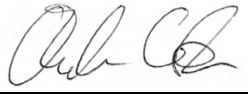
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Susumu Yoshida, et al.	Attorney Docket No.:18768-0217IP6
U.S. Patent No.:	9,818,449	
Issue Date:	November 14, 2017	
Appl. Serial No.:	15/176,435	
Filing Date:	June 8, 2016	
Title:	EDITING METHOD AND RECORDING AND REPRODUCING DEVICE	

DECLARATION OF DR. ANDREW COCKBURN

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

I hereby declare 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 further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code.

Dated: December 27th, 2024 By: 

Andrew Cockburn

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I. QUALIFICATIONS AND BACKGROUND INFORMATION

1. My education and experience are described more fully in the attached curriculum vitae (Appendix A). I am a Professor at the Department of Computer Science and Software Engineering at the University of Canterbury, New Zealand. I also currently head the HCI (Human-Computer Interaction) and Multi-Media research group at the University of Canterbury.

2. In 1988, I was awarded a Bachelor of Science with Honors in Computer Science from the University of York, England.

3. In 1993, I was awarded a Ph.D. from the University of Stirling, Scotland. My thesis was on "Computer Supported Cooperative Work" which relates to forms of group interaction supported on computers.

4. In 1993, I joined the University of Canterbury as a Lecturer in the Department of Computer Science (now the Department of Computer Science and Software Engineering). I was subsequently promoted to a Senior Lecturer, and then an Associate Professor, before my appointment as a Professor in 2010. I currently hold the title of Professor.

5. I have over 30 years of experience in the area of HCI. The field of HCI is generally concerned with ways of understanding and improving the interaction between humans and computers, with a view to understanding, evaluating, designing, and building new styles of interactions that improve on one

or more of the end goals of making computers faster to learn, more intuitive, more efficient to use, and more subjectively satisfying.

6. Throughout my career, I have published the results of many research projects that have involved building new user interfaces or reviewing existing user interfaces for performing a particular task, and evaluating their effectiveness. This includes publications relating to:

(a) investigating user experiences with web navigation interfaces, for example when using the "back" button on web browsers;

(b) reviewing and improving various interface schemes for traversing through documents and lists in desktop and mobile computer applications, including zooming, scrolling, and other techniques;

(c) analyzing new interfaces for text entry on mobile and touch-sensitive devices;

(d) addressing the problems arising from the small form factor of mobile devices with touch-sensitive displays, including wearable technologies;

(e) examining the influence of haptic feedback on user performance with mouse and touchscreen input devices;

(f) evaluating the importance of spatially stable displays in user interfaces; and

(g) designing, analyzing and evaluating gesture-based input techniques for various user activities, including music data entry, web navigation, text entry, and scrolling.

7. I also have extensive experience in designing and building new user interfaces and reviewing existing user interfaces. This includes a number of projects regarding the design, development and evaluation of user interfaces that I have undertaken with companies in the computing and HCI industry, such as:

(a) working with Airbus SAS in 2016 on methods to assist pilots' gesture-based interaction with touchscreens in turbulent environments;

(b) working with Hewlett-Packard Research Labs from 2010-2012 on the design and evaluation of gesture-based pointing techniques for remote displays, such as interactive TVs;

(c) a number of projects from 2006-2010 working with Logitech on the design, development, evaluation and improvement of user interfaces for next generation mice, including in relation to scrolling and window management tasks;

(d) working with IBM Almaden Research in 2006 on the design, development and evaluation of user interfaces for gesture-based text entry on mobile devices;

(e) working with Digit Wireless in 2002 on the evaluation of user performance for user interfaces for digital text entry on mobile devices; and

(f) working with Microsoft Research in 1999 on the development, evaluation and improvement of user interfaces for web browsing, in particular the mechanisms for revisiting pages (such as through the "back" button or bookmarks).

8. At the University of Canterbury, I currently teach a course on HCI for final year undergraduate students and a course on research methods in HCI for postgraduate students.

9. In the past, I have also taught introductory computer programming courses for first year students across disciplines, which included the implementation of graphical user interfaces.

10. I also manage an active research lab with a number of Ph.D. students. I have previously supervised fourteen students to successful completion of their Ph.D.s in the field of HCI.

11. The Association for Computing Machinery (ACM) is the world's largest scientific an educational computing society. In 2015, I was elected to the ACM Special Interest Group on Computer-Human Interaction (CHI) Academy, which honors the principal leaders of the field of HCI.

12. I also annually attend conferences relating to the field of HCI and regularly read journals that cover research in the field of HCI.

13. To keep abreast with industry trends, I regularly read broader journals, magazines and websites related to computer science and technology, including Communications of the ACM, ACM TechNews, BBC Technology, and New York Times Technology.

14. A detailed list of my other professional activities, memberships, and speaking engagements is included in my CV.

15. I have been retained on behalf of LG Electronics, Inc. and LG Electronics USA, Inc. ("Petitioners" or Petitioner or collectively "LG") to offer technical opinions relating to U.S. Patent No. 9,818,449 ("the '449 Patent") and prior art references relating to its subject matter. I have reviewed the '449 Patent, and relevant excerpts of the prosecution history of the '449 Patent. I have also reviewed the following references:

- LG-1001 U.S. Patent No. 9,818,449 ("the '449 Patent")
- LG-1002 Excerpts from the Prosecution History of the '449 Patent ("the Prosecution History")
- LG-1004 U.S. Patent Application Publication No. 2001/0056434 to Kaplan et al. ("Kaplan")
- LG-1005 U.S. Patent Application Publication No. 2004/0201691 to Bryant et al. ("Bryant")

- LG-1006 U.S. Patent Application Publication No. 2006/0107289 to DeYonker et al. ("DeYonker")

- LG-1007 U.S. Patent Application Publication No. 2004/0078383 to Mercer et al. ("Mercer")

- LG-1008 U.S. Reissue Patent No. RE32,632 to Atkinson ("Atkinson")

- LG-1009 U.S. Patent No. 6,493,006 to Gourdol et al. ("Gourdol")

- LG-1010 Brent Ethington, *Introducing Microsoft Windows 95*, Microsoft Press (1995), with authenticating declaration of Carmen Debord

- LG-1011 George W. Furnas and Jeff Zacks, 1994, *Multitrees: Enriching and Reusing Hierarchical Structure*, In Proceedings of the SIGCHI Conference on Human Factors in Computer Systems (CHI 1994), Beth Adelson, Susan Dumais, and Judith Olson (Eds.), ACM, New York, NY, USA, 330-336. DOI http://dx.doi.org/10.1145/191666.191778, with authenticating declaration of Scott Delman

- LG-1012 Benjamin B. Bederson, 2001, *PhotoMesa: A Zoomable Image Browser Using Quantum Treemaps and Bubblemaps*, In Proceedings of the 14th annual ACM symposium on User Interface Software and Technology (UIST 2001), ACM, New York, NY, USA, 71-80. DOI http://dx.doi.org/10.1145/502348.502359

- LG-1013 U.S. Patent No. 6,609,253 to Swix et al. ("Swix")

- LG-1014 U.S. Patent No. 5,442,744 to Piech et al. ("Piech")

- LG-1015 U.S. Patent No. 5,884,056 to Steele ("Steele")

- LG-1016 U.S. Patent No. 6,166,735 to Dom et al. ("Dom")

- LG-1017 U.S. Patent Application Publication No. 2002/0082730 to Capps et al. ("Capps")

- LG-1018 U.S. Patent Application Publication No. 2004/0064476 to Rounds ("Rounds")

- LG-1019 Microsoft Computer Dictionary, 4th Ed., Microsoft Press (1999)

- LG-1020 James Cohoon & Jack Davidson, *C++ Program Design: An Introduction to Programming and Object-Oriented Design*, 3rd Ed., McGraw Hill (2002)

- LG-1021 U.S. Patent Application Publication No. 2004/0177319 to Horn ("Horn")

- LG-1022 U.S. Patent No. 9,384,783 to Susumu Yoshida, et al. ("the '783 Patent")

- LG-1023 U.S. Patent No. 6,903,897 to Wang et al. ("Wang")

- LG-1024 U.S. Patent No. 7,009,803 to Sharma et al. ("Sharma")

- LG-1025 Jeppesen et al., "Hard Disk Controller: the Disk Drive's Brain and Body," 2001, IEEE.

- LG-1035 "Change BMP Icon to Thumbnail View," *available at* https://www.tiplord.com/customizing/bmpicons.html, with Wayback capture

16. I have also reviewed various supporting references and other documentation as further noted in my opinions below.

17. Counsel has informed me that I should consider these materials through the lens of one of ordinary skill in the art related to the '449 Patent at the

time of the earliest possible priority date of the '449 Patent, and I have done so during my review of these materials. The '449 Patent claims the benefit of priority to a number of applications, the earliest of which was filed on December 2, 2004 ("the Critical Date"). Counsel has informed me that the Critical Date represents the earliest possible priority date to which the challenged claims of '449 Patent are entitled, and I have therefore used that Critical Date in my analysis below.

18. I have no financial interest in the parties or in the outcome of this proceeding. I am being compensated for my work as an expert on an hourly basis. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

19. In writing this declaration, I have considered the following: my own knowledge and experience, including my work experience in the field of HCI; my experience in teaching those subjects; and my experience in working with others involved in those fields. In addition, I have analyzed various publications and materials, in addition to other materials I cite in my declaration.

