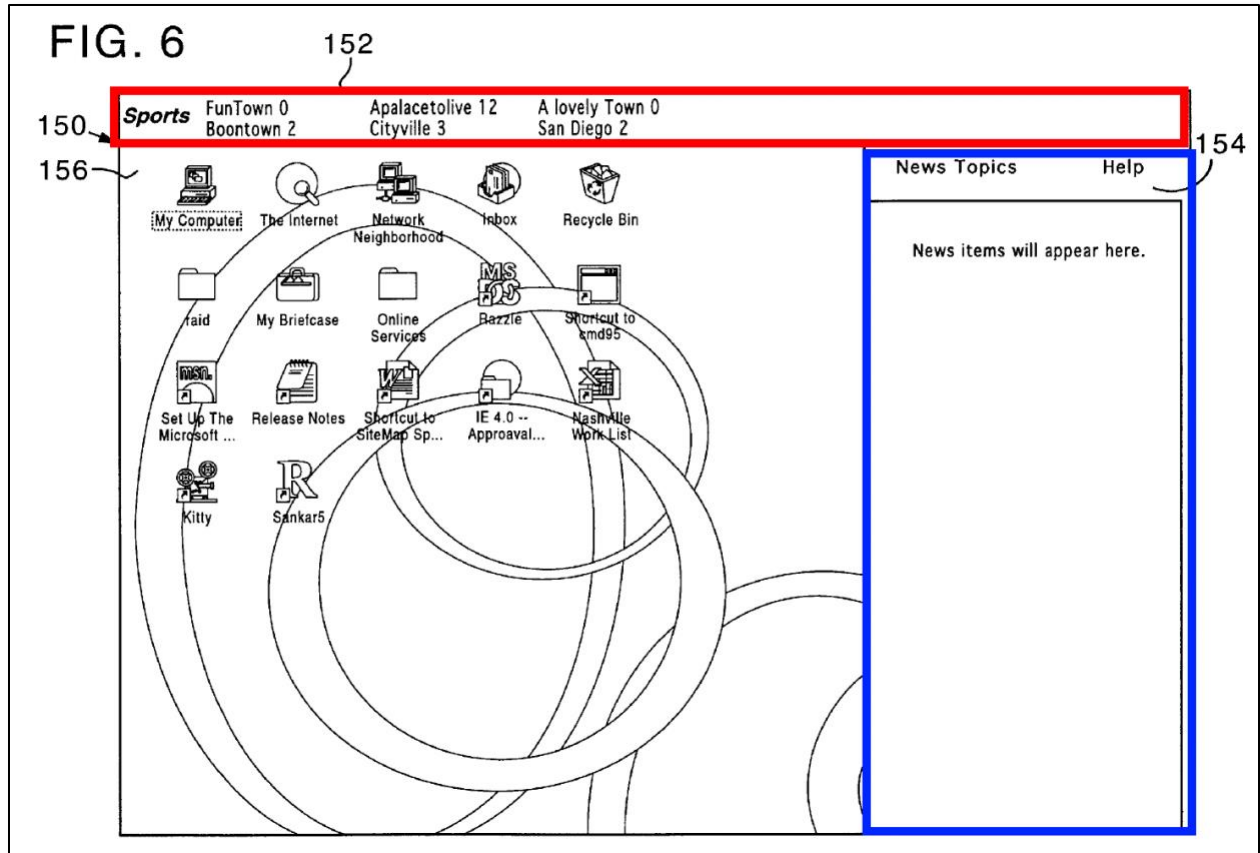
93. Furthermore, such a modification would have been compatible with *Slivka-Anabuki* because *Anabuki* also teaches HTML documents and downloading images using a URL. Thus, modifying *Slivka-Anabuki* in view of *Powell* would have had a reasonable expectation of success as well.

F. Claim 1(c): “responsive to instructions included in the requested networked information monitor template, presenting the viewer graphical user interface defined by the networked information monitor on the display of the client computing device separate from and outside of any other graphical user interface that includes user controls for specifying the first network location from which the first content element for the networked information monitor is served over the network;”

94. *Slivka* alone or in view of *Powell* renders obvious a first content element. See Claim 1(b)(ii). In my opinion, *Slivka* teaches HTML frames (e.g., news

pane 154, ticker 152) (“NIMs”) that lack controls for specifying a first network location, as claimed.

95. Similarly, I note that *Slivka* does not depict any such controls for enabling a user to specify a first network location in Fig. 6. Specifically, *Slivka* does not depict forward or backward browsing buttons nor a URL entry field nor other manual navigation controls or controls for enabling a user to specify a network location. Further, in my opinion, *Slivka*’s frames are separate and outside of any GUI that includes such controls. I have reproduced annotated Fig. 6 from the Petition below, where ticker 152 (red) and news pane 154 (blue) are depicted and lack said controls for enabling a user to specify a network location:



96. *Slivka*, Fig. 6 (annotated). Further, *Slivka* does not teach any such controls for specifying a network location in *Slivka*'s exemplary HTML instructions. See generally *Slivka FH*, 69-80. Indeed, a POSITA would have understood or found obvious that *Slivka*'s HTML frames do not function as a conventional browser and lack the aforementioned URL entry field, forward and backward navigation buttons, and other navigation controls for specifying a network location. As I opine for Claim 1, *Slivka* teaches receiving content (e.g., images, text) from the Internet/web in HTML frames rather than controls for enabling a user to specify a network location for content in said HTML frames. See Claim 1(Pre), 1(a), 1(b), 1(b)(i), 1(b)(ii).

- G. Claim 1(d): “responsive to instructions included in the requested networked information monitor template, transmitting over the network a first content request to the first network location referenced by the definition of the first content element for the networked information monitor template;”**

97. *Slivka* alone or in view of *Powell* renders obvious a first content element. *See* Claim 1(b)(ii). As I opined above, *Slivka* alone or in view of *Powell* teaches a first content element and a set of HTML instructions that includes at least one definition of a first content element. *See* Claim 1(b)(ii). In my opinion, a POSITA would have understood or found obvious that *Slivka*’s news pane 154, which receives content (e.g., images, text) over the Internet would have included a “first content request to the first network location referenced by the definition of the first content element for the NIM template,” as claimed. *See* Claim 1(b)(ii). In my opinion, a POSITA would have understood that such a definition of a first content element that is contained within a set of HTML instructions (e.g., for news pane 154) would have caused a first content request to be transmitted to the first network location referenced by said definition (e.g., a URL). Further, a POSITA would have understood that transmitting a content request would have been responsive to instructions that were included within the NIM template that was requested. *See Slivka*, 5:32-57. I note I also discussed the well-known client and server interaction above. *See* Section V. Further, a POSITA would have understood or found obvious that the Internet is a network, as claimed. *See* Section V.

98. Additionally as I opined above, *Slivka* teaches a first content request for content to be displayed in the HTML frame transmitted to a first network location. See Claims 1(b)(ii)-1(c).

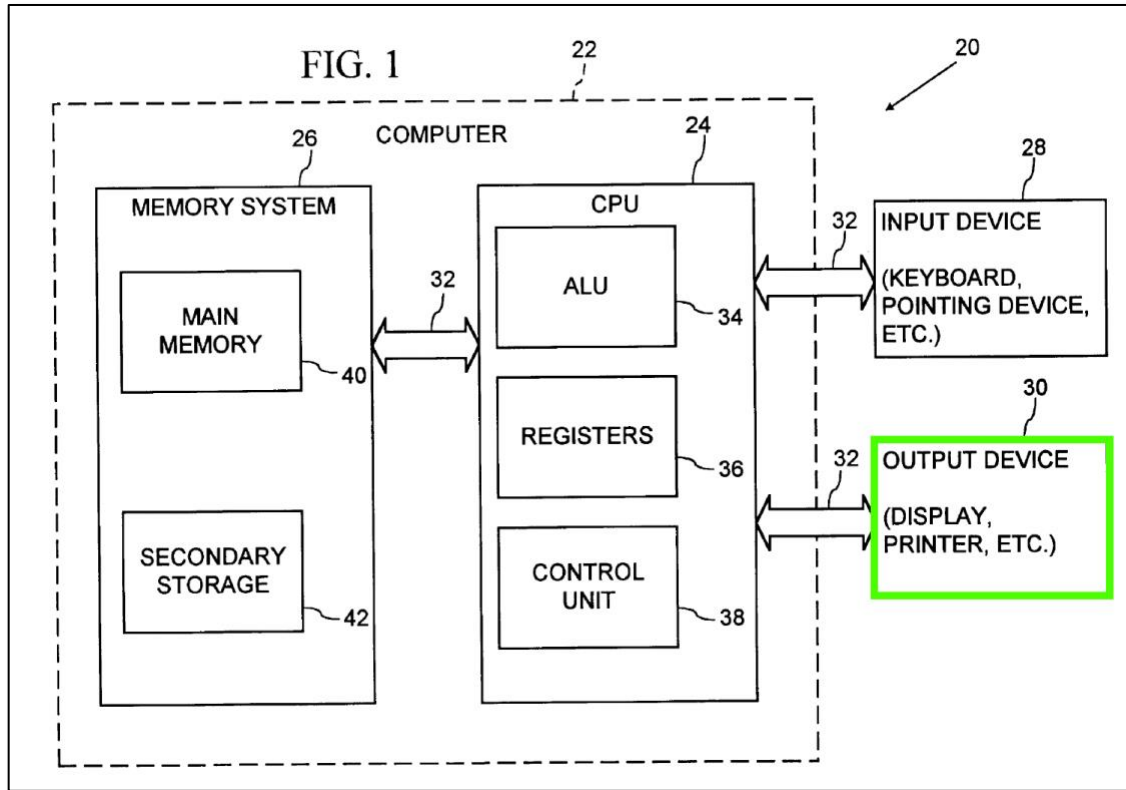
H. Claim 1(e): “receiving, over the network, the first content element transmitted responsive to the first content request;”

99. In my opinion, a POSITA would have understood that in response to transmitting a request for a first content element, a web server would have transmitted a first content element to the requesting device, such that *Slivka*’s device would have received the first content element transmitted responsive to the first content request. Indeed, *Slivka* teaches receiving content from over the Internet, and a POSITA would have found obvious that such content would have been requested, such as via a URL within *Slivka*’s set of HTML instructions, as rendered obvious by *Slivka* as modified by *Powell* and *Anabuki*’s teachings. *Slivka*, 18:49-19:11. See Claims 1(Pre), 1(b)(ii), 1(c), 1(d).

I. Claim 1(f): “presenting the received the first content element in the viewer graphical user interface defined by the networked information monitor template, wherein the definition of the viewer graphical user interface and/or the first content element define all controls for enabling a user to interact with the first content element through the viewer graphical user interface.”

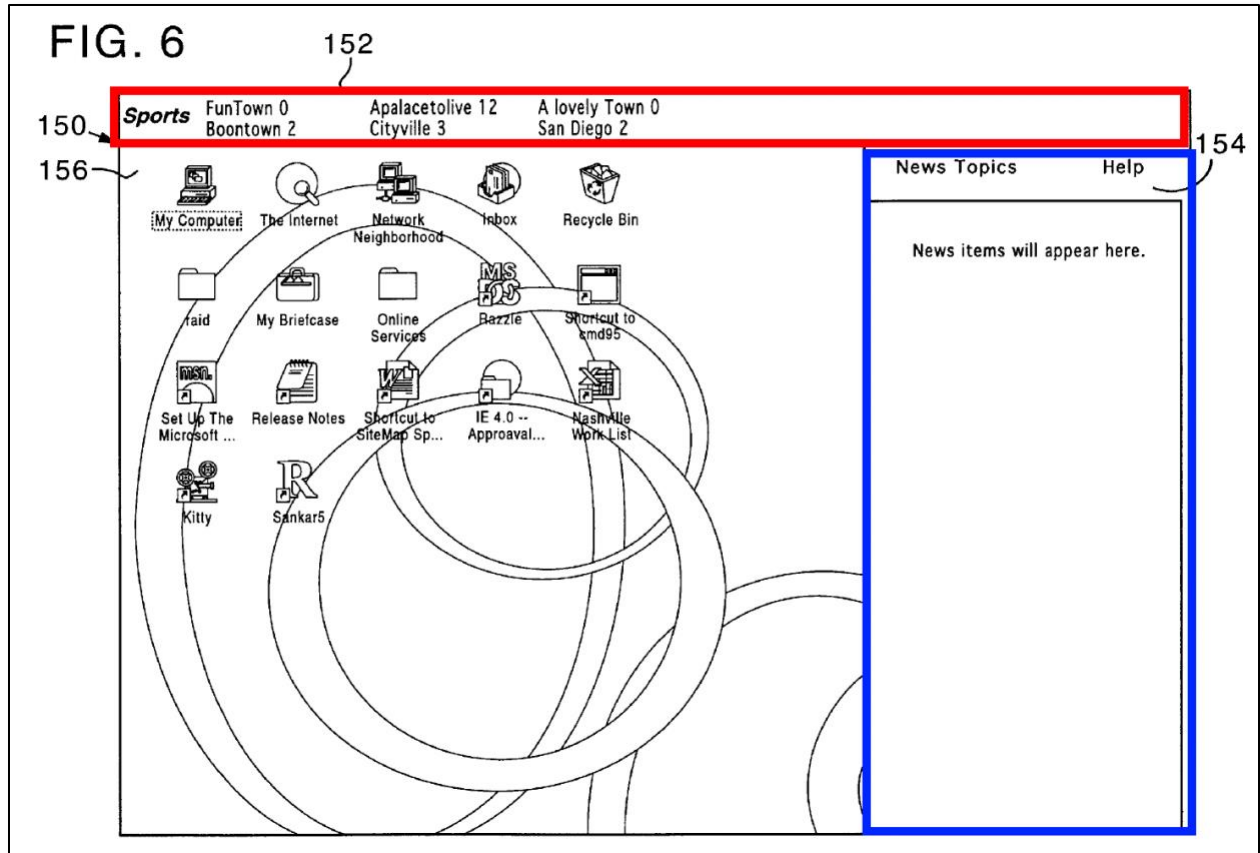
100. As I discussed above, *Slivka* alone or in view of *Powell* renders obvious a first content element and a viewer GUI defined by the NIM template. See Claim 1(b)(ii).

101. In my opinion, a POSITA would have understood or found obvious that *Slivka*'s shell 50 would have been controlled by CPU 24. Indeed, *Slivka*'s shell 50 "extends the framework of the Windows® 95 operating system shell" and "provides a graphical user interface of the computer to interact with the operating system[.]" *Slivka*, 16:23-52, 5:59-66, 11:54-12:13, 18:49-19:18, 20:8-34. *Slivka* also teaches shell 50 includes hypertext viewer 70. *Id.* As I discussed above in the Overview of the Technology, software parses HTML instructions to generate a desktop on a display device. *See* Section V. *Slivka* teaches shell 50 (including hypertext viewer 70) parses at least one set of HTML instructions (e.g., for news pane 154) to generate an HTML frame on a user's display. *Slivka*, 16:23-52, 5:59-66, 11:54-12:13, 18:49-19:18, 20:8-34. I have reproduced annotated Fig. 1 from the Petition below, which depicts *Slivka*'s output device 30 (display) on which *Slivka*'s HTML frames are displayed.



Slivka, Fig. 1 (annotated). Therefore, a POSITA would have understood and found obvious that CPU 24 thus presents the received first content element in the viewer GUI defined by the NIM template, as claimed.