20. My opinions, as explained below, are based on my education, experience, and expertise in the fields relating to the '449 Patent. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in the art as of the Critical Date, or before. Any figures that appear within this document

have been prepared with the assistance of Counsel and reflect my understanding of the '449 Patent and the prior art discussed below.

II. LEGAL PRINCIPLES

A. Anticipation

21. I have been informed that a patent claim is invalid as anticipated under 35 U.S.C. § 102 if each and every element of a claim, as properly construed, is found either explicitly or inherently in a single prior art reference. Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes the claimed limitations, it anticipates.

22. I have been informed that a claim is invalid under 35 U.S.C. § 102(a) if the claimed invention was known or used by others in the U.S., or was patented or published anywhere, before the applicant's invention. I further have been informed that a claim is invalid under 35 U.S.C. § 102(b) if the invention was patented or published anywhere, or was in public use, on sale, or offered for sale in this country, more than one year prior to the filing date of the patent application (critical date). And a claim is invalid, as I have been informed, under 35 U.S.C. § 102(e), if an invention described by that claim was described in a U.S. patent granted on an application for a patent by another that was filed in the U.S. before the date of invention for such a claim.

B. Obviousness

23. I have been informed that a patent claim is invalid as "obvious" under 35 U.S.C. § 103 in light of one or more prior art references if it would have been obvious to a POSITA, taking into account (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, (3) the level of ordinary skill in the art, and (4) any so called "secondary considerations" of non-obviousness, which include: (i) "long felt need" for the claimed invention, (ii) commercial success attributable to the claimed invention, (iii) unexpected results of the claimed invention, and (iv) "copying" of the claimed invention by others. For purposes of my analysis above and because I know of no indication from the patent owner or others to the contrary, I have applied a date of August 5, 2011, as the date of invention in my obviousness analyses, although in many cases the same analysis would hold true even at an earlier time than August 5, 2011.

24. I have been informed that a claim can be obvious in light of a single prior art reference or multiple prior art references. To be obvious in light of a single prior art reference or multiple prior art references, there must be a reason to modify the single prior art reference, or combine two or more references, in order to achieve the claimed invention. This reason may come from a teaching, suggestion, or motivation to combine, or may come from the reference or references themselves, the knowledge or "common sense" of one skilled in the art, or from the nature of the problem to be solved, and may be explicit or implicit

from the prior art as a whole. I have been informed that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. I also understand it is improper to rely on hindsight in making the obviousness determination.

III. OVERVIEW OF CONCLUSIONS FORMED

25. This declaration explains the conclusions that I have formed based on my analysis. To summarize those conclusions, based upon my knowledge and experience and my review of the prior art publications listed above, I believe that:

- Claims 1-16 are obvious over Bryant (Ground 1)
- Claims 1-16 are obvious over Kaplan (Ground 2)
- Claims 1-16 are obvious over Bryant in view of Kaplan (Ground 3)
- Claims 1-16 are obvious over Kaplan in view of Bryant (Ground 4)
- Claims 1-16 are obvious over Horn (Ground 5)

IV. LEVEL OF ORDINARY SKILL IN THE ART

26. In my opinion, a person of ordinary skill in the art ("POSITA") relating to, and at the time of, the purported invention of the '449 Patent would have had at least a bachelor's degree in computer science, electrical engineering, computer engineering, or a related field, and about 1-2 years of practical experience in the relevant industry, including the design and implementation of

user interfaces. Additional graduate education could substitute for professional experience, and *vice versa*.

27. Based on my experiences, I have a good understanding of the capabilities of one of ordinary skill. Indeed, I have taught, participated in organizations, and worked closely with many such persons over the course of my career. Based on my knowledge, skill, and experience, I have an understanding of the capabilities of one of ordinary skill. Furthermore, I possess those capabilities myself.

V. INTERPRETATIONS OF THE '449 PATENT CLAIMS AT ISSUE

A. Claim Construction Standards

28. I have been informed by Counsel and understand that the best indicator of claim meaning is its usage in the context of the patent specification as understood by one of ordinary skill. I further understand that the words of the claims should be given their plain meaning unless that meaning is inconsistent with the patent specification or the patent's history of examination before the Patent Office. Counsel has also informed me, and I understand that, the words of the claims should be interpreted as they would have been interpreted by one of ordinary skill at the time of the invention was made (not today). I have been

informed by Counsel that I should use December 2, 2004 as the point in time for claim interpretation purposes.

B. Construction of terms from the '449 Patent and related patents

29. During prosecution of the '449 Patent and *inter partes* review of a patent related to the '449 Patent, various arguments and statements were made concerning terms that implicate the '449 Patent's claims.

30. First, I note that during prosecution of the '449 Patent, the examiner included an "Examiner's Comment" in the Notice of Allowance that indicated that certain terms ("recording unit," "output unit," and "reproducing unit") invoke 35 U.S.C. § 112, ¶6 and that Applicant did not dispute this assessment. LG-1002, 217. However, I further note that, in an *inter partes* review of U.S. Patent No. 9,384,783 ("the '783 Patent"), which is related to the '449 Patent, IPR2018-01432, the Board did not determine that similar terms "recording unit" and "display device" invoked 35 U.S.C. § 112, ¶6. *Fandango Media, LLC v. Maxell, Ltd.*, IPR2018-01432, Paper 32, 9-15 (PTAB Feb. 10, 2020); LG-1022, 8:58-59.

31. To the extent that the terms "recording unit," "output unit," and/or "reproducing unit" are deemed to invoke § 112, ¶6, I have identified below the specific portions of the '449 Patent's specification that describe structure that correspond to the recited function of each of the elements below. However, my

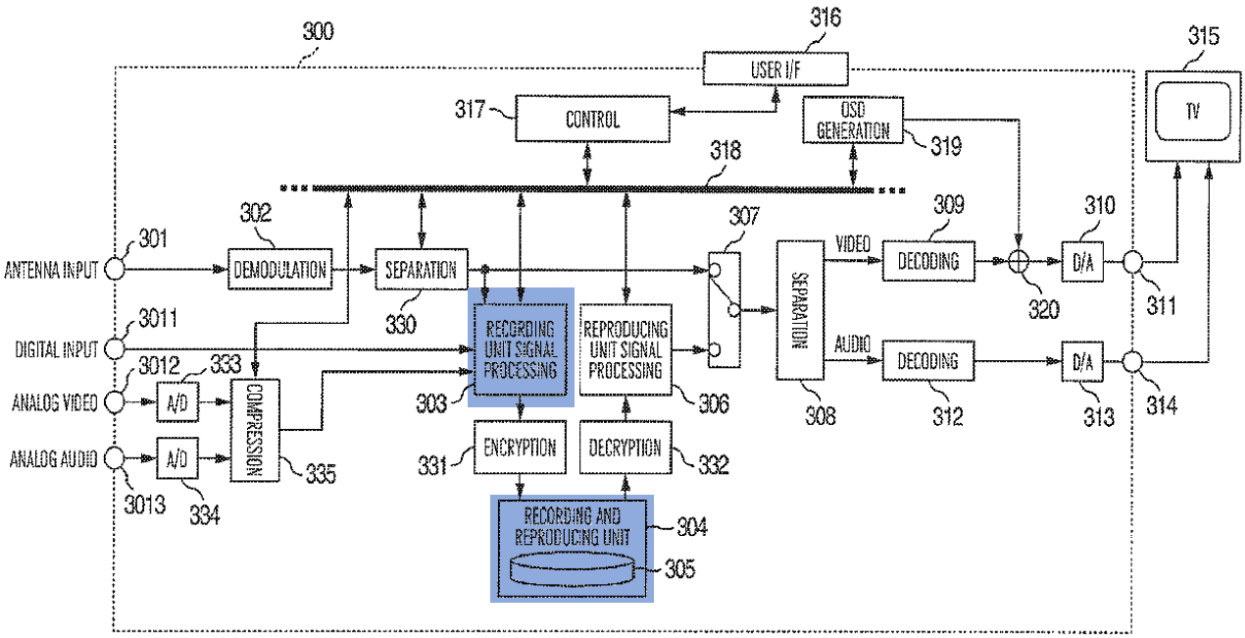
analysis and application of the prior art discussed in my declaration apply regardless of whether § 112, ¶6 is deemed to apply.

32. Second, I note that, during the IPR2018-01432, the Board made several claim construction determinations that affect the terms recited in the '449 Patent's claims. IPR2018-01432, Paper 32, 9-15. I have commented on these terms below.

i. *"recording unit"*

33. The "recording unit" recited in claims 1, 5, 9, and 13 performs the function of "record[ing] a plurality of video information on a recording medium." LG-1001, 8:40-41; *see also id.*, 9:35-36, 10:29-30, 11:24-25. The corresponding structure in the '449 Patent includes "recording unit signal processing circuit" 303 and/or "recording and reproducing unit" 304 and equivalents. LG-1001, 4:38-5:17 ("digital signal … is subjected to necessary signal processing such as timing adjusting data addition and modulation in the recording unit signal processing circuit 303," "recorded on the recording medium 305 by the recording and reproducing unit 304"), FIG. 3.

FIG.3



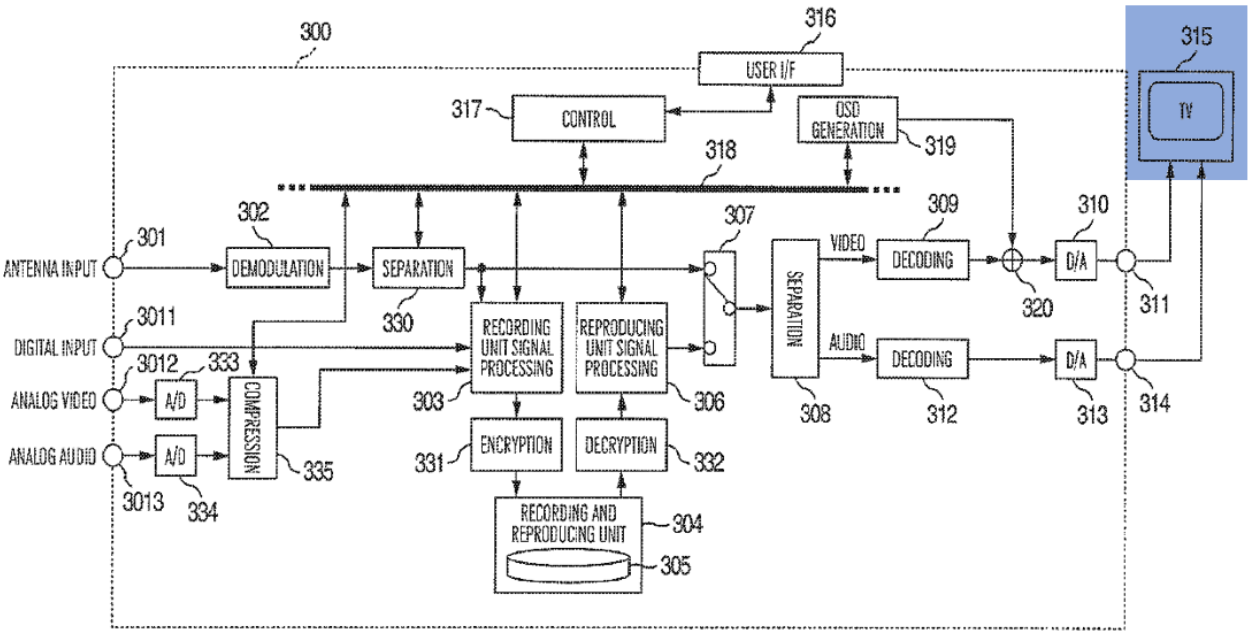
LG-1001, FIG. 3 (annotated)

ii. *"output unit"*

34. The "output unit" recited in claims 1, 2, 3, 9, 10, and 11 performs the function of "output[ting] a menu display for a user," "display[ing] a first group of thumbnails corresponding to the first group of video information," and "display[ing] a second group of thumbnails corresponding to the second group of video information." LG-1001, 8:42-46, 8:53-55, 8:59-61; *see also id.*, 9:40-44, 9:45-57, 10:31-35, 10:38-49, 11:28-12:3. It further performs the function of "display[ing] a [first/second] character corresponding to the [first/second] group of

video information in the first area when the [first/second] group of thumbnails is displayed" and "display[ing] the [first/second/ group of thumbnails in a second area when the [first/second] group of thumbnails is displayed." LG-1001, 9:8-16, 9:19-25; *see also id.*, 10:3-10, 10:13-19, 10:64-11:4, 11:8-15, 12:16-23, 12:27-34. The corresponding structure in the '449 Patent is "TV set 315" and equivalents. LG-1001, 4:61, 5:26-30, 5:41-46, FIG. 3; *see also* LG-1001, FIGS. 4-7, 12 and related text.

FIG.3



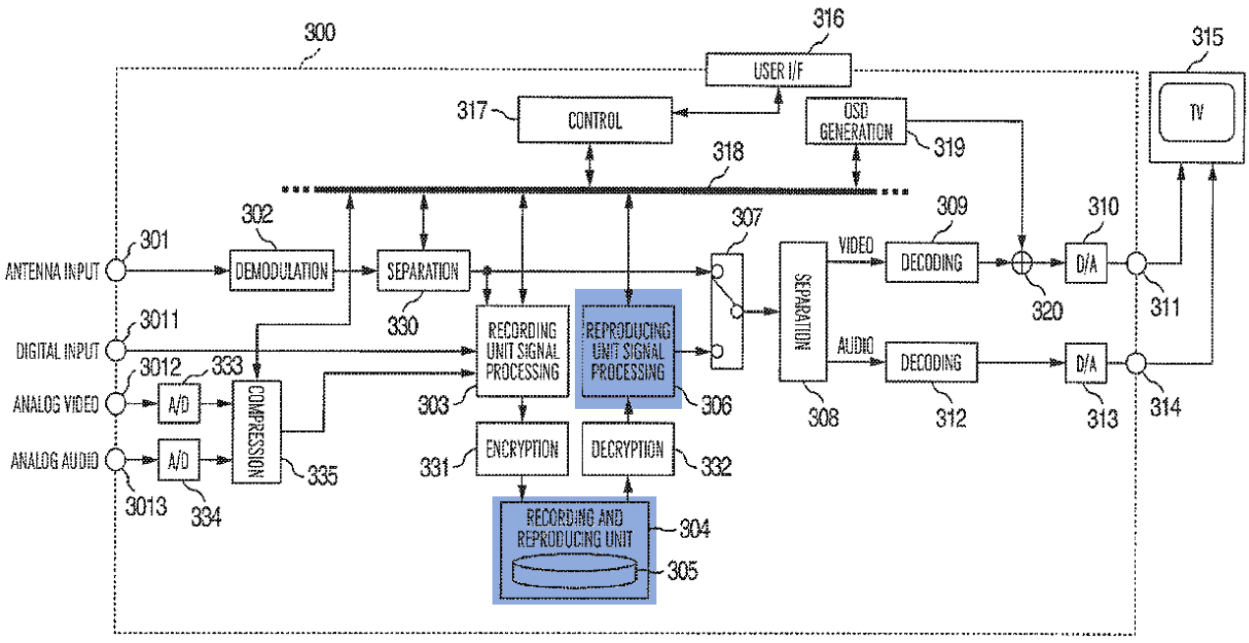
LG-1001, FIG. 3 (annotated)

iii. *"reproducing unit"*

35. The "reproducing unit" recited in claims 1, 5, 9, and 13 performs the function of "reproduc[ing] selected video information read out from the recording

medium." LG-1001, 8:47-48; *see also id.*, 9:38-39, 10:36-37, 11:26-27. The corresponding structure in the '449 Patent includes "reproducing unit signal processing circuit" 306 and/or "recording and reproducing unit" 304 and equivalents. LG-1001, 4:38-63, 5:18-36 ("At the time of reproducing, encrypted digital data read out from the recording medium 305 via the recording and reproducing unit 304 … is decrypted in the decryption circuit 332, [and] subjected to signal processing required for reproduction such as demodulation in a form based on a predetermined modulation scheme in the reproducing unit signal processing circuit"), FIG. 3.

FIG.3



LG-1001, FIG. 3 (annotated)

iv. *"one video information"*

36. In the *inter partes* review of the related '783 Patent, the Board determined that the "one video information" included in the first and second group is the same "one video information," not merely copies thereof as Patent Owner argued in IPR2018-01432. IPR2018-01432, Paper 32, 13-15. This construction should be maintained.[1] The limitation uses the article "one" to refer to "one video information," and subsequent references recite "*the* one video information." The plain usage of these words implies that the same "one video information" is initially included in each group. *Id.*, 11. If different copies of video information existed in the first and second groups, then the "one video information" deleted from the first group could not "continue[] to be included in the second group" because there would be different video information in the second group. *Id.*, 11-12. The specification of the '449 patent supports this construction, which describes two users' groups (i.e., user-defined unified information for "mother" and "father") ultimately referring to the same "one video information" (e.g., the

[11] I note that the specification of the '449 Patent (and the '783 Patent) does not include the term "video information." Rather, the specification only recites "video data," and the Board and parties appear to equate "video information" and "video data."

underlying AV data for program #1). *Id.*, 12-13; LG-1001, 2:53-61, 3:37-50, 6:9-30, FIG. 1.

v. *"one video information … is deleted from the first group of video information"*

37. The Board also already construed the use of "deleted" in the phrase "one video information … is deleted form the first group of video information" in its Final Written Decision for IPR2018-01432. IPR2018-01432, Paper 32, 13-15. There, the Board determined that "delet[ing]" video information from the first group includes reversing a registration (i.e., unregistering) of video information from the first group. *Id.*, 14-15. The Board further determined that "delet[ing]" video information from a group does not necessarily require deleting underlying AV data." *Id.*, 15.

38. I see no reason to deviate from the Board's reasoning here for this similar term in the '449 Patent (in claims 1, 4-5, 8-9, 12-13, and 16), even though the Board reached its conclusion under the broadest reasonable interpretation standard. The deletion "from the first group of video information [data]" implies that the deletion may relate to group membership, rather than to the underlying video data themselves. *Id.,* 14.

VI. TECHNOLOGY BACKGROUND

39. The data management techniques of the ’449 Patent, including its use of menus, thumbnails, and pointers, were well known in the field by 2004. By this time, computers had long had the ability to display digital media (e.g., graphics, audio, and video), and included numerous mechanisms for organizing and navigating such media.