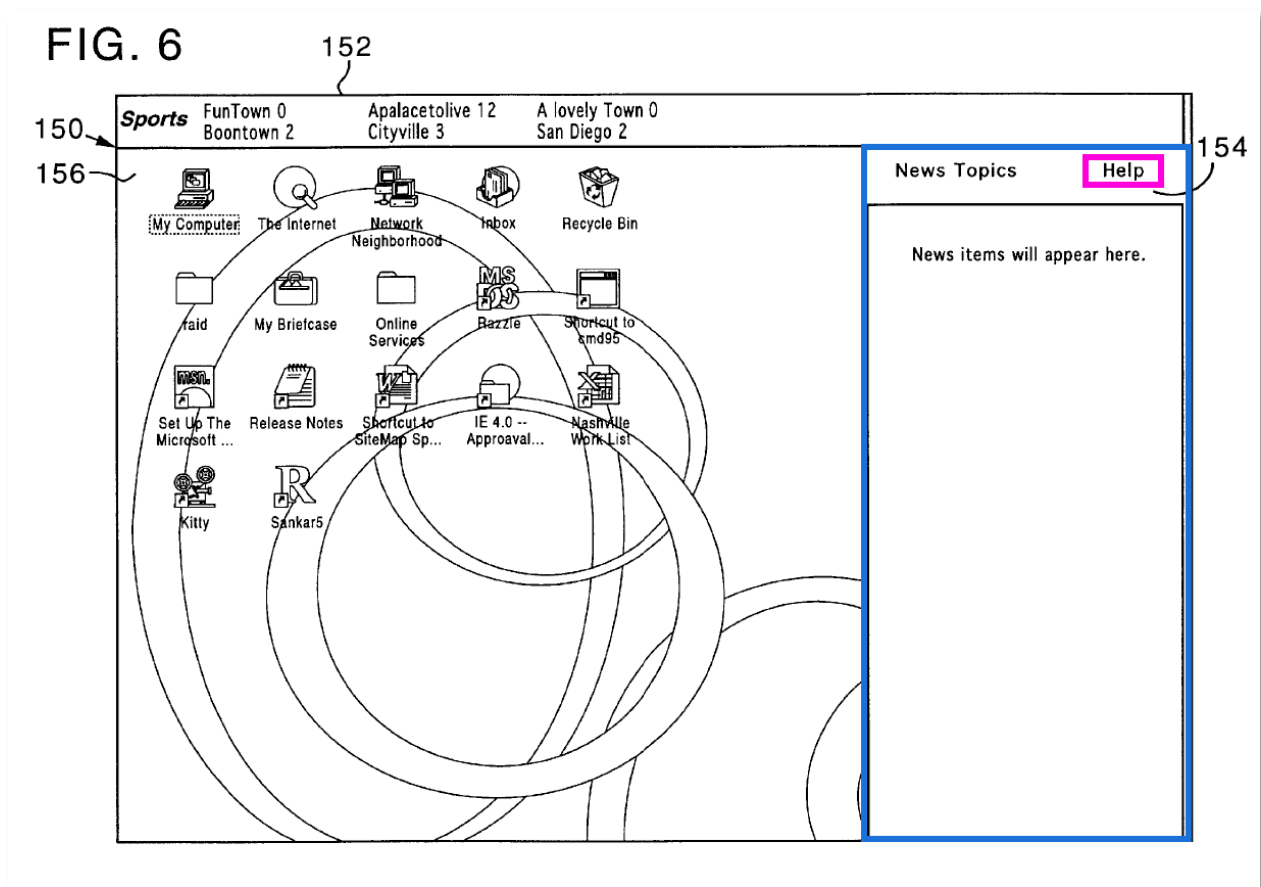
102. Further, as I discussed above, *Slivka* teaches receiving content from a definition of a first content element, as claimed. See Claim 1(b)(i), 1(b)(ii). *Slivka's* Fig. 6 below depicts HTML frames (ticker 152 (red), news pane 154(blue)) that depict content received from the Internet. *Slivka*, 18:49-19:11.



Slivka, Fig. 6 (annotated). I note that while *Slivka* does not expressly provide examples of news content, a POSITA would have understood or found obvious from *Slivka*'s teaching of "News items will appear here" that news items appear in the news pane 154 HTML frame after news content is retrieved from the Internet. *Slivka*, 18:49-19:11 (teaching presenting news and sports/stocks content to a user in HTML frames).

103. In my opinion, *Slivka* further teaches the definition of the viewer GUI includes all controls for enabling a user to interact with the first content element, as claimed. For example, *Slivka* teaches a "help" button for news pane 154, which a

POSITA would have understood or found obvious would have allowed a user to interact with or control the first NIM, put simply, to get “help” about the use and/or content of the NIM. Indeed, a POSITA would have understood or found obvious that such a help button would have been a control characteristic that would have been included in *Slivka*’s set of HTML instructions for said news pane 154. Embedding such controls in HTML instructions was well known in HTML, as I discussed above. See Section V (discussing *Powell*). Annotated Fig. 6 below depicts news pane 154 (blue) and a “help” control (pink):



Slivka, Fig. 6 (annotated).

104. Additionally, *Slivka's FH* contains exemplary HTML instructions for an "OnLineButton" that a user can press to switch to live content for news pane 154. *Slivka's FH* teaches an "OnLineButton" with a classid, width, height, and various colors (e.g., BordColor (border color)):

```
<BODY LEFTMARGIN=0 TOPMARGIN=0 BGCOLOR=#000000>
<CENTER>
<IMG SRC="IELOGO.GIF" VSPACE=32>
<FONT FACE=TAHOMA SIZE=2 COLOR=gray>
<BR>Press this button
<BR><U>after</U> you are connected to the internet
<BR>to switch to live content.
<BR><BR>
<object id=OnLineButton
  classid="clsid:BEAADBC0-E570-11CF-A9AD-00AA00B92C4D"
  width=72 height=18>
  <PARAM NAME=BordColor VALUE="#000000">
  <PARAM NAME=BackColor VALUE="#D0D0D0">
  <PARAM NAME=ForeColor VALUE="#000000">
  <PARAM NAME=BackHighColor VALUE="#808080">
  <PARAM NAME=ForeHighColor VALUE="#FFFFFF">
  <PARAM NAME=BackClickColor VALUE="#000000">
```

APPENDIX D - Page 1

Slivka FH, 74 (excerpt, annotated).

105. A POSITA would have understood that said OnLineButton, which is included in *Slivka's* exemplary HTML instructions, would have been part of the HTML frame when displayed on a display device. Further, such an OnLineButton would have included control characteristics and along with the help button I

discussed above would have met the claimed “all controls for enabling a user to interact with the first content element through the GUI.”

- J. Claim 2: “the method of claim 1, wherein the definition of the viewer graphical user interface includes a definition of at least one control effective for controlling an aspect of the viewer graphical interface, and wherein presenting the viewer graphical user interface comprises presenting the at least one control.”**

106. See Claim 1. In my opinion, *Slivka* in view of *Anabuki* and *Powell* renders Claim 1 obvious and as I discussed above, *Slivka* teaches defining a control effective for controlling an aspect of the viewer GUI including the OnLineButton and help button. See Claim 1(f). It is also my opinion that *Powell* teaches the claimed “definition of the viewer GUI includes a definition of at least one control effective for controlling an aspect of the viewer GUI.” For example, *Powell* teaches a location at which the user interface is rendered on a display device and the size of the user interface when presented on the display. As I discuss below, in my opinion, a POSITA would have found it obvious that *Slivka* (or *Slivka-Anabuki*) in view of *Powell* teaches HTML instructions to specify the size and location of a viewer GUI to thus control an aspect of the viewer GUI.

107. In my opinion, *Powell* teaches well known HTML instructions, such as margins, that would have specified the location at which *Slivka*’s electronic display renders a viewer GUI. *Powell* teaches a LEFTMARGIN and TOPMARGIN that are specified via a number value and which create a margin of a number of pixels equal

to said number value. For example, *Powell* teaches “TOPMARGIN=‘15’ will create a 15-pixel margin between the top of the browser window and its content, as well as at the bottom if the content extends that far.” *Powell*, 266-267.

108. *Powell* also teaches using HTML instructions to set alignment, which also specifies the location at which *Slivka*’s electronic display renders a viewer GUI. In particular, *Powell* teaches setting the ALIGN attribute to LEFT, RIGHT, CENTER, or JUSTIFY. *Powell*, 311. Additionally, *Powell* teaches using ALIGN to specify TOP, BOTTOM, or MIDDLE to set the position of images on a display. *Powell*, 313-315. Further, *Powell* teaches HTML instructions for setting the location of an image to an absolute distance, a percentage of horizontal and vertical dimensions, or by using keywords to specify horizontal and vertical dimensions. *Powell*, 417. In my opinion, a POSITA would have understood that using HTML instructions to specify location (e.g., margins, alignment) would have thus altered the location at which the user interface is rendered on a display device, as claimed. Indeed, such HTML instructions alter the location of the user interface and where content is displayed.

109. It is also my opinion that *Powell* teaches modifying the size of a user interface by using HTML instructions to set a number of rows, a number of columns, to specify HEIGHT, and by allowing frame resizing. First, *Powell* teaches the HTML instruction “<FRAMESET COLS=‘200,400’>” to specify a first column 200

pixels wide followed by a second column 400 pixels wide. *Powell*, 361. Similarly, *Powell* teaches “<FRAMESET COLS=‘20%, 80%’>” to generate two columns where the first column takes up 20% of the screen and the second column takes up the remaining 80% of the screen (where the screen may be a frame rather than the entire display). *Powell*, 361. Similarly, *Powell* also teaches using the HTML instruction “<FRAMESET ROWS=‘10%, 80%, 10%’>” to generate three rows where the first takes up 10%, the second takes up 80%, and the third takes up the remaining 10% of the frame or display size. *Powell*, 362. *Powell* also teaches utilizing a wildcard value to specify the amount remaining after the numerical value is taken into account. For example, *Powell* teaches “<FRAMESET COLS=‘175,*’>” which would result in a column of 175 pixels and a second that takes up the remaining column space (hence, wildcard). *Powell*, 362.

110. In another example of using HTML instructions to specify size, *Powell* teaches using “HEIGHT” and “WIDTH” attributes to specify a number of pixels or percentage for the height and width of an image. *Powell*, 246-250, 256, 268, 328-337, 372-376. *Powell* also teaches a NORESIZE attribute which disallows a user from resizing a user interface but that using said NORESIZE attribute is not recommended, thus allowing a user to resize a user interface. *Powell*, 370.

111. In my opinion, a POSITA would have been motivated and found it obvious to modify *Slivka* (or *Slivka-Anabuki*) in view of *Powell*’s teachings. Such a

combination would have utilized *Powell's* well known HTML instructions to modify *Slivka's* sets of HTML instructions to specify the location at which the user interface is presented on a display and the size of a user interface. I note that *Powell* teaches HTML instructions for numerous other aspects of HTML including specifying fonts, colors, and using style guides. Therefore, in my opinion, *Powell* teaches a solution to a known problem involving providing HTML instructions to generate HTML frames and using HTML instructions for specifying aspects of at least one HTML frame on a display device. Indeed, a POSITA would have been motivated to modify *Slivka* (or *Slivka-Anabuki*) per *Powell's* teachings to customize and improve *Slivka's* HTML frames such as by enhancing on-screen layout and frame characteristics, such as by accommodating graphics, images, or other content to be presented in the HTML frame or by advantageously providing particular frame colors to enhance a user's experience or catch attention of a user. Indeed, such a modification would have advantageously allowed for customized content to better interact with other elements on *Slivka's* display device.

112. Further, in my opinion, modifying *Slivka* (or *Slivka-Anabuki*) to specify a location at which a user interface is rendered or a size of a user interface would have advantageously allowed for content to better interact with elements outside of the HTML frame on the user's display. Because *Powell* teaches such well known HTML techniques for HTML instructions, such a modification to *Slivka* (or *Slivka-*

Anabuki) would have been use of a known technique to improve *Slivka* (or *Slivka-Anabuki*) computer system in the same way as *Powell's* HTML instructions modify HTML frames and a user interface.

113. It is also my opinion that such a modification would have had a reasonable expectation of success because *Slivka* already teaches using sets of HTML instructions and includes exemplary HTML instructions which would require merely minor modifications to implement *Powell's* teachings. Thus, such a modification using well-known and well-understood HTML instructions would have been straightforward and would not have required undue experimentation nor would hardware or complex system changes have been required to modify *Slivka* (or *Slivka-Anabuki*) in view of *Powell's* teachings. Further, a POSITA would have understood that such modifications would have applied the same to *Slivka-Anabuki* because *Slivka's* modifications regarding *Powell's* HTML features would not have impacted the retrieval of sets of HTML instructions from a server as taught by *Anabuki*.

K. Claim 3: “The method of claim 2, wherein the aspect is the location at which the user interface is rendered on a display device.”

114. See Claim 2.

L. Claim 4: “The method of claim 2, wherein the aspect is the size of the user interface when presented on the display of the client computing device.”

115. See Claim 2.

- M. Claim 6: “The method of claim 1, wherein the definition of the viewer graphical user interface defined by the networked information monitor template comprises an image, and wherein presenting the viewer graphical user interface defined by the networked information monitor template on the display of the client computing device comprises presenting the image included in the definition as part of the viewer graphical user interface.”**

116. See Claim 1. I note that *Slivka* teaches an HTML frame such as news pane 154 that receives and presents images and text relating to news events on the display. *Slivka*, 19:1-11, Fig. 6. In my opinion, a POSITA would have understood or found obvious that such images would have been defined by a set of HTML instructions for the news pane 154 as part of *Slivka*'s viewer GUI. Additionally, *Slivka*'s *FH* includes exemplary HTML instructions teaching at least one GIF (Graphics Interchange Format) image presented on the display, namely, IELOGO.GIF.

APPENDIX D
NEWS.HTM

NEWS.HTM

```
<!--For Alpha Only - local copy for no proxy users-->
```

```
<meta http-equiv="Refresh" content=14400>
```

<HTML>

<HEAD>

<SCRIPT Language="VBScript">

$$\angle 1 = 110^\circ$$

Option Explicit

Sub Window_OnLoad()

Dim Ret

```
Ret = OnLineButton.ChangeFont(13, "Arial")
```

```
Ret = OnLineButton.AddButton("Go Online","Switches to live content") End Sub
```

```
Sub OnLineButton_Click(x)
```

```
parent.tickerframe.location.href =
```

```
"http://iptdweb.microsoft.com/activedesktop/desktop/tickhost.htm" location.href =
```

"http://iptdweb.microsoft.com/activedesktop/infopane/infopane.htm" End Sub

99-27

</SCRIPT>

</HEAD>

<BODY LEFTMARGIN=0 TOPMARGIN=0 BGCOLOR=#000000>

<CENTER>

Press this button

**
<U>after</U> you are connected to the internet**

to switch to live content.

<object id=OnLineButton

[illegible]

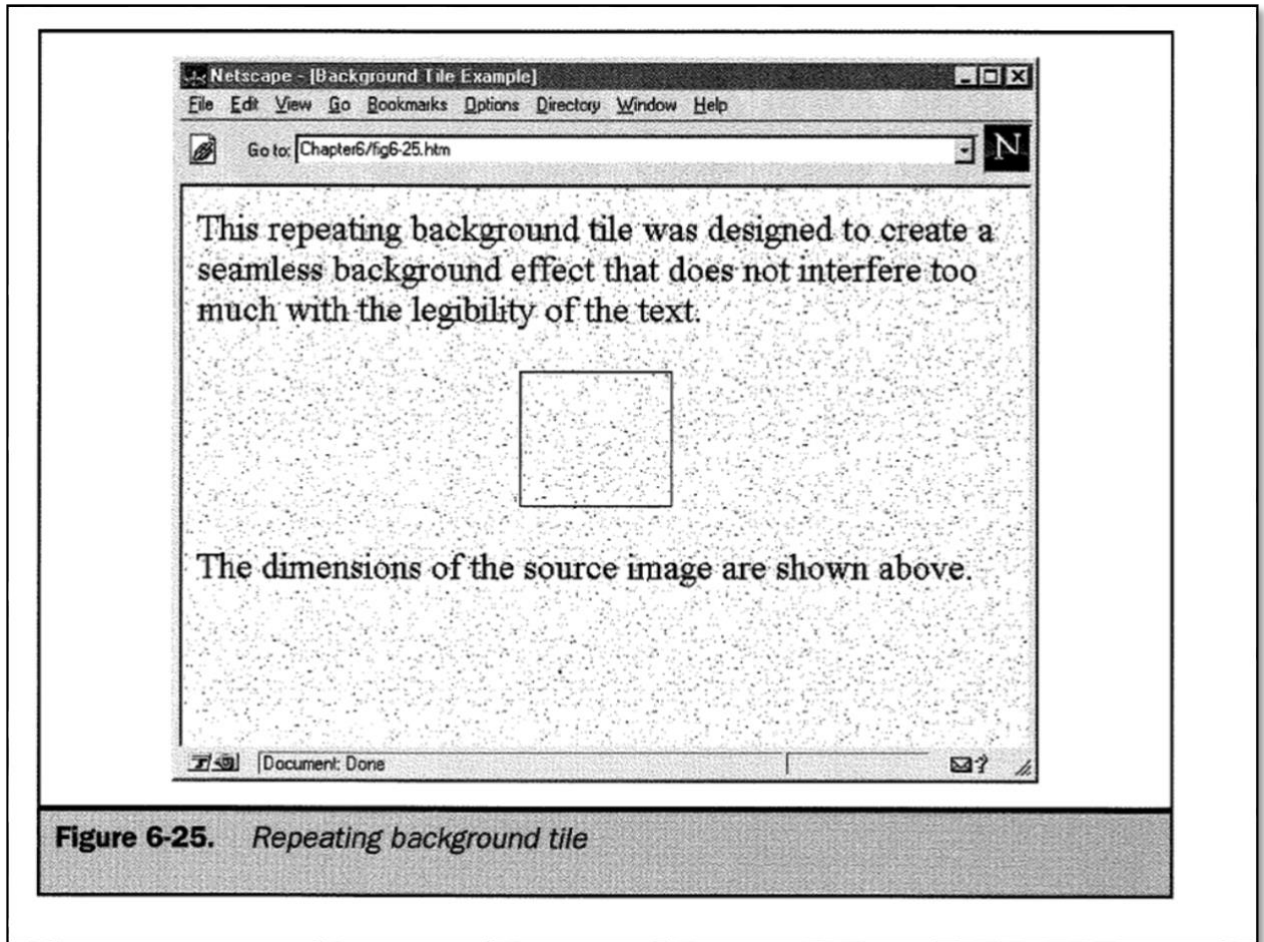
Slivka FH, 74 (excerpt, annotated).

- N. Claim 7: “The method of claim 6, wherein presenting the received the first content element in the viewer graphical user interface defined by the networked information monitor template comprises presenting the received the first content element in association with the image.”**

117. See Claims 1, 6. *Slivka* teaches presenting at least one image received from the Internet in news pane 154. *Slivka*, 18:49-19:11; *Slivka FH*, 74. In my opinion, a POSITA would have understood or found obvious that presenting said first content element in the viewer GUI defined by the NIM template would have also comprised presenting the received first content element in association with the image.

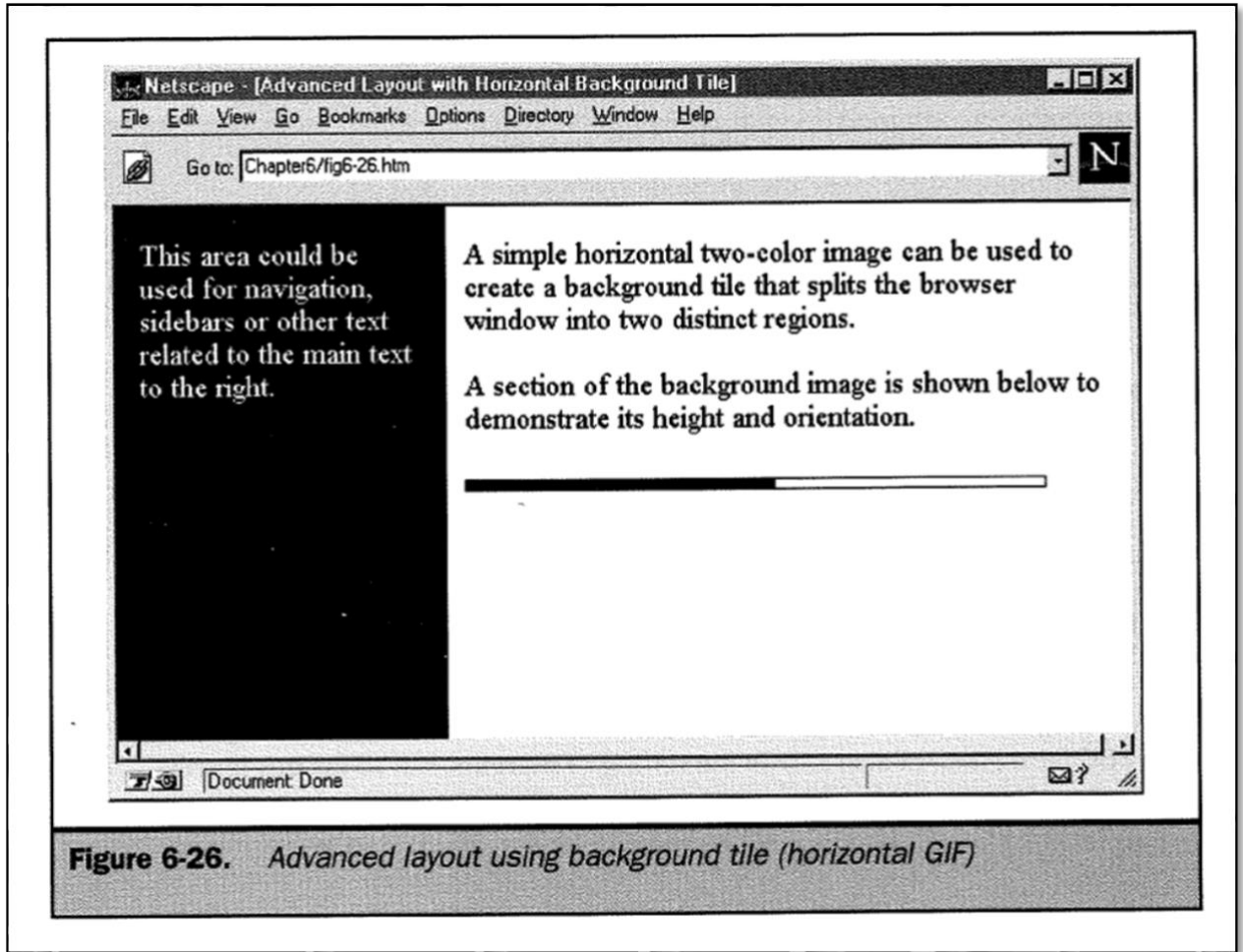
- O. Claim 8: “The method of claim 6 wherein presenting the received the first content element in the viewer graphical user interface defined by the networked information monitor template comprises presenting the first content element at least in part within the image.”**

118. See Claim 6. In my opinion, *Slivka* teaches news pane 154 presents content from the Internet, such as images and text, relating to news stories. *Slivka*, 18:49-19:11. I note that *Powell* teaches setting a background image by using the BACKGROUND HTML instruction. For example, the background image may be specified using a URL for a GIF or JPEG image. *Powell*, 263. *Powell’s* Fig. 6-25 below depicts a background tile that is repeated across the full background.



Powell, 264 (“Figure 6-25”).

119. In another example, *Powell* teaches using a background image to create a layout used for navigation. Figure 6-26 below depicts using a dark portion of a background for “sidebars or other text related to the main text to the right” and using a light background to display text or images, with the result that the background tile splits the frame into two regions. *Powell*, 265.



Powell, 265 (“Figure 6-26”), 248 (“Figure 6-27”).

120. In my opinion, a POSITA would have been motivated and found it obvious to modify *Slivka* to present a first content element in the viewer GUI defined by the set of HTML instructions (“NIM template”) to thus present the first content element at least partly within the image, as claimed. Indeed, *Powell* teaches multiple methods for presenting content in a viewer GUI that were “very common” and were advantageous for creating a “useful page layout.” *Powell*, 264-265. Therefore, a POSITA would have been motivated to modify *Slivka* to achieve the same benefits.

Such a modification would have been use of known HTML techniques to advantageously modify *Slivka* in the same way taught by *Powell*.

121. It is also my opinion that such a modification would have had a reasonable expectation of success because *Slivka* already teaches using sets of HTML instructions and includes exemplary HTML instructions which would require merely minor modifications to implement *Powell's* teachings. Thus, such a modification using well-known and well-understood HTML instructions would have been straightforward and would not have required undue experimentation nor would hardware or complex system changes have been required. Further, *Powell* teaches use of such HTML instructions was “very common,” which a POSITA would have understood would have thus not required undue experimentation to implement such modifications to *Slivka* in light of *Powell's* teachings. Further, a POSITA would have understood that such modifications would have applied the same to *Slivka-Anabuki* because *Slivka's* modifications regarding *Powell's* HTML features would not have impacted the retrieval of sets of HTML instructions from a server as taught by *Anabuki*.

- P. Claim 9: “The method of claim 1, wherein the definition of the viewer graphical user interface defines at least one control permitting the modification of the appearance of the viewer graphical user interface defined by the networked information monitor template, and wherein presenting the viewer graphical user interface defined by the networked information monitor template on the display of the client computing device comprises presenting the at least one control.”**

122. See Claims 1-4. As I discussed above, *Slivka* teaches an OnLineButton that a user may press to switch to live news content; the description of OnLineButton in the HTML instructions in Appendix D is “Press this button after you are connected to the internet to switch to live content”. See Claim 1(f). In my opinion, a POSITA would have understood or found obvious that such an OnLineButton would have met the claimed “control permitting the modification of the appearance of the viewer GUI” because – as the description of OnLineButton says explicitly – pressing said OnLineButton would have presented *live* news content from the internet to a user, thus replacing the previous content and modifying the appearance of the news pane 154 HTML frame. As I discussed above, said news pane 154 (“NIM”) is defined by a set of HTML instructions (“NIM template”). See Claim 1. Further, as I discussed above, said OnLineButton control was included in *Slivka*’s *FH* exemplary HTML instructions.

```
<BODY LEFTMARGIN=0 TOPMARGIN=0 BGCOLOR=#000000>
<CENTER>
<IMG SRC="IELOGO.GIF" VSPACE=32>
<FONT FACE=TAHOMA SIZE=2 COLOR=gray>
<BR>Press this button
<BR><U>after</U> you are connected to the internet
<BR>to switch to live content.
<BR><BR>
<object id=OnLineButton
  classid="clsid:BEAADBC0-E570-11CF-A9AD-00AA00B92C4D"
  width=72 height=18>
  <PARAM NAME=BordColor VALUE="#000000">
  <PARAM NAME=BackColor VALUE="#D0D0D0">
  <PARAM NAME=ForeColor VALUE="#000000">
  <PARAM NAME=BackHighColor VALUE="#808080">
  <PARAM NAME=ForeHighColor VALUE="#FFFFFF">
  <PARAM NAME=BackClickColor VALUE="#000000">
```

APPENDIX D - Page 1

Slivka FH, 74 (excerpt, annotated); see Claim 1(f).

Q. Claim 10: “The method of claim 1, wherein the first content element includes audio content, video content, graphics content, still image content, textual content and/or interactive content.”

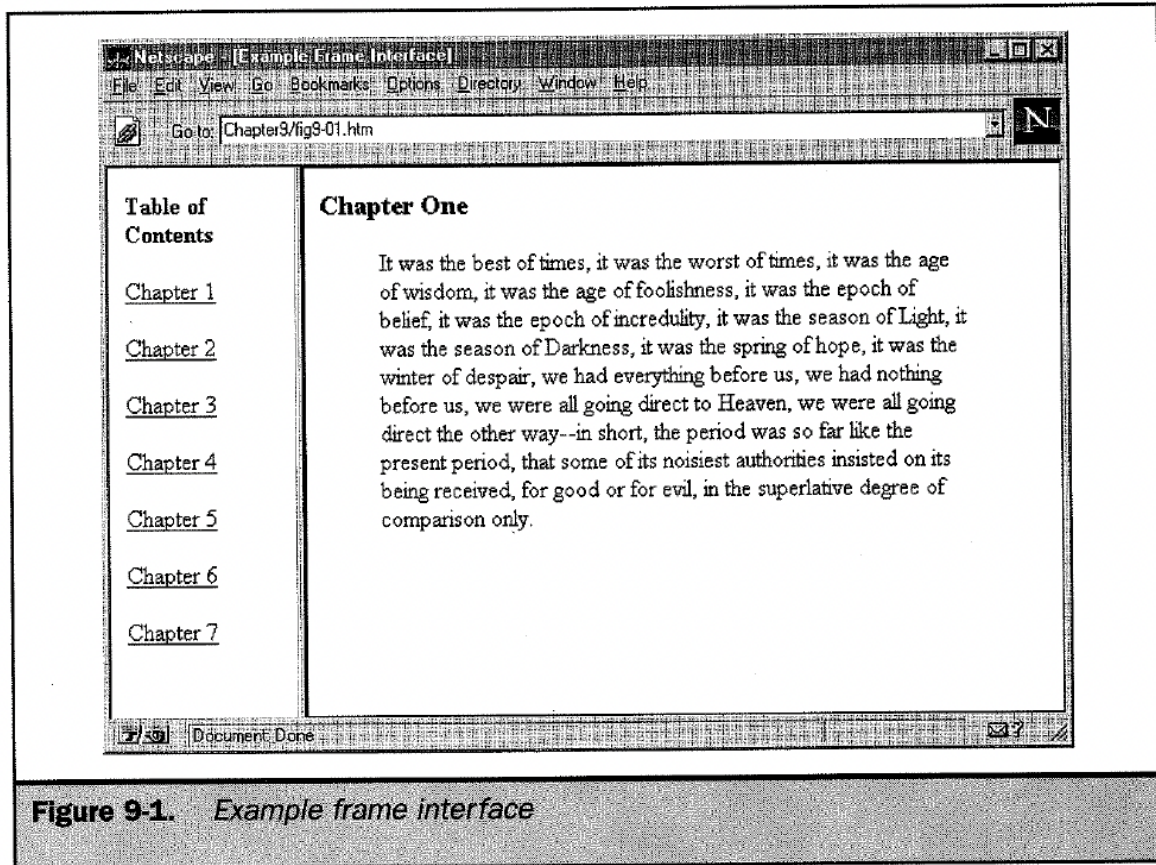
123. See Claim 1. As I opined above, *Slivka* alone or in view of *Powell* renders obvious a first content element that includes “audio content, video content, graphics content, still image content, textual content and/or interactive content,” as claimed. For example, *Slivka* teaches images and text content presented in news pane 154. See Claim 1(b)(ii); *Slivka*, 18:49-19:11, Fig. 6.