A. Graphical User Interfaces (GUIs) and Displays of Video Information

40. In computing, a user interface is the boundary where interactions between humans and computers occur. An advancement in the way in which humans interact with computers – and particularly with respect to the old command-line interface was – was the Graphical User Interface (“GUI”). GUIs offer visual interfaces on display screens that are often designed for simplicity and ease of learning. A common and well-known example of a GUI uses the “desktop metaphor,” where files and applications of the computer system are represented as graphical icons on a virtual desktop shown on the computer screen, and where the user interacts with those icons using a pointing device such as a mouse cursor. Windows 95 was one example of such a GUI:

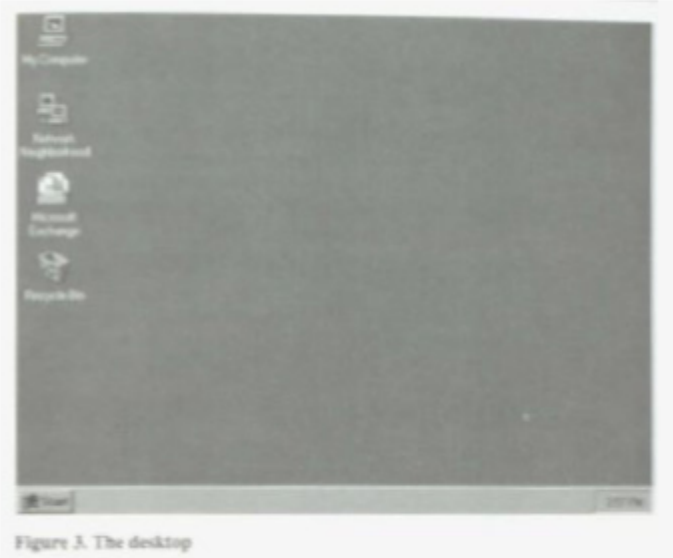


Figure 3. The desktop

LG-1010, 24 (FIG. 3) ("After users start their computers, they are presented with the Windows 95 desktop shown in Figure 3. It's neat and clean and displays only a few graphical objects.") (Introducing Microsoft® Windows 95); *see also id.*, 32 (illustrating an example of a desktop with icons).

41. One goal of many GUIs was to make the user interface more intuitive and easy to learn by implementing concepts that are analogous to the real world – dragging an icon across the computer screen "desktop" and dropping the icon into a "folder," for example, resembles the physical act of placing a document in a folder that a user is already familiar with. GUIs displayed many kinds of information, including image thumbnails including the type or content of a file. *See, e.g.*, LG-1010, 29.

42. GUIs include numerous mechanisms that allow users to interact with and control the computer system. One of the most common of those mechanisms are "menus" that present options that can be selected by a user. Such menus date back over thirty-years: "[a]ppropriate programming of the computer is provided such that a 'menu' bar 100 comprising a variety of command options indicated by titles (for example, T1, T2, T3 … Tn), is displayed across the CRT screen or the like as shown in FIG. 14":

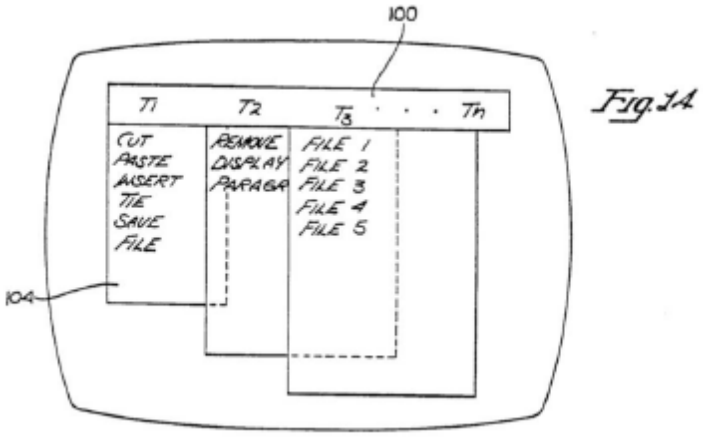


Fig. 14

LG-1008, 6:9-13, FIG. 14 (U.S. Patent No. RE32,632 to Atkinson).

43. Menus have taken many different forms, including pull-down menus, pop-up menus, menus with multiple areas, etc. *See, e.g.*, LG-1009, 2:4-7 (U.S. Patent No. 6,493,006 to Gourdol et al.) (describing menus to "provide a simple, straightforward method for the user to view and choose commands that relate to an application running on the computer."). An example from Gourdol's '006 Patent illustrates a "context" menu with two areas – a first area with options for "Cut",

"Copy", and "Bold", and a second area with options for "Help …", "Speller", and "Mail to":

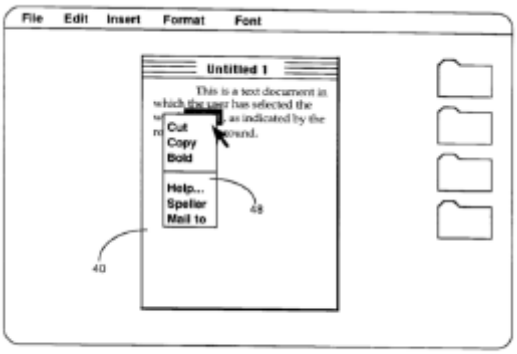


FIG. 5

LG-1009, FIG. 5; *see also* LG-1010, 25, 31-33 (illustrating various menus available in Windows 95).

B. Filing Systems and Aliases/Links

44. By 2004, computers had long included mechanisms for organizing and navigating data, such as multimedia files. By way of example, Windows 95 supported the ability to create "shortcuts" to files. *See, e.g.*, LG-1010, 32-33 ("Shortcuts: For Accessing Objects"). These shortcuts were interface elements that could be seen and manipulated within the "Explorer" file browser and provided references to the original files. Double-clicking on them would open the original file. *See* LG-1010, 32 ("Opening the shortcut opens the object that the shortcut is 'pointing' to."). Deleting them would leave the original file unaffected: "A

shortcut can be deleted without affecting the object to which it points." LG-1010, 33.

45. As an example, the Windows 95 File Explorer could be used to display folders containing images, videos, documents, etc.:

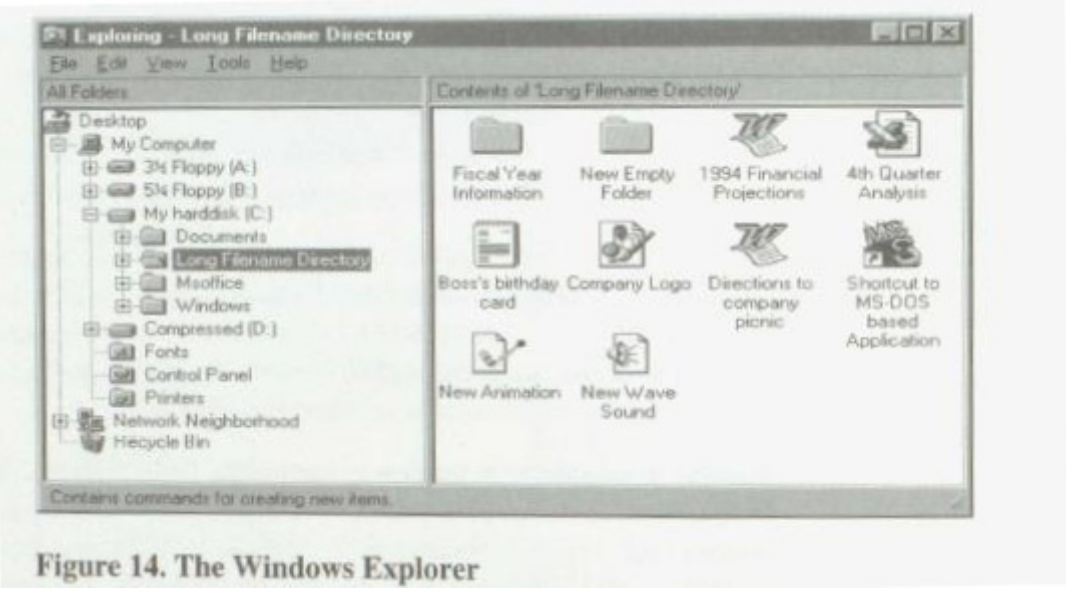


Figure 14. The Windows Explorer

LG-1010, 32. Similarly, the folders could contain shortcuts to the underlying files or applications. *See id*. ("Shortcut to MS-DOS…"). In Windows, the name of a shortcut as well as the icon used for the shortcut could be modified by the user. LG-1010, 33-34. For instance, Windows 95 included the ability to display the

content of a file as an image thumbnail instead of a generic icon within Windows Explorer.[2]

C. Computer Pointers and Data Structures

46. The "shortcut" discussed above is a specific type of "pointer." A "pointer" refers to the idea of storing data in computer memory that indicates the location of other data. *See, e.g.*, LG-1010, 32. The concept of a "pointer" is not unique to Windows 95, and in fact is a foundational concept of computer science. *See, e.g.*, LG-1019, 8 (Microsoft Computer Dictionary); LG-1020, 30 (*C++ Program Design: An Introduction to Programming and Object-Oriented Design*). This is important because it is exceedingly common in computing systems to have data that needs to be used or shown in multiple places – and it is important to avoid duplicating that data. This need to avoid duplicating data is important for multiple reasons – for example, the original data may be large, and so it is important to be efficient. Also, the original data may be changed. If it were duplicated then when the original was changed, the copy would become out of date. It is the nature of

[2] This ability to display image thumbnails within Windows Explorer was off by default, but could be enabled by changing the Default value of the Registry Key "HKEY_CLASSES_ROOT\Paint.Pictures\DefaultIcon" to "%1". LG-1035.

pointers that when a pointer to an original object is deleted, the original object is unaffected.

47. Pointers are particularly important in the construction of computer systems because they enable another foundational concept called "data structures". Data structures are used in computing systems to organize data in a way that enables efficient access and modification of that data. Common data structures include lists and hierarchies of items. *See, e.g.*, LG-1011.