- R. Claim 11: “The method of claim 1, further comprising: executing a client parser application that is separate from the networked information monitor template, the client parser application being configured to present the viewer graphical user interface defined by the networked information monitor template on the client computing device, to generate the request for the content that is transmitted to the first network location referenced by the definition of the first content element for the networked information monitor template, and to present the first content element received from the first network location within the viewer graphical user interface defined by the networked information monitor template.”**

124. See Claim 1. In my opinion, a POSITA would have understood or found obvious that *Slivka*’s shell 50 meets the claimed “client parser application separate from the [NIM] template.” I note that *Slivka* teaches shell 50 provides a GUI for a user of a computer and “displays and navigates between other hypertext documents such as those available from the internet.” *Slivka*, 1:17-19, 5:59-62, 3:14-30, 4:27-33, 18:65-67. In my opinion, a POSITA would have understood or found obvious that *Slivka*’s shell 50 generates a request for content that is transmitted to the first network location referenced by the definition of the first content element for the NIM template because the shell obtains and parses sets of HTML instructions to both produce and display HTML frames on the display device. *Slivka*, 18:49-19:11. See also Section IX.A “Overview of *Slivka*” above.

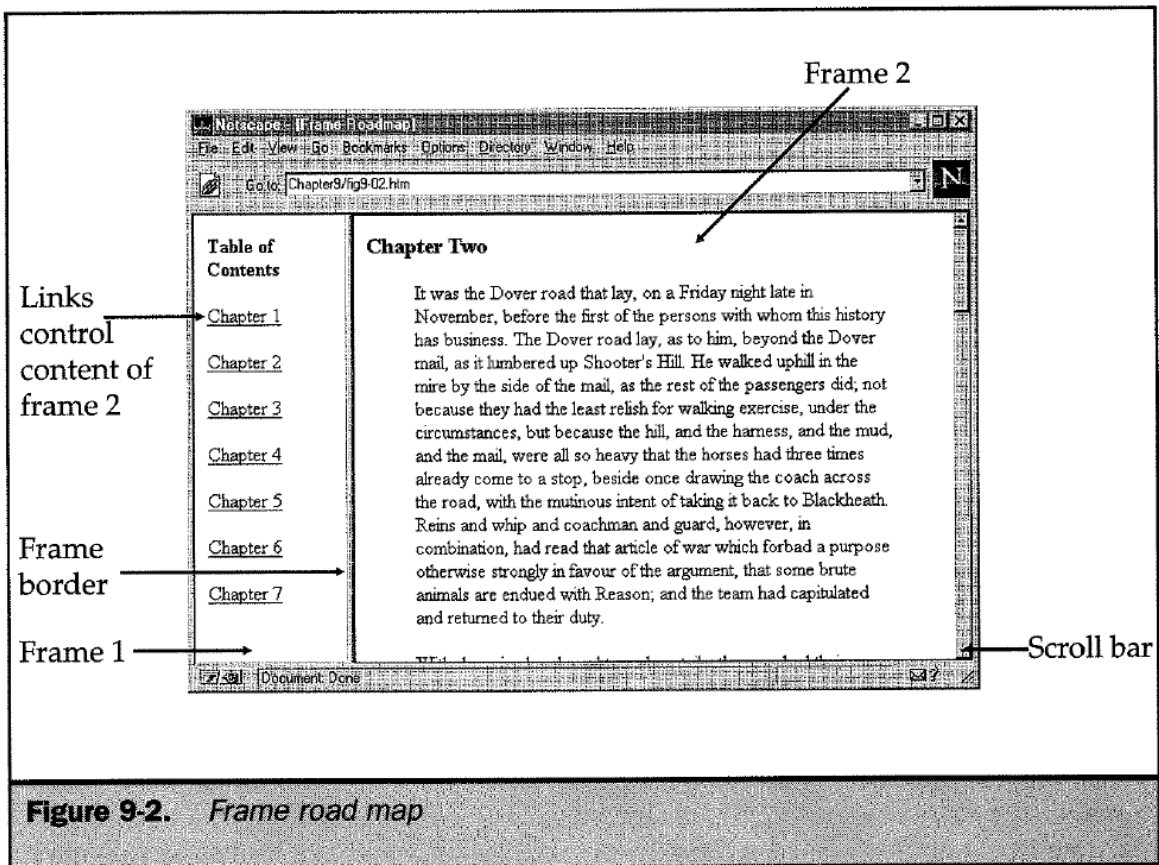
S. Claim 12: “The method of claim 1, further comprising causing the networked information monitor to communicate with another networked information monitor.”

125. See Claim 1. In my opinion, *Slivka* as modified by *Powell* teaches causing the NIM to communicate with another NIM, as claimed. I note that in the '545 Patent specification, such communication is described as “opening another NIM, or changing the content of another NIM that is already open.” '545 Patent, 22:65-23:2. I note that *Powell* teaches the contents of one frame “can be manipulated, or linked to the contents of another. This allows designers to build sophisticated interfaces.” *Powell*, 342. *Powell* specifically teaches that “[O]ne frame can contain links that produce a result in another frame. An example of such an interface is shown in Figure 9-1.” *Id.* As depicted below, *Powell* teaches a Table of Contents where a user may click a chapter, which will cause said selected chapter to open in the right frame. A POSITA would have understood that the first frame (Table of Contents) thus changes the content of another NIM that is already open (the right frame with chapter text) or opens a chapter in the right frame if no chapter was previously selected.



Powell, 342 (“Figure 9-1”).

126. Indeed, *Powell* teaches that the contents of one frame thus affect the contents of another frame in this manner. *Powell*, 343, 345, 346 (“When using frames, you may often find it desirable to make the links in one frame target another frame. This way, when a user presses a button or activates a link in one framed document, the requested page loads in another frame.”). In another similar example, *Powell*’s Figure 9-2 features text teaching Frame 1 including links to control content of Frame 2 (which is also indicated with an arrow).



Powell, 344 (“Figure 9-2”), *see also id.*, 345 (“Figure 9-3”), 347 (“Figure 9-5”).

127. In my opinion, a POSITA would have been motivated and found it obvious to modify *Slivka-Anabuki* per *Powell*’s teachings to utilize frames with controls such that *Slivka-Anabuki*’s HTML frames (such as news pane 154 and ticker 152) would have been able to communicate with one another, open another HTML frame, or change the content of one another or an already open HTML frame. *See Powell*, 342-347. For example, such a modification would have advantageously allowed a user to generate more information regarding a news story or sports score in another frame or to cause such information to be presented in an already open

frame. In particular, such a modification would have allowed a user to click on a sports score of ticker 152 to see more information in news pane 154, such as a full box score, weather information, game highlights, or other sports information. Therefore, such a modification to *Slivka-Anabuki* would have been use of a known technique to advantageously provide information displayed in an additional HTML frame in a streamlined manner in the same way taught by *Powell*. Further, *Powell* expressly teaches that the benefits of this approach are obvious: “Each frame may contain a different document. The benefits of this approach are obvious.” *Powell*, 342. *Powell* also teaches that such allows for building sophisticated interfaces. *Powell*, 342 (“The contents of one frame can be manipulated, or linked to the contents of another. This allows designers to build sophisticated interfaces.”), 343 (“[F]rames are an important tool in the Web designer’s toolbox[.]”).

128. It is also my opinion that such a modification would have had a reasonable expectation of success because *Slivka* already teaches using sets of HTML instructions and includes exemplary HTML instructions which would require merely minor modifications to implement *Powell*’s teachings. *Powell* expressly teaches that such technique was “an important tool in the Web designer’s toolbox” and that “frames are included in the HTML 4.0 standard.” Thus, such a modification using well-known and well-understood HTML instructions would have been straightforward and would not have required undue experimentation nor would

hardware or complex system changes have been required. Further, *Powell* teaches use of such HTML instructions was “very common,” which a POSITA would have understood would have thus not required undue experimentation to implement. Further, a POSITA would have understood that such modifications would have applied the same to *Slivka-Anabuki* because *Slivka*’s modifications regarding *Powell*’s HTML features would not have impacted the retrieval of sets of HTML instructions from a server as taught by *Anabuki*.

T. Claim 13: “The method of claim 1, wherein the networked information monitor is configured to cause the client computing device to periodically request the first content element from the first network location referenced by the definition the first content element for the networked information monitor template and to present the received first content element within the viewer graphical user interface in an ongoing manner.”

129. See Claim 1. In my opinion, *Slivka* teaches that news pane 154 presents content retrieved from the Internet, including images and text relating to news events. *Slivka*, 18:49-19:11, Fig. 6. I note that *Slivka*’s *FH* includes exemplary HTML instructions including a content “Refresh” instruction with a time period of 14400. *Slivka FH*, 74. A POSITA would have understood or found obvious that such a “Refresh content” HTML instruction would have resulted in *Slivka*’s news pane 154 refreshing news content to provide new news periodically at the indicated time interval.

```
<meta http-equiv="Refresh" content=14400>  
<HTML>
```

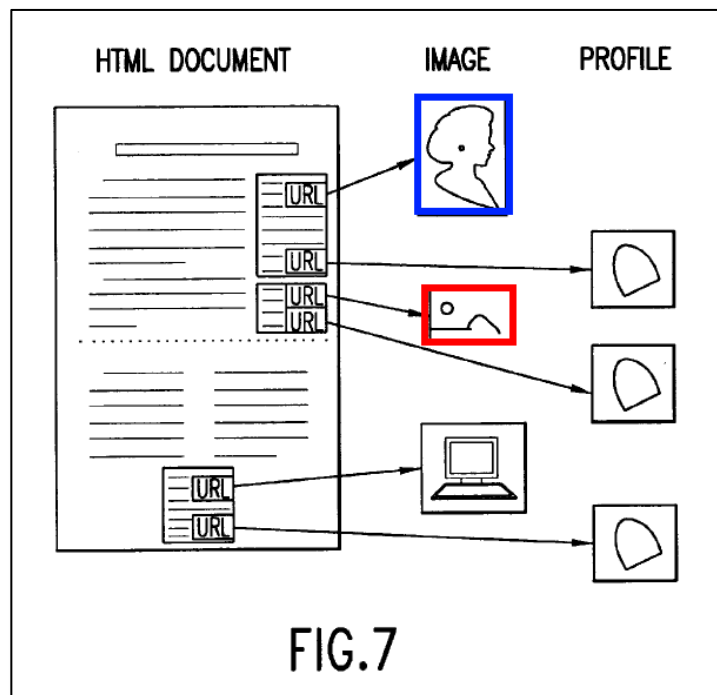
Slivka FH, 74 (excerpt). Thus, a POSITA would have understood or found obvious that *Slivka* teaches or renders obvious periodically requesting the first content element and presenting the received first content element within the viewer GUI in an ongoing manner, as claimed.

U. Claim 14: “The method of claim 1, wherein the network is the internet.”

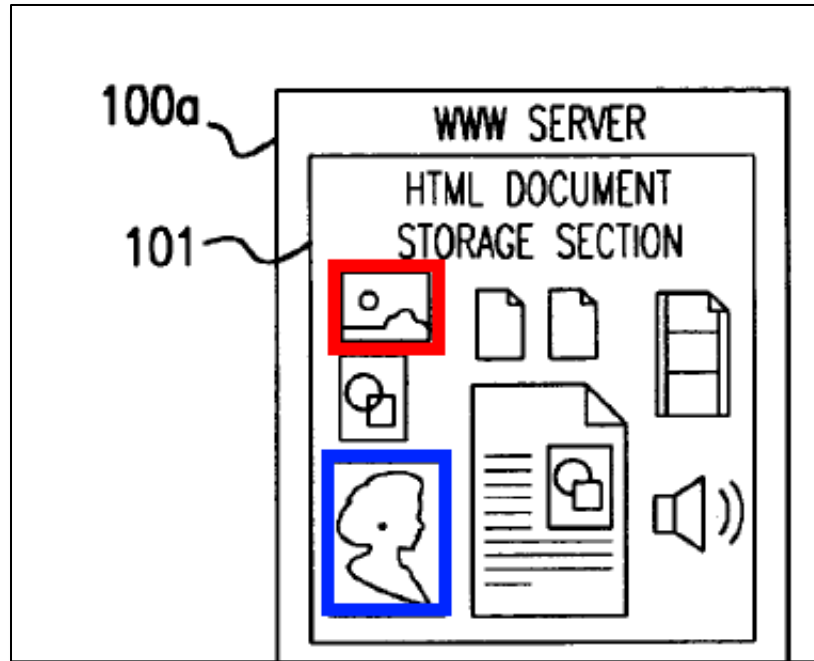
130. See Claim 1. In my opinion, a POSITA would have understood or found obvious that *Slivka* teaches the network is the Internet, as claimed. Indeed, *Slivka* expressly teaches receiving content for news pane 154 and ticker 152 over the Internet. *Slivka*, 18:49-19:11, 5:27-31. A POSITA would have further understood or found obvious that such a definition of a first content element to an Internet location would have been a network location, as claimed, because the Internet is a network. I discussed client and server interactions over a network such as the Internet above. See Section V.A. I also opined on *Slivka*’s network connections including having a network interface or modem. See Claim 1(Pre).

- V. **Claim 15(Pre): “The method of claim 1, wherein the networked information template further comprising a definition of a second content element for the networked information monitor template, the definition of the second content element referencing a second content element for the networked information monitor template is served over the network, and wherein the method further comprises:”**

131. See Claim 1. In my opinion, *Anabuki* teaches a single HTML document that includes a plurality of URLs for a plurality of images. I have reproduced annotated Fig. 7 from the Petition below, where a first image is annotated blue and a second image is annotated red:



Anabuki, FIG. 7 (annotated), 11:5-13, 10:4-10. Fig. 4 below depicts said first image (blue) and second image (red) stored in the HTML document storage section 101 of WWW server 100a.



Anabuki, Fig. 4 (excerpt, annotated),

132. In my opinion, a POSITA would have been motivated and found it obvious to modify *Slivka* to utilize content (e.g., text, images) from multiple sources in *Slivka*'s HTML frames (e.g., news pane 154, ticker 152) in view of *Anabuki*'s teachings. Such a modification would have advantageously allowed news pane 154 to present multiple images and text for news stories. Further, such a modification would have advantageously modified *Slivka*'s news pane 154 to display news and images from multiple sources at the same time, such as multiple news organizations, websites, regions (whether local, international, national) and from various categories (business, weather forecasts, finance, classifieds). Such a modification would have utilized a definition of a second content element to reference a second content element at a second location (whether at the same server or a second server as a first

content element) in the same way that a definition of a first content element references a first content element at a first network location. Such a modification would have merely been use of the known technique of using a definition of a second content element for content in a manner consistent with *Slivka's* definition of a first content element. Thus, use of *Anabuki's* known technique of referencing multiple images via multiple URLs would have advantageously improved *Slivka's* system in the same way.

133. It is also my opinion that such a modification would have had a reasonable expectation of success because such would have been merely use of well-known HTML techniques using well known HTML instructions. Further, such a modification would have required only minor modifications to *Slivka's* set of HTML instructions to add a URL reference to a second image, for example. Therefore, in my opinion, such a modification would not have required undue experimentation.