48. One type of data structure is a "multitree" as described in a 1994 paper by Furnas and Zacks. LG-1011, 4 (Title: "Multitrees: enriching and reusing hierarchical structure"). A multitree builds on the standard hierarchy that one would see in a computer file system such as with Windows 95. Section (i) of the figure below shows a standard hierarchy or "tree." The data items at the bottom of the tree could hold any kind of data, including files, images or video thumbnails.

49. Multitrees use pointers to allow an additional tree to be added on top of the existing data items. Section (ii) of the figure below illustrates an example where "Professor A" selects a subset of the data items in the existing tree to include in her or his syllabus. Section (iii) shows how "Professor B" could choose a different subset of the same data items for their (different) syllabus.

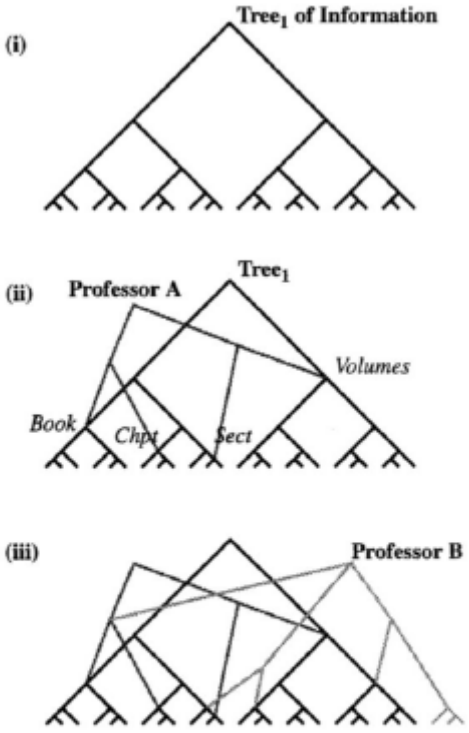
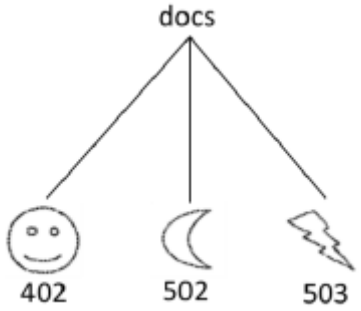
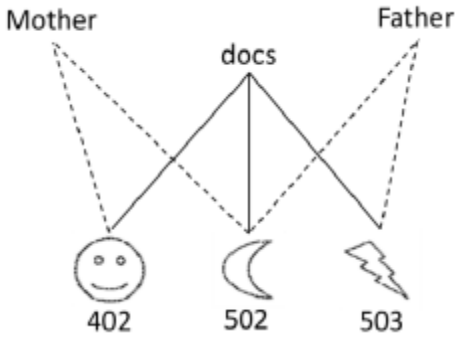


Figure 1 . Constructing a multitree - an example. Beginning with an initial tree of information, Professor A builds her course syllabus. In (a) she chooses a disjoint set of complete subtrees and adds new tree structure above them. Similarly, Professor B makes another, chooses fragments, including some of A's and some completely new ones, and builds a tree above to organize them.

LG-1011, 5 (Figure 1). A "docs" folder could contain the original files ("402", "502", and "503") as illustrated in the figure below.



And then a multitree can be created to represent the "Mother" and "Father" folders (or playlists) as illustrated in this figure:



D. Digital Media and Playlists

50. Computers have long had the ability to display graphics, audio and video, and have had numerous mechanisms for organizing and navigating those media. This included the playback of videos stored on, or streamed by, a computer. *See, e.g.*, LG-1004, FIG. 16, [0002], [0057]; LG-1018, [0002]-[0003]; LG-1017, FIG. 17B; LG-1015, Abstract; LG-1014, 2:27-42 and FIG. 1; LG-1016, FIG. 4; LG-1006, [0017].

51. By the early 2000's, personal computers with basic operating systems had become powerful enough to use for digital media including music, pictures, and movies. *See id*.; *see also* LG-1005, [0037]-[0041] and FIGS. 1 and 2; LG-1015, Abstract; LG-1014, FIG. 1 ("Player 11"); LG-1016, 7:33-67, Dom Claim 1. That is, it was well known that digital media, including videos, could be played back using a computer. *See id*.

52. As an example, a personal computer could be configured to function as a DVR. *See* LG-1006, Abstract, [0002]-[0004], [0015]-[0017], [0020]-[0022]

("The recorded media content 140 includes TV programs that a viewer has recorded to watch at a later time. The DVR and playback application 136 also facilitates playback of the recorded media content 140 on the display 104."), [0037] ("The 'My TV' UI screen 400 has a menu 402 of operational choices for the viewer, including…a listing of recorded TV programs stored on the device 102…. A set of six thumbnail images 404 representing the six most recently recorded TV programs are also depicted on the UI screen 400."), FIG. 1. Moreover, content could be accessed and played back using thumbnails corresponding to the video. *See id*.; LG-1006, [0026] ("With the handset 154, the viewer can select a thumbnail to cause the client device 102 (and namely, the DVR and playback application 136) to playback the recorded TV program associated with the thumbnail.").

53. As another example, software at that time could allow a user to display and navigate through representative images of their personal photos by zooming in and out large layouts of photos as described in a 2001 paper. LG-1012. This software, called PhotoMesa, was unique because of the specific layout algorithm used to display many groups of photos on a single screen and because of the zooming navigation mechanism (*see* Figure 1 below), but the use of small thumbnails images to represent the underlying full image along with metadata to

control display, search, and navigation of photos was already well known at that time.

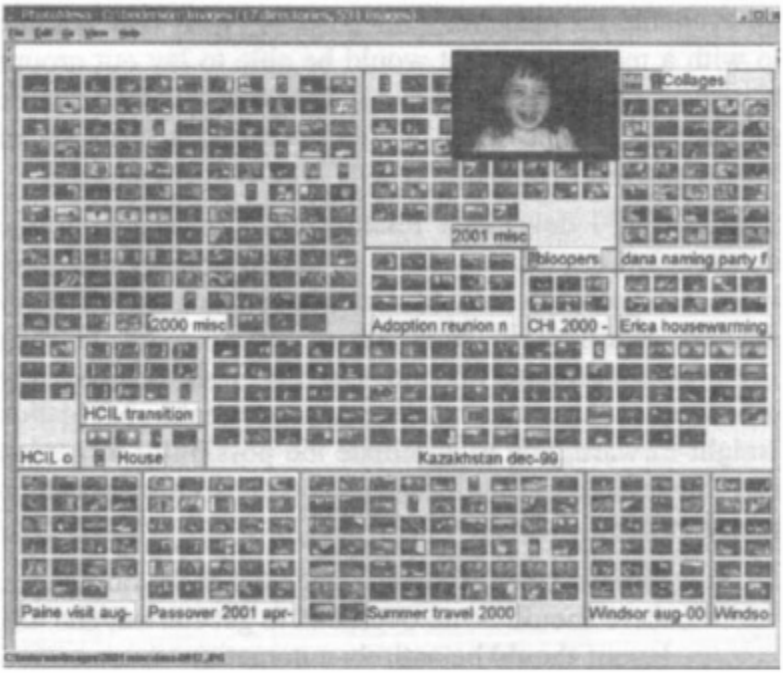


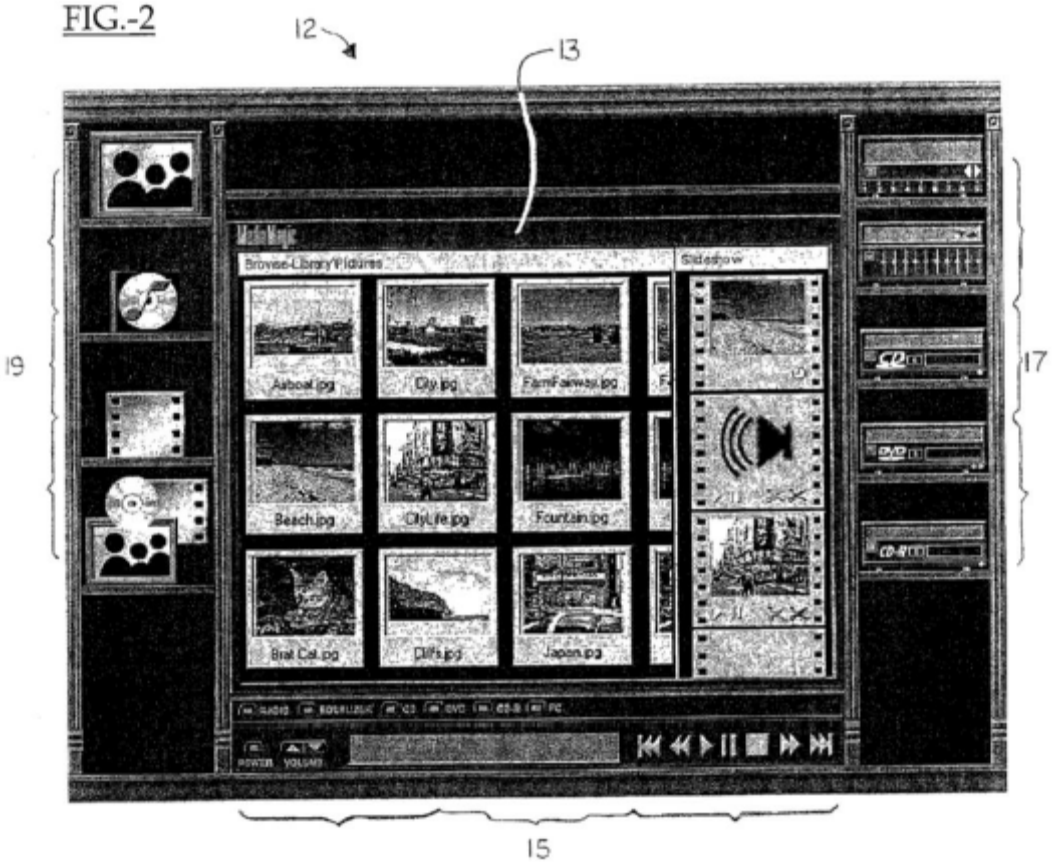
Figure 1: Screen snapshot of PhotoMesa with over 500 images in 17 groups.

LG-1012, 71 (FIG. 1)

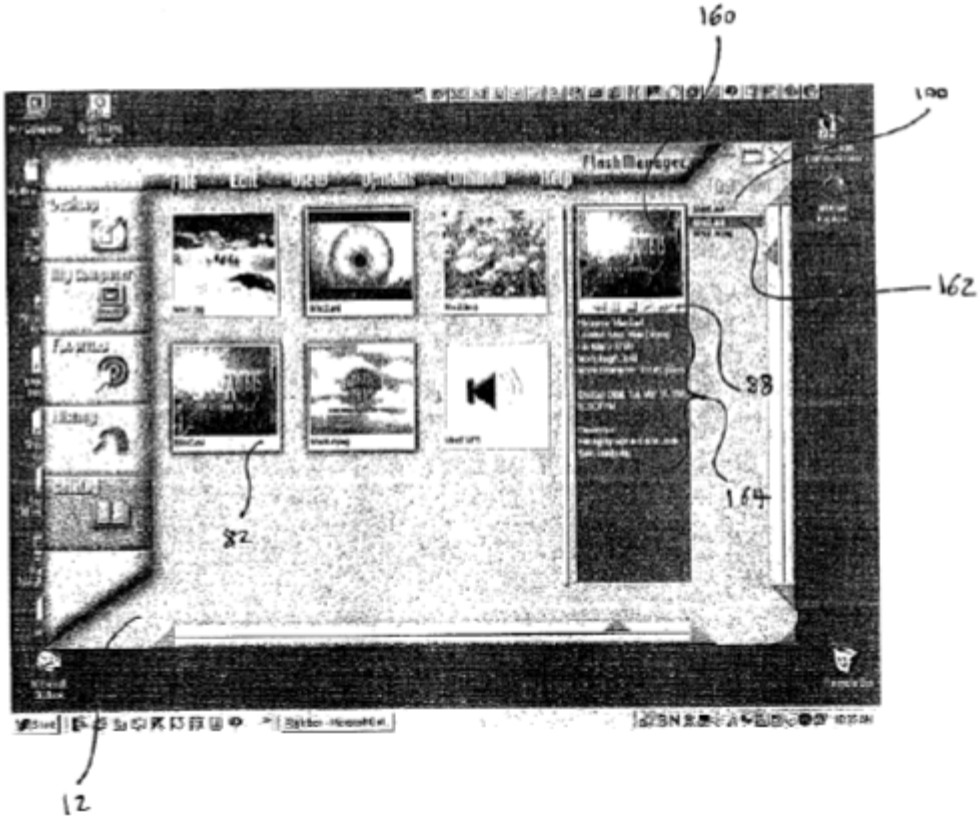
54. For example, Kaplan (US2001/0056434A1) described "a multimedia management system for storing, manipulating, and displaying multimedia content." LG-1004, [0004]; *see also* Section VIII.A.i. Similar to PhotoMesa, Kaplan displayed a grid of thumbnails representing not only photos but also frames from videos. Kaplan also describes the concept of a "Play List" which "records the order that a user selects video and/or audio files and allows them to be played back in sequence." LG-1004, [0006]. These play lists are conceptually equivalent to

the previously described "shortcuts", in that they are representations of underlying data that can be used to access that data – but without manipulating the underlying data. Kaplan goes on to say that "the Play List is created as the user selects one or more thumbnails from the user interface 12. It does not matter where or in what container the user selects a particular thumbnail, it is automatically added to the Play List once selected. The user is able to select multiple video, still images and/or audio files to preview. The Play List records the order in which the user selects the video and/or audio files and allows them to be played back in sequence." LG-1004, [0056]; *see also* LG-1004, FIGS. 2 and 16, [0039], [0057] ("For the convenience of the user, Player Controls 88 are included within the thumbnail 160, thereby allowing the user to preview the video/audio thumbnail selected while reviewing the detailed information. Another feature of user interface 12 is the ability to preview any selected video computer file in full screen mode.").

FIG.-2



LG-1004, FIG. 2



LG-1004, FIG. 16

55. Playlists of media elements were well known. *See, e.g.*, LG-1013 (U.S. Patent No. 6,609,253 to Swix) ("Swix"); *see also* LG-1007 (U.S. Publ. No. 2004/0078383 to Mercer et al.) ("Mercer").

56. Swix describes a "(VCR) control of an interactive media system" (1:10-11) that includes a play list containing portions of the video to be played: "the video server delivers a program to the subscriber containing at least two video portions. The video server orders and assembles the video portions into a playlist. For example, if the subscriber orders a movie, the present invention may precede

the movie with an advertisement, a movie trailer, or a public announcement." LG-1013, 13:49-55.

57. In Mercer, authoring software is provided for managing user created, as well as automatically created, playlists. *See* LG-1007, [0004], [0006]-[0007]. These playlists could also include sub-groupings. *See* LG-1007, [0006]-[0007] ("Unlike playlists on the personal computer, which are simple flat lists of media files, the playlists of the invention include one or more groups that allow the user to use a simple navigation metaphor such as 'Next' and 'Previous' to navigate within the groups to the desired album, artist, genre, etc."), [0032], [0039] (describing playlists). Mercer's playlists were enabled by a "file system structure" that "represent[ed] information about all the media files on a computer-readable medium." *See, e.g.*, LG-1007, FIGS. 15 and 16, *[*0029]-[0030]; *see also id.*, [0128]-[0316] (describing contents). A user interface for managing playlist is provided in FIGS. 11 and 12. *See* LG-1007, [0113] ("FIG. 11, user interface 1102 displays icons indicating menu options 1104, 1106, 1108, and 1110 to select video files, audio files, image files, and presentations, respectively. FIG. 12 is a screen shot of user interface 1102 after the audio files menu option 1106 is selected by the user").

58. In summary, the storage and reproduction of multimedia files, playlists, menus, and pointers/hierarchical data organization, were all well-known

and commonplace features of standard computing systems and software. Similarly, given the ubiquitous nature of such features, one of skill in the art at the time of filing would have been able to implement such features into a multimedia system with relative ease, and with a good understanding of how such features would perform once included.

VII. OVERVIEW OF THE '449 PATENT

A. Admitted Prior Art

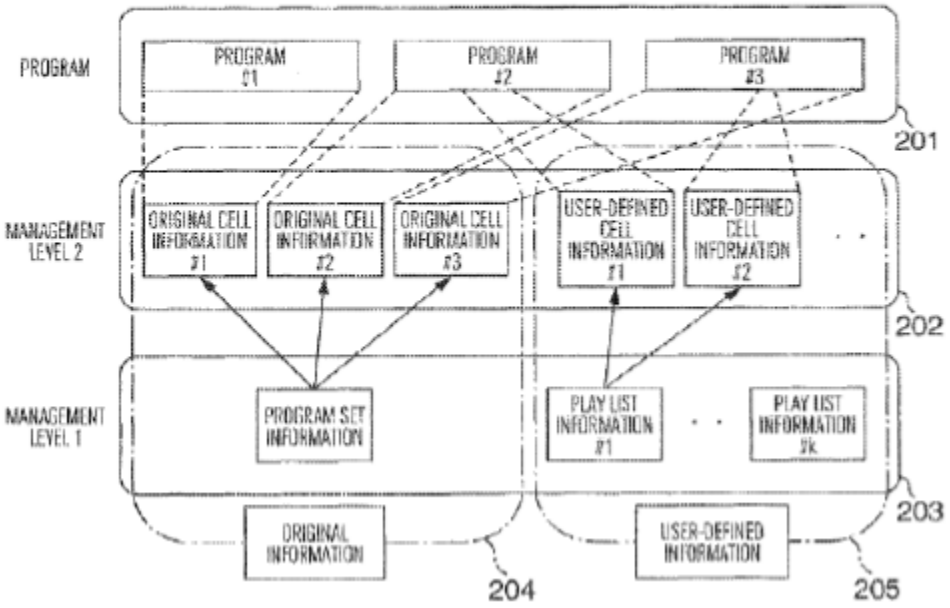
59. The '449 Patent admits that "conventional techniques" for managing "AV data on a recording medium" were known, and describes a known two-level management scheme for such management:

> In the above-described conventional technique, it is mentioned that the play list indicates the reproduction sequence by linking portions of AV data together. As an example, a management state of AV data on a recording medium in the above-described conventional technique is shown in FIG. 2.
>
> Reference numeral 201 designates AV data themselves on the recording medium…. Reference numeral 202 designates a second management hierarchical level (management level 2) in management information. Original cell information #1 to original cell information #3 indicate the whole reproduction range of program units, i.e., a program #1 to a program #3, respectively. Each of user-defined cell information #1 to user-defined information #2 indicates a reproduction range of the whole or a part of a program arbitrarily specified by the user. The number of the user-defined cell information #1 to user-defined information #2 is increased or decreased by the user's editing manipulation. Reference numeral 203 designates a first management hierarchical level (management level 1). Program information contains all of the original cell information #1 to original

> cell information #3. By conducting reproduction on the basis of the program set information, the user can reproduce all AV data recorded on the recording medium. Play list information #1 to play list information #k indicate a reproduction sequence of the user-defined cell information arbitrarily specified by the user. It is possible to have a plurality of reproduction sequences….