W. Claim 15(a): “responsive to instructions included in the requested networked information monitor template, transmitting over the network a second content request to the second network location referenced by the definition of the second content element for the networked information monitor template.”

134. See Claims 15(Pre), 1(d).

X. Claim 15(b): “receiving, over the network, the second content element transmitted responsive to the second content request; and”

135. See Claims 15(Pre), 1(e).

Y. Claim 15(c): “presenting the received second content element in the viewer graphical user interface defined by the networked information monitor template, wherein the definition of the viewer graphical user interface and/or the second content element define all controls for enabling a user to interact with the second content element through the viewer graphical user interface.”

136. *See* Claims 15(Pre), 1(f).

Z. Claim 16(Pre): “A computer-implemented method of obtaining and displaying content obtained over a network to a user on a client computing device, the method being implemented in the client computing device, the client computing device including electronic storage, a display, and one or more processors configured to execute one or more computer program modules, the method comprising:”

137. *See* Claim 1(Pre).

AA. Claim 16(a): “executing on the client computing device client parser, wherein the execution of the client parser results in the client computing device:”

138. *See* Claim 9.

BB. Claim 16(a)(i): “transmitting over the network a first content request to a first network location referenced by a definition of a first content element in a networked information monitor template that is readable by the client parser;”

139. *See* my opinions for Claim 1(d). A POSITA would have understood or found obvious that a client parser would have read a NIM template. *See* Claims 1(a) 1(d), 1(f), 11.

CC. Claim 16(a)(ii): “receiving, over the network, the first content element transmitted responsive to the first content request;”

140. *See* Claim 1(e).

DD. Claim 16(a)(iii): “presenting a viewer graphical user interface defined by the networked information monitor template on the display of the client computing device and wherein the viewer graphical user interface defined by the networked information monitor template is presented separate from and outside of any other graphical user interface that includes user controls for specifying the first network location from which the first content element for the networked information monitor is served over the network; and”

141. See Claim 1(c).

EE. Claim 16(a)(iv): “presenting the received content element within the viewer graphical user interface defined by the networked information monitor template, wherein the definition of the viewer graphical user interface and/or the first content element define all controls for enabling a user to interact with the first content element through the viewer graphical user interface.”

142. See Claim 1(f).

FF. Claim 17: “The method of claim 16, wherein execution of the client parser further results in the client computing device determining that the first element content modifies the networked information monitor template and responsive to such determination, modifying the networked information monitor template prior to the step of presenting the graphical user interface.”

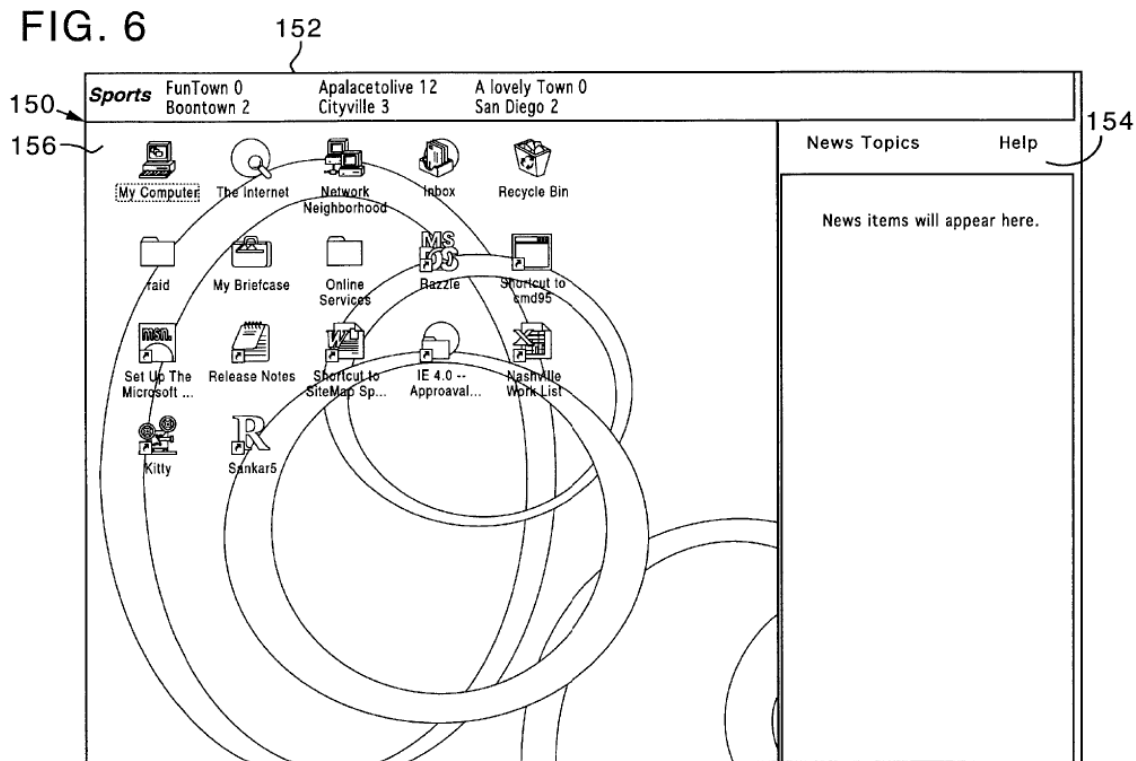
143. See Claim 16. As I opined above, *Slivka* teaches shell 50 (i.e., client parser) presents HTML frames such as news pane 154 and ticker 152 on a display. See Claim 11. *Slivka* further teaches that shell 50 controls and presents HTML frames based on the contents of the sets of HTML instructions (NIM templates). *Id.* Also as I discussed above, *Slivka* teaches time-varying content for news pane 154 that modifies the HTML frame. See Claims 9, 13. Because the *Slivka*’s set of HTML instructions define the HTML frame, which presents time-varying content, a

POSITA would have understood or found obvious that time-varying content would modify the set of HTML instructions as news content (e.g., images, text) changes. I note that *Slivka* teaches an OnLineButton for news pane 154 where a user can press said OnLineButton to present live/updated news content in news pane 154. See Claim 9.

144. It is also my opinion that a POSITA would have found obvious that shell 50 obtains and processes the set of HTML instructions for news pane 154, for example, which causes *Slivka's* computer system to determine that the first content element modifies the set of HTML instructions, as claimed. A POSITA would have found such obvious because *Slivka* teaches shell 50 processes the set of HTML instructions for news pane 154 including the “first content element,” and that such processing would have occurred before news pane 154 is displayed on *Slivka's* display device because such must occur in order to present the updated content. *Slivka*, 18:49-67. A POSITA would have found obvious that *Slivka's* computer system would have thus determined that the first content element modifies the set of HTML instructions (“NIM template”) and would have subsequently modified said set of HTML instructions (“NIM template”) before presenting news pane 154 HTML frame on the display device to a user.

GG. Claim 18: “The method of claim 16, further comprising presenting an icon representing networked information monitor associated with the networked information monitor template on the display of the client computing device, and wherein execution of the client parser to perform one or more of the transmitting operation, the presenting the viewer graphical user interface operation, or presenting the first content element operation is responsive to reception of selection by a user of the icon.”

145. See Claim 16. I note that *Slivka* teaches utilizing icons for various computer applications and functions, as depicted in Fig. 6 below:



Slivka, Fig. 6. *Slivka* teaches generating HTML frames for the icons in the same manner as the set of HTML instructions generate news pane 154. *Slivka*, 6:4-19. One example is the “My Computer” view. *Id.* In my opinion, a POSITA would have found it obvious to modify *Slivka*’s news pane 154 HTML frame to be represented

with an icon on the desktop in the same way as, for example, the My Computer icon such that when the icon is selected, *Slivka*'s shell retrieves the content (the transmitting operation) and presents the HTML frame (the presenting the viewer graphical user interface operation) with the retrieved news content (presenting the first content element operation). Such a modification would have advantageously allowed a user to decide when to activate news pane 154's HTML frame instead of news pane 154 being automatically generated on system startup and would have resulted in better system accessibility from a user's perspective. Such a modification would also have advantageously reduced CPU processing resources and networking resources needed to activate news pane 154, run news pane 154 continuously including continuing to retrieve and display news content at *Slivka*'s refresh interval. Therefore, in my opinion, such a modification would have been simply use of a known technique of utilizing an icon to allow a user to start news pane 154 when desired in the same way that *Slivka* already teaches is done for My Computer and other programs. See Fig. 6. Thus, the result would have been client parser performing its processing operations only after a user selects an icon instead of generating news pane 154 at system startup. It is also my opinion that such a modification would have had a reasonable expectation of success for the same reason. Utilizing an icon was known, with *Slivka* already teaching such. Therefore, such a modification would not have required undue experimentation.

- HH. Claim 19: “The method of claim 16, further comprising invoking the client parser an initiating one or more of the transmitting operation, the presenting the viewer graphical user interface operation, or presenting the first content element operation automatically during a start-up process of the client computing device.”**

146. See Claim 16. As I opined above, *Slivka* teaches a client computing device. See Claim 1(Pre). In my opinion, *Slivka* teaches shell 50 (“client parser”) synthesizes the desktop view at system startup. *Slivka*, 10:32-44. In my opinion, a POSITA would have found obvious that *Slivka* teaches shell 50 thus processes the set of HTML instructions for news pane 154 to automatically generate news pane 154 as an HTML frame on the display device. Therefore, in my opinion, *Slivka* teaches the claimed “presenting the viewer GUI operation” “automatically during a start-up process of the client computing device,” as claimed.

- II. Claim 20(Pre): “The method of claim 19, wherein execution on the client computing device of the client parser further results in the client computing device:”**

147. See Claims 11, 19.

- JJ. Claim 20(a): “transmitting over the network a second content request to a second network location referenced by a definition of a second content element in a second networked information monitor template that is readable by the client parser;”**

148. See Claims 15(a), 1(d).

- KK. Claim 20(b): “receiving the second content element transmitted responsive to the second content request;”**

149. See Claims 15(b), 1(e).

LL. Claim 20(c): “presenting a second viewer graphical user interface defined by the second networked information monitor template on the display of the client computing device, wherein the second viewer graphical user interface lacks user controls, wherein the definition of the second viewer graphical user interface and/or the second content element define all controls for enabling a user to interact with the second content element through the second viewer graphical user interface; and”

150. *See* Claim 15(c).

MM. Claim 20(d): “presenting the second content element within the viewer second graphical user interface,”

151. *See* Claims 15(c), 1(f).

NN. Claim 20(e): “wherein execution of the client parser to perform the transmitting the second content request, the presenting the second viewer graphical user interface operation, and the presenting the second content element is responsive to reception of a selection to initiate a second networked information monitor associated with the second networked information monitor template.”

152. *See* Claim 19.

OO. Claim 21: “The method of claim 16, wherein the network is the internet.”

153. *See* Claims 14, 16.

XI. OPINIONS REGARDING GROUND 2: CLAIM 5 IS OBVIOUS IN VIEW OF *SLIVKA, ANABUKI, POWELL, AND MELBIN*

- A. Claim 5: “The method of claim 1, wherein the networked information monitor template includes instructions in extensible markup language (XML) format, and further wherein the method further comprises parsing the definition of the viewer graphical user interface.”**

154. See Claim 1. In my opinion, *Slivka-Anabuki-Powell* teaches using sets of HTML instructions to generate a hypertext page for a desktop display. I also note that a POSITA would have been motivated and found it obvious to modify *Slivka-Anabuki-Powell* in light of *Melbin’s* teachings to utilize XML (extensible markup language) in addition to HTML to advantageously utilize templates with instructions for how a “content server should process certain contents of the page.” *Melbin*, 2:32-50, 6:10-44. I note that *Melbin* teaches using markup language for layout and logic. “Layout elements describe where components are played on a page, and logic elements describe the actual content or how to locate content.” *Id.* In one example, *Melbin* teaches using instructions containing both HTML and XML: “Elements can contain both standard HTML or special tags such as XML tags. The XML tags, which may be a form of server side markup language, can be used to retrieve data from a content catalog according to instructions specified by the elements.”

155. In my opinion, modifying *Slivka-Anabuki-Powell* in light of *Melbin’s* teachings would have advantageously improved *Slivka-Anabuki-Powell* in the same way as *Melbin*. Indeed, a POSITA would have understood that HTML is a specific

markup language designed for data presentation -- its elements define constructs such as headings, paragraphs, itemized lists, the placement of images, and the appearance of text. XML, on the other hand, focuses on the representation of content, including allowing for the definition of metadata that describes the meaning of content. By combining XML and HTML, a system can separate the representation of content from how the content is presented, which a POSITA would have recognized as a good software engineering practice, since each aspect can be maintained and modified if necessary separately. Such a use of a known technique would have advantageously improved *Slivka-Anabuki-Powell* to include both HTML instructions and XML instructions for informing a content server how to process certain contents in the same way as *Melbin*. It is also my opinion that such a modification would have had a reasonable expectation of success because utilizing both HTML and XML instructions was known, per *Melbin's* teachings.

XII. CONCLUSION

156. For the aforementioned reasons, in my opinion, to a POSITA, the claims of the '083 Patent are rendered obvious by the prior art.

157. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1001. If called to testify as to the truth of the matters stated herein, I could and would testify competently.

Date: May 22, 2023

Respectfully submitted:

By:



Dr. Loren Terveen

Loren G. Terveen

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Education

| | | |
|---|----------------------------|------|
| Ph.D. in Computer Sciences | University of Texas | 1991 |
| M.S. in Computer Sciences | University of Texas | 1988 |
| B.A. in Computer Science,
Mathematics, History | University of South Dakota | 1984 |

Affiliations Member of ACM, ACM/SIGCHI

**Research
Interests** Human-Computer Interaction, Social Computing

**Professional
Experience**

| | | |
|---|--|------------|
| Professor | University of Minnesota | 2002 -- |
| Distinguished McKnight University Professor | | 2017 -- |
| Principal Member of
Technical Staff | AT&T Labs - Research | 1996-2002 |
| Member of Technical Staff | AT&T Bell Labs | 1991-1996 |
| Graduate Research Intern | Microelectronics and
Computer Corporation | 1986-19991 |
| Teaching Assistant | University of Texas at Austin | 1985 |

AWARDS AND MAJOR ROLES

ACM Distinguished Scientist (awarded 2009)

ACM SIGCHI Academy (2019)

ACM SGICHI Lifetime Service Award (2023)

ACM SIGCHI President (2015-2018)

ACM Council, SIG Governing Board Representative (2016 – 2018)

RESEARCH

External Funding

NSF:CISE: Community-Engaged Design and Implementation of a Framework for Ethical Online Communities Research (**Co-PI**, with Svetlana Yarosh PI, Stevie Chancellor Co-PI, Joseph Konstan Co-PI, Kangjie Lu Co-PI), \$400,000 for 01/01/2023 to 12/31/2025.

Cisco: Detecting and Reducing Bias in Collaborative Virtual Meetings (**Co-PI**, with Stevie Chancellor PI). **\$177,915** for 9/1/2021 to 12/31/2022.

NSF:CHS:Small: Incorporating and Balancing Stakeholder Values in Algorithm Design (UMN **PI**), Award Total \$500,000, UMN Share \$243,941 for 8/1/2019 to 7/31/2022.

NSF: EAGER: AI-DCL: Capture, Explain and Negotiate the Inherent Trade-offs in Machine Learning Algorithms (UMN **co-PI**), Award Total \$295,713, UMN Share \$103,267 for 10/1/2019 to 9/30/2022.

NSF:CHS: Small: Collaborative Research: Structured Data Peer Production: Addressing Challenges and Leveraging Opportunities (**PI**), \$249,738 for 9/1/2018 - 8/31/2021.

National Cancer Institute (NCI): Restore: Improving sexual outcomes of gay and bisexual prostate cancer survivors (R. Simon Rosser **PI**; my role: **Co-PI**); \$2,039,220 (directs) \$3,039,541 (total), 2017-2022.

NSF: “PFI:BIC: Smart Human-Centered Collision Warning System: sensors, intelligent algorithms and human-computer interfaces for safe and minimally intrusive car-bicycle interactions” (Co-PI, with Rajesh Rajamani (PI), Max Donath, and Nichole Morris), \$999,773 for September 1, 2016 to August 31, 2019.

NSF: “Computer-Supported Cooperative Work Doctoral Colloquium” (**PI**), \$25,000 for 03/01/2016 to 02/28/2017.

National Institute on Drug Abuse: “A Technology-Delivered Peer-to-Peer Support ARB Adherence Intervention for HIV+ Adults”, (Co-PI, with Keith Horvath (PI) and Darin Erickson), \$3,302,62 for 07/01-2015 to 05/31/2020.

NSF: “HCC: Tools and Mechanisms to Support Social Participation Efforts”, (**PI**), \$499,399 for 10/01/2012 to 09/30/2015.

NSF: “SoCS: Collaborative Research: Novel Algorithms and Interaction Mechanisms to Enhance Social Production”, (**PI**), \$527,140, for 7/01/2012 to 06/30/2015.

NSF: “Collaborative Research: Supporting Newcomer Socialization in Online Production Communities”, (**PI**), \$301,135.00 for 08/2011 to 08/31/2015.

Minnesota Department of Transportation: “Statewide Cycloplan: A Bicycle Planning Tool with Participatory GIS”, **(PI)**, \$130,000, for 10/01/2011 to 06/30/2013.

Metropolitan Council: “Cycloplan II”, **(PI)**, \$71,350, for 08/15/2011 to 05/31/2012.

NSF: “Wikisym Doctoral Consortium”, **(PI)**, \$13,163, for 05/01/2011 to 04/30/2012.

IBM: “Mobile Crowdsensing”, **(PI)**, \$100,000 awarded 04/01/2011

NSF: “Social-Computational Systems (SoCS) Community Meeting” **(PI)**, \$48,801 for 09/01/2010 to 08/31/2011

NSF: “SoCS: Collaborative Research: Information Framing: Intelligent Interfaces for an Online Production Community”, **(PI)**, \$375,000 for 09/15/2010 to 08/31/2015.

NSF: “Collaborative Research: Guiding Folksonomy Development to Enable Novel Tagging Applications” **(PI)**, with J. Riedl and S. Sen (Macalester College)). \$949, 788 for 04/1/2010 to 03/31/2014 (UMN Share).

Minnesota Department of Transportation: Bike, Bus, and Beyond: Extending Cyclopath to Enable MultiModal Routing **(PI)**, \$60,627, for 07/08/2010 to 01/31/2012

NIH: An Interactive Website to Promote Communication about Sexual Health and Dating Relationships between Parents and Teens **(Co-PI)**, with Sonya Brady (PI), Simon Rosser, and Renee Sieving), \$679,500 for 09/30/2009 to 08/31/2011.

Metropolitan Council: “Cycloplan” **(PI)**, \$185,000, October 2009 – March 2011.

NSF “Collaborative Research: Understanding Online Volunteer Communities: Toward Theory-Based Design” **(co-PI)**, with J. Riedl, J. Konstan, M. Snyder, & Y. Ren; R. Kraut (CMU) \$2,400,000 for 08/01/2008 to 07/31/2013.

NSF: “Recommender Systems Doctoral Consortium” **(PI)** \$15,415, 2007-2008.

NSF: “Mining Spatiotemporal Data: From Personal Use to Community Knowledge” **(PI)** \$449,570 for 12/1/2005 to 11/30/2009.

NSF: “Collaborative Research: Mark This! - Operationalizing the notion of "place" for interactive community systems” **(PI)**, with Q. Jones (NJIT) and S. Whittaker (Univ. of Sheffield)). \$173,411 for 6/1/2003 to 5/31/2007 (UMN share).

NSF: “Being There: Mobile Devices for Community and Commerce” **(PI)**, with J. Konstan, J. Riedl, and S. Shekhar). \$120,000 for 9/1/2002 to 8/31/2005.

NSF: “ITR: Collaborative Research: Designing On-Line Communities to Enhance Participation” (co-PI, with J. Konstan & J. Riedl, R. Kraut & S. Kiesler (CMU), P. Resnick and Y. Chen (Univ. of Michigan)). \$1,246,017 for 9/1/2003 to 8/31/2009 (UMN share).

AT&T: “VURI: Collaborative Filtering and Intelligent Interface Design for Enhanced TV Applications” (PI). \$35,000 for November 1, 2008 to October 31, 2009.

AT&T: “VURI: Collaborative Filtering and Intelligent Interface Design for Enhanced TV Applications” (PI). \$35,000 for June 1, 2007 to May 31, 2008.

Internal Funding

Minnesota/China Collaborative Research Grant: "Expertise Oriented Mining for Web Community". \$10,000 for July 1, 2007 to June 30, 2008 (PI, with Jie Tang, Tsinghua University, Beijing China).

University of Minnesota TEL grant: “The Next Generation Online Learning Environment: Designing for Community and Collaboration”. \$10,000 for September 2006 to May 2007. (co-PI, with Joan Hughes, David Ernst, and Ann Ooms, College of Education and Human Development).

University of Minnesota Digital Technology Center: “Indoor Navigation Aids for Visually Impaired People”. \$25,67 for June 2005 to December 2006. (co-PI, with S. Shekhar and G. Legge).

University of Minnesota Digital Technology Center: “Eye-Tracking Research on Community Websites: Photo Directories and Building Social Networks”. \$19,300 for June 2004 to June 2005. (co-PI, with J. Konstan).

University of Minnesota Grant-In-Aid: “Facilitating Participation in Online Communities”. \$20,397 for 1/1/2003 to 6/30/2004.

Books

1. Bickhard, M.H. and Terveen, L.G. Foundational Issues in Artificial Intelligence and Cognitive Science: Impasse and Solution, (1995), Elsevier Science.

Refereed Journal Papers

2. Mo Houtti, Moyan Zhou, Loren Terveen, and Stevie Chancellor. “All of the White People Went First”: How Video Conferencing Consolidates Control and Exacerbates Workplace Bias. *PACM Human-Computer Interaction* (2023).
3. Mo Houtti, Isaac Johnson, Joel Cepeda, Soumya Khandelwal, Aviral Bhatnagar, and Loren Terveen. 2022. “We Need a Woman in Music”: Exploring Wikipedia’s Values on Article Priority. *PACM Human-Computer Interaction* 7, (2022).
4. Charles Chunkai Zhang*, Mo Houtti*, C, Estelle Smith, Ruoyan Kong, and Loren Terveen. Working for Invisible Machines or Pumping Information into an Empty Void? An Exploration of Wikidata Contributors’ Motivations. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 6 (2022). (* co-first authors)
5. C. Estelle Smith, William Lane, Hannah Miller Hillberg, Daniel Kluver, Loren Terveen, and Svetlana Yarosh. Effective Strategies for Crowd-Powered Cognitive Reappraisal Systems: A

- Field Deployment of the Flip*Doubt Web Application for Mental Health. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 5 (2021). **Best Paper Honorable Mention.**
6. C. Estelle Smith, Avleen Kaur, Katie Z. Gach, Loren Terveen, Mary Jo Kreitzer, and Susan O’Conner-Von. What is Spiritual Support and How Might It Impact the Design of Online Health Communities? In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 5 (2021).
 7. Levonian, Z., Dow, M., Erickson, D.R., Ghosh, S., Miller Hillberg, H., Narayanan, S., Terveen, L. and Yarosh, L. Patterns of Patient and Caregiver Mutual Support Connections in an Online Health Community. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 4 (2020).
 8. Zhu, H., Yu, B., Halfaker, A., and Terveen, L. Value-Sensitive Algorithm Design: Method, Case Study, and Lessons. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 2, No. 2 (2018).
 9. Miller Hillberg, H., Levonian, Z., Terveen, L., and Hecht, B. What I See is What You Don’t Get: Effects of Seeing Emoji Rendering Differences Across Platforms. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 2, No. 2 (2018).
 10. Hall, A., Terveen, L., and Halfaker, A. Bot Detection in Wikidata Using Behavioral Cues. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 2, No. 2 (2018).
 11. Sheppard, S.A., Turner, J., Thebault-Spieker, J., Zhu, H., and Terveen, L. Never Too Old, Cold or Dry to Watch the Sky: A Survival Analysis of Citizen Science Volunteerism. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 1, No. 2 (2017).
 12. Thebault-Spieker, J., Kluver, D., Klein, M., Halfaker, A., Hecht, B., Terveen, L., and Konstan, J. Simulation Experiments On (The Absence of) Ratings Bias in Reputation Systems. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 1, No. 2 (2017).
 13. Yu, B., Wang, X., Lin, A.Y., Ren, Y., Terveen, L., and Zhu, H. Out With The Old, In With The New? Unpacking Member Turnover in Online Production Groups. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 1, No. 2 (2017).
 14. Nguyen, T.T., Harper, F.M., Terveen, L., and Konstan, J. User Personality and User Satisfaction with Recommender Systems. In *Information Systems Frontiers* (2017).
 15. Filson Moses, J., Dwyer, P.C., Fugelstad, P.T., Kim, J.S., Maki, A., Synder, M., and Terveen, L. Encouraging Online Engagement: The Role of Interdependent Self-Construal and Social Motives in Fostering Online Participation. In *Personality and Individual Differences* (2017).
 16. Thebault-Spieker, J., Terveen, L., and Hecht, B. Towards a Geographic Understanding of the Sharing economy: Systemic Biases in UberX and TaskRabbit. In *ACM Transactions on Computer-Human Interaction* (2017).
 17. Brady, S.S., Sieving, R.E., Terveen, L.G., Rosser, R. S., Kodet, A.J., and Rothberg, V.D. An Interactive Website to Reduce Sexual Risk Behavior: Process Evaluation of TeensTalkHealth, JMIR Research Protocols (2015).
 18. Ren, Y., Harper, F.M., Drenner, S., Terveen, L., Kiesler, S., Riedl, J., and Kraut, R.E. (2012). Building Member Attachment in Online Communities: Applying Theories of Group Identity and Interpersonal Bonds. *Management Information Systems Quarterly*.
 19. Jones, Q., Grandhi, S., Karam, S., Whittaker, S., Zhou, C., and Terveen, L. Geographic ‘Place’ and Community Information Preferences, in *Computer-Supported Cooperative Work*.
 20. Zhou, C., Frankowski, D., Ludford, P., Shekhar, S., Terveen, L., Discovering Personally Meaningful Places from Location Data: An Interactive Clustering Approach. *ACM Transactions on Information System*, 25, 3 (July 2007).

21. Ling, K., Beenen, G., Ludford, P.J., Wang, X., Chang, K., Li, X., Cosley, D., Frankowski, D., Terveen, L., Rashid, A.M., Resnick, P., and Kraut, R.E. Using Psychology to Motivate Contributions to Online Communities. *Journal of Computer-Mediated Communication*, 10, 4 (June 2005).
22. Terveen, L. and McDonald, D. Social Matching: A Framework and Research Agenda. *ACM Transactions on Computer-Human Interaction*, 12, 3 (2005), 401-434.
23. Whittaker, S., Jones, Q., Nardi, B., Creech, M., Terveen, L., Isaacs, E., and Hainsworth, J. ContactMap: organizing communication in a social desktop, in *ACM Transactions on Computer-Human Interaction*, 11, 4 (December 2004), 445-471.
24. Jones, Q., Grandhi, S., Terveen, L., and Whittaker, S. People-To-People-to-Geographical-Places: The P3 Framework for Location-Based Community Systems. in *Computer-Supported Cooperative Work*, 13, 3-4 (August 2004), 249-282.
25. Herlocker, J.L., Konstan, J.A., Terveen, L.G., and Riedl, J.T. Evaluating Collaborative Filtering Recommender Systems, *ACM Transactions on Information Systems* (2004).
26. Amento, B., Terveen, L., Hill, W., Hix, D., and Schulman, R. Experiments in Social Data Mining: The TopicShop System, in *ACM Transactions on Computer-Human Interaction*, 10, 1 (March 2003), 54-85.
27. Whittaker, S., Terveen, L.G., and Nardi, B.A. Let's stop pushing the envelope and start addressing it, in *Human-Computer Interaction*, 15, 2-3 (Sep 2000), 75-106.
28. Terveen, L.G., Hill, W.C., and Amento, B. Constructing, Organizing, and Visualizing Collections of Topically Related Web Resources, in *ACM Transactions on Computer-Human Interaction*, 6, 1 (Mar. 1999), 67-94.
29. Selfridge, P.G. and Terveen, L.G. Knowledge Management Tools for Business Process Support and Reengineering, in *Journal of Intelligent Systems in Accounting, Finance, and Management* (Jan. 1996).
30. Terveen, L.G. An Overview of Human-Computer Collaboration, in *Knowledge-Based Systems*, 8, 2-3 (1995), 67-81.
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35. Yu, B., Ye, Y., Terveen, L., Wu, Z.S., Forlizzi, J., and Zhu, H. Keeping Designers in the Loop: Communicating Inherent Algorithmic Trade-offs Across Multiple Objectives. In *Proceedings of DIS 2020*, the ACM Conference on Designing Interactive Systems.
36. Smith, C.E., Yu, B., Srivastava, A., Halfaker, A., Terveen, L., and Zhu, H. Keeping Community in the Loop: Understanding Wikipedia Stakeholder Values for Machine

Learning-Based Systems. In *Proceedings of CHI 2020, the ACM Conference on Human Factors in Computing Systems*. **Best Paper Honorable Mention.**