LG-1001, 1:49-2:12; *see also id.*, 3:6-7 ("FIG. 2 shows a management state of AV data in a conventional technique example."), 1:24-47 (describing existing "recording and reproducing devices" with "management information for managing digital data to be recorded is generated and recorded together onto the same recording medium"), FIG. 2.

FIG.2
PRIOR ART



LG-1001, FIG. 2

60. From this disclosure, a POSITA would have understood that the patent admits that at least: (1) hierarchal management levels for AV data; (2) reproduction of AV data stored on a recording medium; and (3) user-defined playlists, were known. This is consistent with my understanding of the state or the art in the technology area. *See* Section VI ("Technology Background").

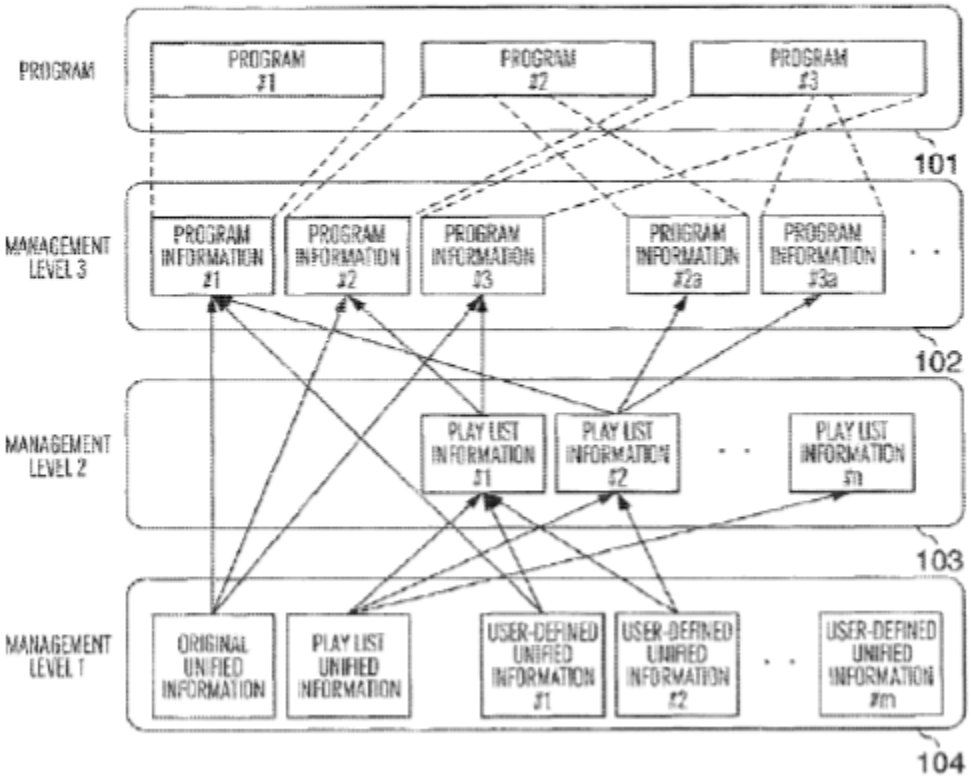
61. I refer to the above descriptions of "conventional technique[s]" and devices as the "Admitted Prior Art."

B. The '449 Patent

62. U.S. Patent No. 9,818,449 to Yoshida et al. is titled "Editing Method and Recording and Reproducing Device," and was filed on June 8, 2016. The '449 Patent states that it a continuation of Appl. Nos. 14/141,417, filed December 26, 2013, 12/567,898, filed September 28, 2009, and 11/203,457, filed August 11, 2005. The '449 Patent also claims priority to a number of Japanese applications, the earliest of which was filed December 2, 2004.

63. The '449 Patent is directed to managing data, such as multimedia digital data files (e.g., audio and videos files) that a user may want to reproduce. *See, e.g.*, LG-1001, Abstract; 1:25-47. For instance, the '449 Patent uses a "management" scheme with hierarchal levels, and provides the following summary of a "management state of AV data on a recording medium," shown in Figure 1.

FIG.1

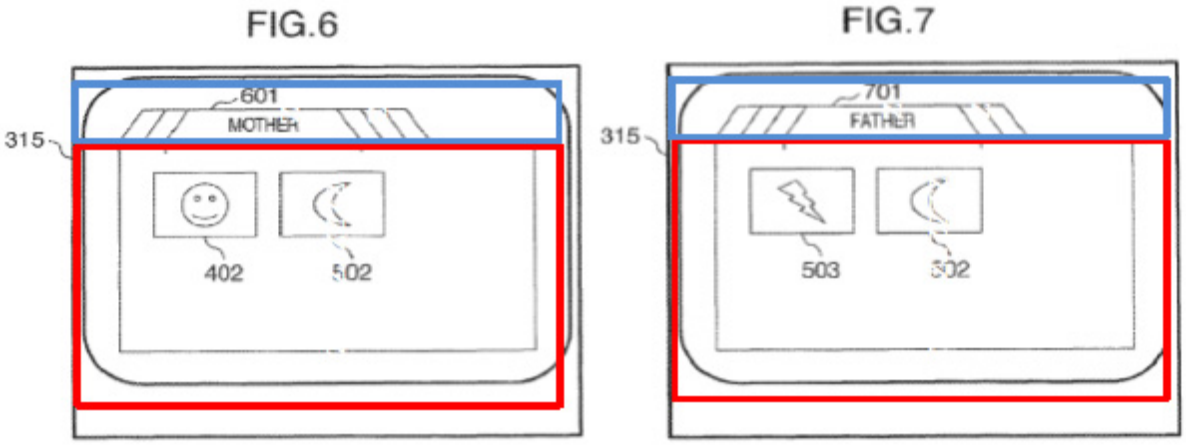


LG-1001, FIG. 1.

64. The ’449 Patent purports to solve problems with “conventional technique[s]” by allowing users to have more control over manipulation and rearranging of their content. *See, e.g.*, LG-1001, 2:16-67. The primary example used in the specification is with respect to “play lists.” *See, e.g.*, LG-1001, Abstract (describing the ability “to provide a recording and reproducing device that allows a user to select and manage arbitrary play lists….”).

65. In particular, the ’449 Patent highlights its data management functions in the context of an example where there is a playlist for a “mother” and a second

playlist for a "father." As shown in FIGS. 6 and 7 of the '449 Patent, two menu areas ("601" Mother and "701" Father) each display a list of thumbnail images (402, 502) and (503, 502) corresponding to "play list information" #1 and #2, respectively. LG-1001, FIGS. 6-7; *see also id.*, 5:64-67.



LG-1001, FIGS. 6-7 (annotated)

As shown above, each menu has a first area (shown in blue) that indicates a first group, classified as "Mother" or "Father." Each menu also has a second area (shown in red), which displays the thumbnails. The thumbnails shown above are pointers to video data (e.g., playlists and/or underlying video clips), and as such, even if one (e.g., 502) is deleted from the first group, it will continue to be included in the second group. *See, e.g.*, LG-1001, FIG. 1.

66. Specifically, the '449 Patent describes that the "'mother' can use the menu display tag for mother 601 as a folder dedicated to herself, and freely register and delete data to be reproduced," and the "'father' can use the menu display tag

for father 701 as a folder dedicated to himself, and freely register and delete data to be reproduced." *Id*., 6:15-30. That is, if the father and mother each have the same video on their respective lists (*e.g.* 502), the father can delete the video from his list without that video being automatically deleted from the mother's list. *Id.*

C. Prosecution History

67. The Office issued no prior art rejections during prosecution of the '449 Patent. *See, generally*, LG-1002. The application that later issued as the '449 Patent was filed with a single claim. LG-1002, 26. In a first Office action, the examiner rejected the single claim as indefinite and based on statutory double patenting. *Id.*, 176-180. In response, Applicant canceled claim 1 and added new claims 2-17. *Id.*, 191-204. The Office subsequently allowed all claims. *Id.*, 211-218. However, the examiner did not raise any prior art rejections before allowing the claims. *See, generally*, *id.*

68. Notably, in the Notice of Allowance, the examiner included an "Examiner's Comment," stating the following:

> the claimed 'recording unit', 'output unit', 'reproducing unit' are limitations that invoke 35 U.S.C. 112, sixth paragraph, and the corresponding structure are found in figure 3: "recording unit signal processing 303', 'reproducing unit signal processing 306' and TV 315, also see figures 4-7.

Id., 217. Applicant did not dispute this characterization of those terms during prosecution. *See, generally*, *id.*

VIII. PRIOR ART ANALYSIS

A. The Prior Art

i. *Bryant*[3]

69. U.S. Publ. No. 2004/0201691to Bryant et al. ("Bryant") (LG-1005) Published October 14, 2004, and is titled "Method for Producing Electronic Job Pages." Bryant was filed April 11, 2003, and I am informed that it is prior art to the '449 Patent under at least 35 U.S.C. §§ 102(a) and (e).