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38. Cheng, H.F., Yu, B., Fu, S., Zhao, J., Hecht, B., Konstan, J., Terveen, L., Yarosh, S., and Zhu, H. Teaching UI Design at Global Scales: A Case Study of Designing Collaborative Capstone Projects for MOOC Students, in *Proceedings of ACM Learning at Scale 2019*.
39. Hall, A., Thebault-Spieker, J., Sen, S., Hecht, B., and Terveen, L. Exploring the Relationship Between “Informal Standards” and Contributor Practice in OpenStreetMap. In *Proceedings of OpenSym 2018*.
40. Thebault-Spieker, J., Halfaker, A., Terveen, L., and Hecht, B. Distance and Attraction: Gravity Models for Geographic Content Production. In *Proceedings of CHI 2018, the ACM Conference on Human Factors in Computing Systems*.
41. Thebault-Spieker, J., Hecht, B., and Terveen, L. Geographic Biases are ‘Born, not Made’: Exploring Contributors’ Spatiotemporal Behavior in OpenStreetMap. In *Proceedings of ACM Group 2018*.
42. Kang, J., Condiff, K., Chang, S., Terveen, L., Konstan, J., and Harper, F.M. Understanding How People Use Natural Language to Ask for Recommendations, in *RecSys 2017*.
43. Miller, H., Kluver, D., Thebault-Spieker, J., Terveen, L., and Hecht, B. Understanding Emoji Ambiguity in Context: The Role of Text in Emoji-Related Miscommunication. In *Proceedings of ICWSM 2017, AAAI Conference on the Web and Social Media*.
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45. Yu, B., Ren, Y., Terveen, L., and Zhu, H. Predicting Member Productivity and Withdrawal from Pre-Joining Attachments in Online Production Groups. In *Proceedings of CSCW 2017, The ACM Conference on Computer-Supported Cooperative Work and Social Computing*.
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47. Chang, S., Harper, M., He, L., and Terveen, L. CrowdLens: Experimenting with Crowd-Powered Recommendation and Explanation. In *Proceedings of ICWSM 2016, AAAI Conference on the Web and Social Media*.
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50. Harper, F.M., Xu, F., Kaur, H., Condiff, K., Chang, S., and Terveen, L. Putting Users in Control of their Recommendations. In *Proceedings of RecSys2015, The ACM Conference on Recommender Systems*.
51. Kapoor, K., Kumar, V., Terveen, L., Konstan, J.A., and Schrater, P. "I like to explore sometimes" – Adapting to Dynamic User Novelty Preferences. In *Proceedings of RecSys2015, The ACM Conference on Recommender Systems*.
52. Warncke-Wang, M., Ranjan, V., Terveen, L., and Hecht, B. Misalignment Between Supply and Demand of Quality Content in Peer Production Communities. In *Proceedings of the International Conference on Weblogs and Social Media (ICWSM'15)*.
53. Chang, S., Harper, F.M., and Terveen, L. Using Groups of Items to Bootstrap New Users in Recommender Systems. In *Proceedings of the 18th ACM conference on Computer supported cooperative work & social computing (CSCW '15)*. ACM, New York, NY, USA.
54. Miller, H., Chang, S., and Terveen, L. "I LOVE THIS SITE!" vs. "It's a little girly": Perceptions of and Initial User Experience with Pinterest. In *Proceedings of the 18th ACM conference on Computer supported cooperative work & social computing (CSCW '15)*. ACM, New York, NY, USA.
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61. Chang, S., Kumar, V., Gilbert, E., and Terveen, L. Specialization, Homophily, and Gender in a Social Curation Site Findings from Pinterest, in *Proceedings of CSCW 2014*.
62. Grevet, C., Terveen, L., and Gilbert, E. Managing Political Differences in Social Media, in *Proceedings of CSCW 2014*.
63. Masli, M., and Terveen, L. Leveraging the Contributory Potential of User Feedback, in *Proceedings of CSCW 2014*.
64. Sheppard, S.A., Wiggins, A., and Terveen, L. Capturing Quality: Retaining Provenance for Curated Volunteer Monitoring Data, in *Proceedings of CSCW 2014*.
65. DeLong, C., Terveen, L., and Srivastava, J. (2013). TeamSkill and the NBA: Applying Lessons from the Virtual World to the Real World, in *Proceedings of ASONAM 2013*.

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108. Terveen, L.G., McMackin, J., Amento, B., and Hill, W. Specifying Preferences Based On User History, *Proceedings of CHI 2002*, 315-322. 15% acceptance rate.
109. Whittaker, S., Jones, Q., and Terveen, L.G. Managing Long Term Conversations: Conversation and Contact Management, *Proceedings of HICSS 2002*. 50% acceptance rate.
110. Amento, B., Terveen, L., Hill, W., and Hix, D. TopicShop: Enhanced Support for Evaluating and Organizing Collections of Web Sites, *Proceedings of UIST 2000*. 26% acceptance rate.
111. Amento, B., Terveen, L., and Hill, W. Does 'Authority' Mean Quality? Predicting Expert Quality Ratings of Web Documents, *Proceedings of SIGIR 2000*. 27% acceptance rate.
112. Amento, B., Hill, W., Terveen, L., Hix, D., and Ju, P. An Empirical Evaluation of User Interfaces for Topic Management of Web Sites, *Proceedings of CHI 1999*, 552-559. 25% acceptance rate.
113. Terveen, L.G and Hill, W.C. Evaluating Emergent Collaboration on the Web, *Proceedings of CSCW 1998*, 355-362. 19% acceptance rate.
114. Whittaker, S., Terveen, L.G, Hill, W.C., and Cherny, L. The Dynamics of Mass Interaction, *Proceedings of CSCW 1998*, 257-264. 19% acceptance rate.
115. Terveen, L.G and Hill, W.C. Finding and Visualizing Inter-site Clan Graphs, *Proceedings of CHI 1998*, 448-455. 23% acceptance rate.
116. Terveen, L.G and Hill, W.C. Involving Users in Continuous Design of Web Content, in *Proceedings of DIS 1997*, ACM Press, 137-145. 41% acceptance rate
117. Terveen, L.G., Hill, W.C., Amento, B., McDonald, D., and Creter, J. Building Task-Specific Interfaces to High Volume Conversational Data, *Proceedings of CHI 1997*, 226-233. 23% acceptance rate.
118. Hill, W.C. and Terveen, L.G Using Frequency-of-Mention in Public Conversations for Social Filtering, *Proceedings of CSCW 1996*, 106-112.
119. Terveen, L.G. and Murray, L. Helping Users Program Their Personal Agents, *Proceedings of CHI 1996*, 355-361. 23% acceptance rate.
120. Terveen, L.G. and Tuomenoksa, M.L. DynaDesigner: A Tool for Rapid Creation of Device-Independent, *Proceedings of INTERACT 1995*, 386-389.
121. Terveen, L.G. and Selfridge, P.G. Intelligent Assistance for Software Construction: A Case Study, *Proceedings of Knowledge-Based Software Engineering 1994*, 14-21.
122. Terveen, L.G., Selfridge, P.G., and Long, M.D. From 'Folklore' to 'Living Design Memory', in *Proceedings of INTERCHI 1993*, 15-22. 19% Acceptance Rate.

123. Terveen, L.G. Interface Support for Data Archaeology, *ISMM International Conference on Information and Knowledge Management (CIKM'93)*. (acceptance rate for 1992 unknown; average is 24%).
124. Brachman, R. J., Selfridge, P.G., Terveen, L.G., Altman, B., Borgida, A., Helper, F., Kirk, T., Lazar, A., McGuinness, D.L., and Resnick, L. A., Knowledge Representation Support for Data Archaeology, *ISMM International Conference on Information and Knowledge Management (CIKM'92)*. (acceptance rate for 1992 unknown; average is 24%).
125. Selfridge, P.G., Terveen, L.G., and Long, M.D. Managing Design Knowledge to Provide Assistance to Large-Scale Software Development, *Proceedings of Knowledge-Based Software Engineering 1992*, 154-162.
126. Terveen, L.G. and Wroblewski, D.A. A Tool for Achieving Consensus in Knowledge Editing, *Proceedings of AAAI 1991*, 74-79. 24% acceptance rate.
127. Terveen, L.G., Wroblewski, D.A., and Tighe, S.N. Intelligent Assistance Through Collaborative Manipulation, *Proceedings of IJCAI 1991*, 9-14. (acceptance rate for 1991 unknown; typically in low 20s).
128. Terveen, L.G. and Wroblewski, D.A. A Collaborative Interface for Browsing and Editing Large Knowledge Bases, *Proceedings of AAAI 1990*, 491-496. 18% acceptance rate.

Book Chapters

129. Terveen, L., Riedl, J., Konstan, J., and Lampe, C. (2014) "Study, Build, Repeat: Using Online Communities as a Research Platform", in *Human Computer Interaction Ways of Knowing*, edited by Judith S. Olson and Wendy Kellogg, New York: Springer.
130. Amento, B., Harrison, C., Nathan, M., and Terveen, L. (2009), Asynchronous Communication – Fostering Social Interaction with CollaboraTV, in Cesar, P., Geerts, D., and Chorianopoulos, K. (ed.), *Social Interactive Television: Immersive Shared Experiences and Perspectives* (2009), Information Science Reference.
131. Amento, B., Terveen, L.G and Hill, W. From PHOAKS to TopicShop: Experiments in Social Data Mining, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), Springer.
132. Whittaker, S., Terveen, L.G, Hill, W.C., and Cherny, L. The Dynamics of Mass Interaction, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), (this chapter is a reprint of Whittaker et al 1998), Springer.
133. Terveen, L.G and Hill, W. Beyond Recommender Systems: Helping People Help Each Other, in Carroll, J. (ed.), *HCI in the New Millennium* (2001), Addison Wesley.
134. Terveen, L.G. Computer-Mediated Collaboration, in *More than Screen Deep: Toward Every-Citizen Interfaces to the Nation's Information Infrastructure* (1997), National Academy Press.

Other Publications

135. Konstan, J.A., and Terveen, L.G. Human-centered recommender systems: Origins, advances, challenges, and opportunities. *AI Magazine*, 2021.
136. Terveen, L. "Autonomous" agents? What should we worry about? What should we do? *Human-Computer Interaction*.
137. Kaur, A., Smith, C. E., and Terveen, L. Sway Together, Stay Together: Visualizing Spiritual Support Networks Through the SoulGarden Prototype. In *Extended Abstracts of CSCW 2021*.

138. Kaur, H., Johnson, I., Miller, H., Terveen, L., Lampe, C., Hecht, b., and Lasecki, W. Oh The Places You'll Share: An Affordances-Based Model of Social Media Posting Behaviors. In *Extended Abstracts of CHI 2017* (ACM Conference on Human Factors in Computing Systems). 40% acceptance rate.
139. Masli, M. and Terveen, L. Geographical Social Production: Lessons from Cyclopath, in CHI 2013 GeoHCI Workshop.
140. Masli, M., Bouman, L., Owen, A., and Terveen, L. Geowiki + route analysis = improved transportation planning, CSCW 2013 Interactive Poster.
141. Brady, S. S., Sieving, R. E., Terveen, L. G., Rosser, B. R. S., Kodet, A. J., & Rothberg, V. D. (2012, October). *TeensTalkHealth: An interactive website to promote healthy relationships and prevent STIs*. Paper presented at the annual meeting of the American Public Health Association, San Francisco, CA.
142. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "The role of community orientation in promoting online participation" (with J. S. Kim, P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, C. A. Mannino, R Davies, & M. Snyder)
143. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Applying a functional approach to participation in online groups" (with P. T. Fuglestad, P. C. Dwyer, J. Filson Moses, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
144. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Past volunteerism predicts amount of content contributed in an online community" (with P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
145. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Social motives and personality as predictors of online participation" (with J. Filson Moses, P. C. Dwyer, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
146. Kapoor, N., Frankowski, D., Konstan, J., and Terveen, L. Lessons Learned in Implementing the CHIplace Online Community, in *Proceedings of Human-Computer Interaction International 2005*.
147. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Exploring How People Describe Places, Short Paper in *Proceedings of Pervasive 2005*.
148. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Discovering Personally Meaningful Places from Location Data, Short Paper in *Proceedings of CHI 2005*.
149. Kapoor, N., Konstan, J., and Terveen, L. How Peer Photos Influence Member Participation in Online Communities, Short Paper in *Proceedings of CHI 2005*.
150. Amento, B., Hill, W., and Terveen, L. The Sound of One Hand: A Wrist-mounted Bio-acoustic Fingertip Gesture Interface, Short Paper in *Proceedings of CHI 2002*, 724-725. 33% acceptance rate.
151. Terveen, L., Hill, W., and Amento, B. Collaborative Filtering to Locate, Comprehend, and Organize Collections of Websites, in SIGART Bulletin, 9, 3&4 (1998), 10-17.
152. Terveen, L., Hill, W., Amento, B., McDonald, D., and Creter, J. 1997. PHOAKS: a system for sharing recommendations. *Commun. ACM* 40, 3 (Mar. 1997), 59-62.
153. Terveen, L.G., Stolze, M., and Hill, W. From 'Model World' to 'Magic World', in *SIGCHI Bulletin*, 27, 4 (1995), 31-34.
154. Terveen, L.G., Papavero, E., and Tuomenoksa, M. DynaDesigner: A Tool for Rapid Design and Deployment of Device-Independent Interactive Services, Refereed Formal Demonstration in *Adjunct Proceedings of CHI'95*, 29-30.

155. Terveen, L.G. Person-Computer Cooperation through Collaborative Manipulation. Ph.D. Thesis, University of Texas Department of Computer Sciences, 1991.

Invited Presentations

Carnegie Mellon University

Northwestern University

The University of California Irvine

Carleton College

Twin Cities MetroGIS Policy Board

Hennepin County Bicycle Advisory Committee

University of Minnesota Digital Humanities Collaborative

University of Minnesota Advanced Transportation Technologies Seminar Series

Georgia Tech

University of Minnesota Urban Ecosystems Symposium

University of Minnesota New Media

IBM T.J. Watson Research

University of Illinois

University of Maryland

University of Washington

Carnegie-Mellon University

Swedish Institute of Computer Science / Royal Institute of Technology

Uppsala University, Sweden

New Jersey Institute of Technology

Microsoft Research

Vassar University

Rensselaer Polytechnic Institute

University of Colorado

Virginia Tech

University of Nebraska

Conference Presentations

- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2014.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2012.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2002.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 1998.
- ACM Conference on Human Factors in Computing Systems (CHI), 1998.
- ACM Conference on Design of Interactive Systems, 1997.

- ACM Conference on Human Factors in Computing Systems (CHI), 1997.
- ACM Conference on Human Factors in Computing Systems (CHI), 1996.
- IFIP TC13 International Conference on Human-Computer Interaction (INTERACT), 1995.
- IEEE Conference on Knowledge-Based Software Engineering, 1994.
- ACM Conference on Human Factors in Computing Systems (CHI), 1993.
- Conference on Information and Knowledge Management, 1993.
- Conference on Information and Knowledge Management, 1992.
- National Conference on Artificial Intelligence (AAAI), 1991.
- International Joint Conference on Artificial Intelligence (IJCAI), 1991.
- National Conference on Artificial Intelligence (AAAI), 1990.

Workshop Presentations

- CHI 2013 GeoHCI Workshop
 - “Geographical Social Production: Lessons from Cyclopath”
- CSCW 2002 Workshop on “The Role of Place in Shaping Virtual Communities”:
 - “Place-Based Community Information Systems”.
- CHI 99 Workshop on “Interacting with Recommender Systems”:
 - “Visualization Interfaces for Recommender Systems”.
- 1999 Human-Computer Interaction Consortium Workshop:
 - “A Reference Task Agenda for Human-Computer Interaction”.
- 1998 AAI Workshop on “Recommender Systems”:
 - “The PHOAKS Recommender System”.
- 1997 Human-Computer Interaction Consortium Workshop:
 - “The PHOAKS Recommender System”.
- 1995 Lifelike Computer Characters Workshop:
 - “Hidden Hands, not Talking Heads: The Magic World Interaction Paradigm”.
- 1995 Lifelike Computer Characters Workshop:
 - “Moving Agent-User Voice Dialogue towards Natural Conversation”.
- CHI 95 Workshop on “‘Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”:
 - “The ‘Magic World’ Approach to Human-Computer Collaboration”.
- 1993 AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”:
 - “A Framework for Human-Computer Collaboration”
- 1993 AI-ED Workshop on “Collaborative Problem Solving: Theoretical Frameworks and Innovative Systems”:

- “Collaborative Problem Solving in Interactive Systems”.
- 1992 CAIA Workshop on “Applying AI To Software Problems: Assessing Promises and Pitfalls”:
 - “Representing and Disseminating Software Design Knowledge”.
- 1992 AAAI Spring Symposium on “Cognitive Aspects of Knowledge Acquisition”:
 - “In The Footprints of The Masters: Embedding Knowledge Acquisition in Organizational Activity”.
- AAAI 90 Workshop on “Complex Systems, Ethnomethodology, and Interaction Analysis”:
 - “Resources for Person-Computer Collaboration”.
- 1990 AAAI Spring Symposium on “Knowledge-Based Human-Computer Communication”:
 - “Tools for Human-Computer Collaboration”.

Patents

U.S. Patent # 5,388,188. Apparatus and methods for providing design advice. (with P. Selfridge). Issued February 7, 1995.

U.S. Patent #5,659,724. Interactive data analysis apparatus employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued August 19, 1997.

U.S. Patent #5,680,530. Graphical environment for interactively specifying a target system (with P. Selfridge). Issued October 21, 1997.

U.S. Patent #5,806,060. Interactive data analysis employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued September 8, 1998.

U.S. Patent # 5,809,492. Apparatus and method for defining rules for personal agents. (with L. Murray). Issued September 15, 1998.

U.S. Patent # 5,953,393. Personal Telephone Agent. (With P. Culbreth, P. Danielsen, R.J. Hall, E. Papavero, and M. Tuomenoksa). Issued September 14, 1999.

U.S. Patent #6,029,192. System and method for locating resources on a network using resource evaluations derived from electronic messages. (with W.C. Hill). Issued February 22, 2000.

U.S. Patent #6,244,873. Wireless myoelectric control apparatus and methods. (with W.C. Hill, F.C. Pereira, and Y. Singer). Issued June 12, 2001.

U.S. Patent #6,256,648. System and method for selecting and displaying hyperlinked information resources. (with W.C. Hill). Issued July 3, 2001.

U.S. Patent #9,430,043. Bioacoustic Control System, Method, and Apparatus. (with B. Amento and W.C. Hill). Issued August 30, 2016.

CONSULTING

This is my consulting record for the years 2019-2023. I have received compensation for the patent litigation cases listed below in these years. I provide details for the cases where my role unless the client requested I do not do so; in the latter case I provide general descriptions.

- (2023) Retained on behalf a consumer and information technology company. General technology area: graphical and touch-based user interfaces. Writing declaration in support of inter partes review petitions.
- (2023) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology areas: graphical user interfaces for web information access. Writing declaration in support of inter partes review petitions.
- (2022) Retained on behalf of a computer software company. General technology areas: map-based user interfaces, mobile computing, messaging. Writing declarations in inter partes review proceedings involving patents owned by the company.
- (2022) Retained as expert witness on behalf of a computer software and hardware company. General technology area: group collaboration systems. Writing declaration in support of inter partes review petitions.
- (2022) Retained as expert witness on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2021) Retained to write declaration in support of inter partes review petitions. General technology area: information discovery.
- (2021) Retained on behalf of a computer software and hardware company. General technology area: graphical user interfaces. Writing declaration in support of inter partes review petitions.

- **Deposed: September 2022**

- (2021) Retained on behalf of a computer software and hardware company. General technology areas: web information access, voice interaction, home automation. Writing declaration in support of inter partes review petitions.
- (2021) Retained on behalf of a computer software company. General technology area: multimedia messaging. Analyzing potential infringement of company's patents.
- (2021) Retained on behalf of a computer software company. General technology areas: map-based user interfaces, mobile computing, messaging. Writing declarations in support of patent holder's position in *ex parte* reexaminations.

- (2020) Retained on behalf of a computer software and hardware company. General technology area: information processing, hypertext, inference. Writing expert reports.
- (2020) Retained on behalf of a computer software and hardware company. General technology area: graphical user interfaces. Analyzed potential invalidity of patents.
- (2020) Retained by on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2020) Retained by Erise IP on behalf of Apple
 - Worked on *Inter Partes* review declaration
 - **Deposed: December 2020**
- (2019) Retained on behalf of Comcast. General technology area: interactive program guide systems. Writing expert reports.
 - **Deposed July 2021**
 - **Testified July 2022**
 - **Testified at jury trial April 2022:** Judge William Jung of the U.S. District Court for the Middle District of Florida granted judgment as a matter of law of no infringement for Comcast.
- (2019) Retained on behalf of a computer and internet software company. General technology area: information search. Did not write expert reports.

SERVICE

University of Minnesota Committees

- College of Science & Engineering Consultative Committee: 2015-2018
- College of Science & Engineering Honors & Awards Committee, 2017-2020

External Professional Activities

ACM Special Interest Group on Computer Human Interaction

- President: 2015-2018
- Executive Committee: Adjunct Chair for Awards, 2012 – 2015.
- Executive Committee: Vice President for Membership and Communication, 2009 – 2012.

Conference Chair

- CHI 2002: ACM Conference on Human Factors in Computing Systems
- IUI 1998: ACM Conference on Intelligent User Interfaces.

Program Committee Chair

- CSCW 2004: ACM Conference on Computer-Supported Cooperative Work.
- CSCW 2013: ACM Conference on Computer-Supported Cooperative Work.

Computer Supported Cooperative Work (CSCW) Steering Committee

- Chair, 2012-2014 (First elected Chair of the committee that oversees the CSCW Conference and the general CSCW and Social Computing research community.)

Awards Committee Chair

- CSCW 2008: ACM Conference on Computer-Supported Cooperative Work.

Journals Edited

- Special Issue of *Knowledge-Based Systems* on Human-Computer Collaboration, Vol. 8, No. 2-3, 1995.

Proceedings Edited

- Proceedings of the 2002 ACM Conference on Human Factors in Computing Systems (CHI 2002).
- Proceedings of the 1998 ACM Conference on Intelligent User Interfaces (IUI 1998).

Editorial Boards

- Communications of the ACM, 2009-present.
- ACM Transactions on CHI, 2000-2006.
- Knowledge-Based Systems, 1993-2009.
- ACM *intelligence*, 1998-2001.

Program Committees

- ACM Conference on Human Factors in Computing Systems (CHI): 1999-2004, 2006, 2016.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 2000, 2006, 2008, 2010, 2011, 2012, 2015.
- ACM Conference on Intelligent User Interfaces (IUI): 1997-2000, 2004.
- ACM Recommender Systems Conference: 2007, 2008, 2009, 2010, 2013.
- ACM GROUP Conference: 2007, 2009, 2010.
- ACM SIGIR Conference: 2008.
- AAAI Conference on the Web and Social Media: 2011, 2012, 2016.
- User Modeling, Adaptation, and Personalization: 2011, 2016.
- NordiCHI 2008, 2010.
- Communities and Technology: 2009.

- Computer-Supported Cooperative Learning 2002.
- User Modeling: 2001.
- International Conference on Knowledge Capture 2001.
- Knowledge-Based Software Engineering (KBSE): 1994-1999.
- Intelligent Data Analysis: 1997.
- National Conference on Artificial Intelligence (AAAI): 1996-1997.
- IEEE Conference on Artificial Intelligence for Applications (CAIA): 1994.
- International Workshop on Privacy-Aware Location-based Mobile Services: 2007.
- SIGIR Workshop on Future Challenges in Expertise Retrieval: 2008.

Other conference leadership positions

- ACM Conference on Computer-Supported Cooperative Work Doctoral Consortium Co-Chair, 2016 and 2011.
- The 2nd AAAI Conference on Human Computation and Crowdsourcing (HCOMP 2014) Doctoral Consortium Co-Chair.
- International Symposium on Wikis and Open Collaboration Doctoral Symposium Chair, 2011.
- ACM Conference on Recommender Systems Doctoral Consortium, Co-Chair, 2007.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1996.

Reviewer

Journals

- ACM Computing Surveys.
- IEEE Transactions on Data and Knowledge Engineering.
- IEEE Expert.
- Information Systems.
- International Journal of Human-Computer Studies.
- Journal of Computer-Supported Cooperative Work.

Conferences

- Ninth IFIP International Conference on Human-Computer Interaction (INTERACT): 2003.
- ACM Conference on Human Factors in Computing Systems (CHI): 1995-1998.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 1998.
- ACM Symposium on User Interface Software and Technology (UIST): 1996.

- ISSM Conference on Information and Knowledge Management: 1993.

National Science Foundations Panels

Served on panels in 1996, 1998, 2001, 2003, 2005, 2010, 2012, 2013.

Workshops Organized

- ACM Wikis and Open Collaboration Doctoral Symposium, 2011.
- Social Computational Systems Community Workshop, 2011.
- ACM Computer Supported Cooperative Work Doctoral Consortium, 2011.
- International Conference on Ubiquitous Computing (UbiComp): “Multi-device Interfaces for Ubiquitous Peripheral Interaction”, 2003.
- ACM Conference on Human Factors in Computer Systems (CHI): “Interacting with Recommender Systems”, 1999.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1996.
- ACM Conference on Human Factors in Computer Systems (CHI): “‘Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”, 1995.
- ACM Conference on Human Factors in Computer Systems (CHI): “New Uses and Abuses of Interaction History”, 1994.
- AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”, 1993.
- World Conference on Artificial Intelligence and Education: “Collaborative Problem Solving: Theoretical Frameworks and Innovative Systems”, 1993.
- Conference on AI for Applications: “Applying AI To Software Problems: Assessing Promises and Pitfalls”, 1992.

Other Professional Service

- Member of SIGCHI Publications Board and Conference Management Committee, 2002-2004.
- ACM Special Interest Group on Artificial Intelligence Conference Chair (1995-1999); originated and co-organized Doctoral Consortia held in conjunction with AAAI and IJCAI.

Internal Service

- Associate Department Head, 2019-
- Chair, Department Head Search Committee, 2015.
- Chair, Strategic Planning Committee, 2013-2014.
- Chair, Social Computing Faculty Search Committee, 2013-2014.
- Curriculum Committee, 2012-2013.

- Chair, Strategic Planning Committee / Faculty Recruiting Committee, 2011-2012.
- Director of Graduate Studies: 2007-2010.
- Communications Committee: 2007
- Newsletter/Brochure Committee (chair): 2006-2007
- Research Opportunities Committee: 2005-2007
- Curriculum Committee: 2003-2005.
- Hosted Robert Kraut, Cray Colloquium speaker: October 2003.
- Participated in recruiting and admission activities.
- Information, Technology, and Everyday Life Initiative: Committee Member.

TEACHING AND ADVISING

Ph.D. Students Advised

- Dan Cosley (co-advised with John Riedl): completed PhD July 2006, currently an Associate Professor at Cornell University; on leave as Program Director at NSF.
- Pamela Ludford: completed PhD September 2007, currently an independent consultant.
- Reid Priedhorksy: completed PhD August 2010, currently employed at Los Alamos National Laboratories.
- Colin Delong: completed PhD October 2013 (co-advised with Jaideep Srivastava)
- Mikhil Masli: completed PhD July 2013, currently employed at IBM.
- Aaron Halfaker (co-advised with John Riedl): completed PhD September 2013, currently employed at Microsoft.
- Katie Panciera: completed PhD August 2014; currently Assistant Professor at Milwaukee School of Engineering.
- Fernando Torre: completed PhD September 2014; founder of a startup.
- Shuo (Steven) Chang: completed PhD August 2016; currently employed at Facebook.
- Tien Nguyen (co-advised with Joe Konstan): completed PhD August 2016; currently employed at Facebook.
- Morten Warncke-Wang (co-advised with Brent Hecht): completed PhD December 2016, currently employed at the Wikimedia Foundation.
- Andrew Sheppard: completed PhD December 2017, currently employed at Houston Engineering.
- Jacob Thebault-Spieker (co-advised with Brent Hecht): completed PhD December 2017; currently Assistant Professor at The University of Wisconsin.
- Hannah Miller (co-advised with Brent Hecht): completed PhD August 2018; currently Assistant Professor at University of Wisconsin Oshkosh.
- Vikas Kumar (co-advised with Joe Konstan), completed PhD August 2018, currently employed at KenSci.

- Andrew Hall: completed PhD August 2019; currently employed at 3M.
- Bowen Yu (co-advised with Haiyi Zhu), completed PhD December 2018, currently employed at Facebook.
- C. Estelle Smith: completed PhD December 2020; currently Assistant Professor at the Colorado School of Mines.
- Zach Levonian (co-advised with Lana Yarosh): completed PhD July 2022.
- Charles Chuankai Zhang (entered program Fall 2019).
- Mohammed (Mo) Houtti (entered program Fall 2019)
- Moyan Zhou (entered program Fall 2021)
- Ava Bartolome (entered program Fall 2022; co-advised with Stevie Chancellor)

M.S. Students Advised

- Tyler Danielsen – received degree in 2016
- Jie Kang – received degree in 2016
- Zahra Eslami – received degree in 2015
- Yanjie Liu – received degree in 2013
- Renji Yu – received degree in 2012
- Carol Drysdale – received degree in 2011
- Jingwen Zhang – received degree in 2011
- Jisu Oh – received degree in 2010
- Sara Drenner – received degree in 2008
- Anna Rouben – received degree in 2006
- Arjun Sundararajan – received degree in 2006
- Pamela Ludford – received degree in 2005
- Rahul Akolkar – graduated May 2004

Undergraduate Honors / Senior Thesis Students Advised

- Moyan Zhou 2021
- Avleen Kaur 2020
- Harmanpreet Kaur, 2016
- Arlo Siemsen, 2014
- Johnathan Frenz, 2013
- David Pitchford - 2012
- Michael Ludwig - 2010
- Jordan Focht – 2010

- Kurt Wilms - 2005
- John Murphy – 2004

Other Committees

- Hanlin Li, PhD: Member of final examination committee (Northwestern University).
- Matheus Araújo, PhD: Member of preliminary and final examination committees
- Hao-Fei Cheng, PhD: Member of preliminary and final examination committees
- Catherine Grevet, PhD: member of preliminary and final examination committees (Georgia Tech).
- Loxley Wang, PhD: member of preliminary and final examination committees.
- Abigail Bakke, PhD: member of preliminary and final examination committees
- Tahir Sousa, MS: member of final examination committee
- Tony Lam, PhD: member of preliminary examination committee.
- Michael Janseen, PhD: member of preliminary examination committee.
- Haleh Hagh Shenass, PhD: member of preliminary & final examination committees.
- Julie Beilfuss, MS: member of final examination committee.
- Liv Knatterud, MS: member of final examination committee.
- Sean McNee, MS: member of final examination committee.
- Shankar Subrahmanian, MS: member of final examination committee.
- Vamsee Venuturumilli, MS: member of final examination committee.
- Eric Gilbert, Ph.D. Preliminary and Final Examination Committees (UIUC, 2009/2010): member of thesis committee.
- Yi (Jenny) Zhang, Ph.D. (New Jersey Institute of Technology, 2004): member of thesis committee.
- Brian Amento, Ph.D. (Virginia Tech, 2001): member of thesis committee.
- David McDonald, Ph.D. (UC Irvine, 2000): member of thesis committee.

Courses taught

A list of all the classes I have taught, in most cases multiple times.

- CSCI 8115: Human-Computer Interaction and UI Technology
- CSCI 5125: Collaborative and Social Computing
- CSCI 5116: GUI Toolkits and Their Implementation
- CSCI 5115: User Interface Design, Implementation, and Evaluation
- HSEM 2519H: Honors Seminar on Crowdsourcing
- CSCI 1902: Structure of Computer Programming II

- CSCI 1901H: Introduction to Computer Science (Honors)

Tutorials

“Intelligent User Interfaces: Issues, Approaches, Evaluation”, offered at 1993 Conference on Artificial Intelligence for Applications.