70. Bryant discloses the capture and use of digital images and video, for instance, with a digital camera and subsequent storage on a computer. *See* LG-1005, [0029], [0036]-[0037]. Bryant describes techniques for "grouping and classifying digital still images and digital motion images captured using a handheld digital camera" by one or more users:

> The grouping can be done manually by the camera user, by pressing a "new group" button on the digital camera before capturing a group of digital images. The classification can be done manually by the camera user, for example, by identifying a "favorite" image within each group of captured images, using a control button on the digital camera as the user reviews the group of captured digital images on the camera's image display. A user identifier can also be stored along with the

[3] General descriptions provided for this and other references and combinations thereof are incorporated into each subsection and mapping of the claims that includes citations to these references.

> classification data, in order to identify the particular camera user for whom the classification was made.

LG-1005, [0029]. For example, the digital images and video can be "organized into categories according to the people, places, subjects or events depicted." [0004].

71. Bryant describes that such "classification provides 'affective information,'" which "usually describes or represents a person's subjective reaction to a given image." LG-1005, [0030]. "One very important type of affective information is the level of importance a user associates with an image, such as whether the image is a 'favorite.'" *Id*. This affective information, such as flags, can be stored in the Bryant system "using a 'tag' or 'flag', associated with an image, which indicates whether or not the image has been identified as a 'favorite' or 'important' image for the user." LG-1005, [0031]. Favorite images can also "be categorized into a range of levels," such as from "most favorite" to "least favorite." *Id*.

72. Further, Bryant describes that because "[d]ifferent users can have different emotional reactions to the same image," the "affective information relating to images should be associated with a particular user, if the images are to be shared with various users." LG-1005, [0032]. This can be accomplished "by associating a user identifier with the affective information," such as favorite. *Id*.

"When the affective information is stored in association with a user identifier, it is known as 'personal affective information'." LG-1005, [0033]. Thus, Bryant describes that multiple users can each be associated with a set of "affective information" relating to media content, such as a set of each user's favorite videos.

73. Bryant further discloses several exemplary computer "user interface screens" (*e.g.*, GUIs) that facilitate users in grouping and classifying the multimedia content, for instance as described with respect to Figures 9A-9C.

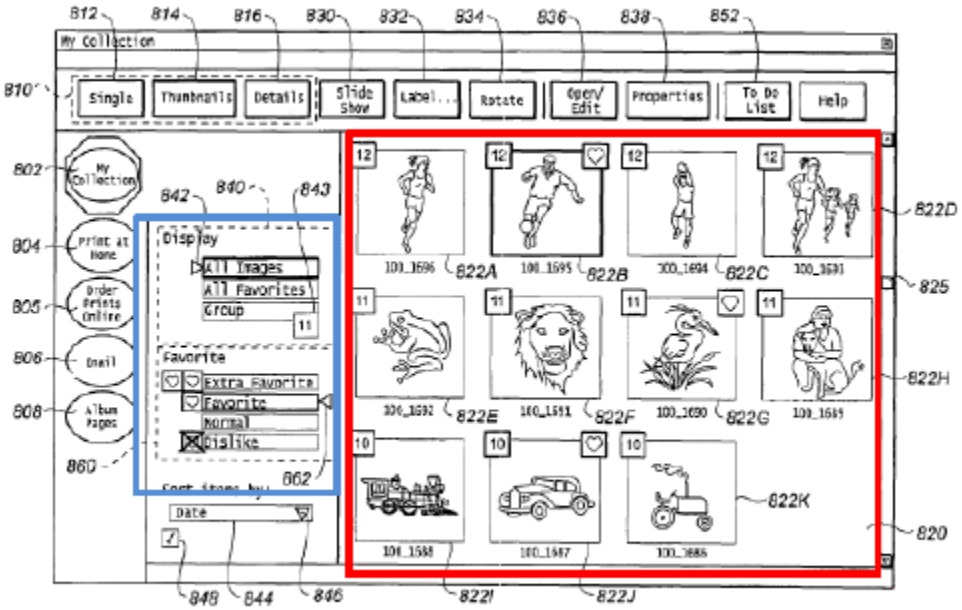


FIG. 9A

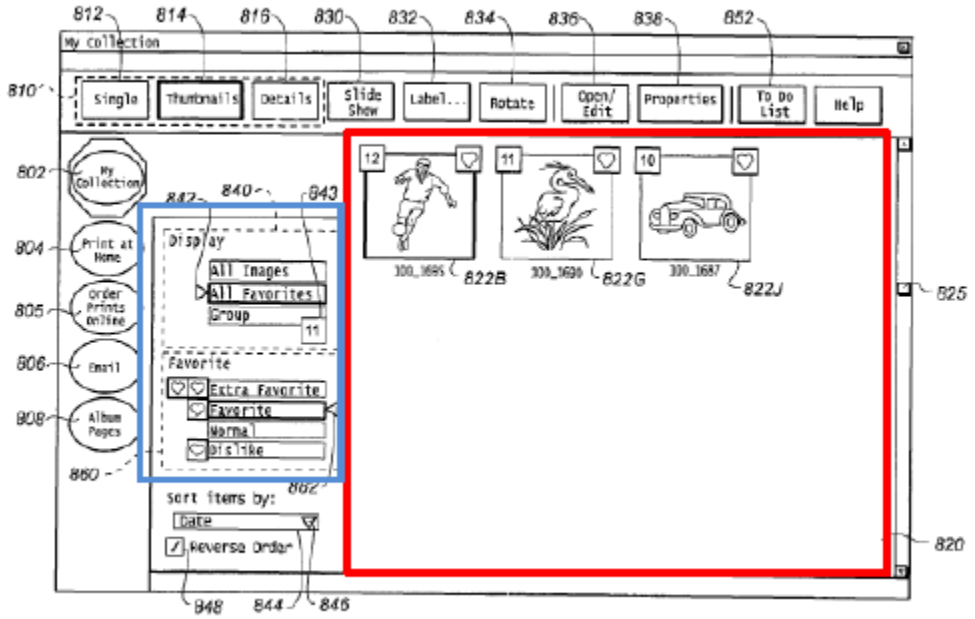


FIG. 9B

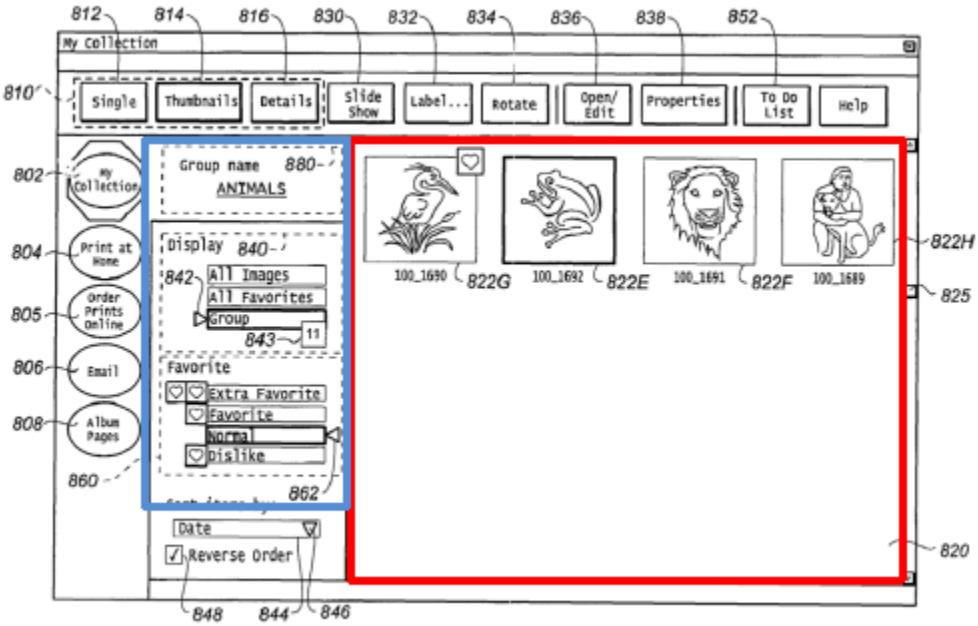


FIG. 9C

LG-1005, FIGS. 9A-9C (annotated to show a first menu area in blue and a second menu area in red).

With respect to these user interfaces, Bryant describes:

> FIG. 9A depicts an example of a computer user interface screen for displaying all of the transferred images. A GUI screen 800A includes an area 820 for displaying the thumbnail images provided using the "thmnail" metadata 692 of each object in the general assets table 600 in FIG. 8. By moving a selector 842 within a display selection area 840, the user can select a display of "All Images", a display of "All Favorites", or a display of a "Group" of images selected using a group number/name box 843". In the example of FIG. 9A, the "All Images" display mode is selected".

LG-1005, [0089].

74. In the examples shown in FIGS. 9A-9C, Bryant explains that the local database of the computer (where the images were transferred) "includes a general assets table 600 that includes an image data object 632-652 for each transferred image," of which there are eleven. LG-1005, [0082]. Each data object "includes the table of data fields 610," which includes "a particular type of metadata describing the image." LG-1005, [0083]. For example, each data object (*e.g.*, corresponding to an image or video file) may be associated with a "thmnail" (thumbnail), "group" number and name fields, and a "favlevel" field as shown in table 610. *Id.,* [0084]-[0087] (describing metadata). The local database with general assets table 600 and table of data fields 610 corresponding to media object 11 (652) is shown in FIG. 8 of Bryant, reproduced below.

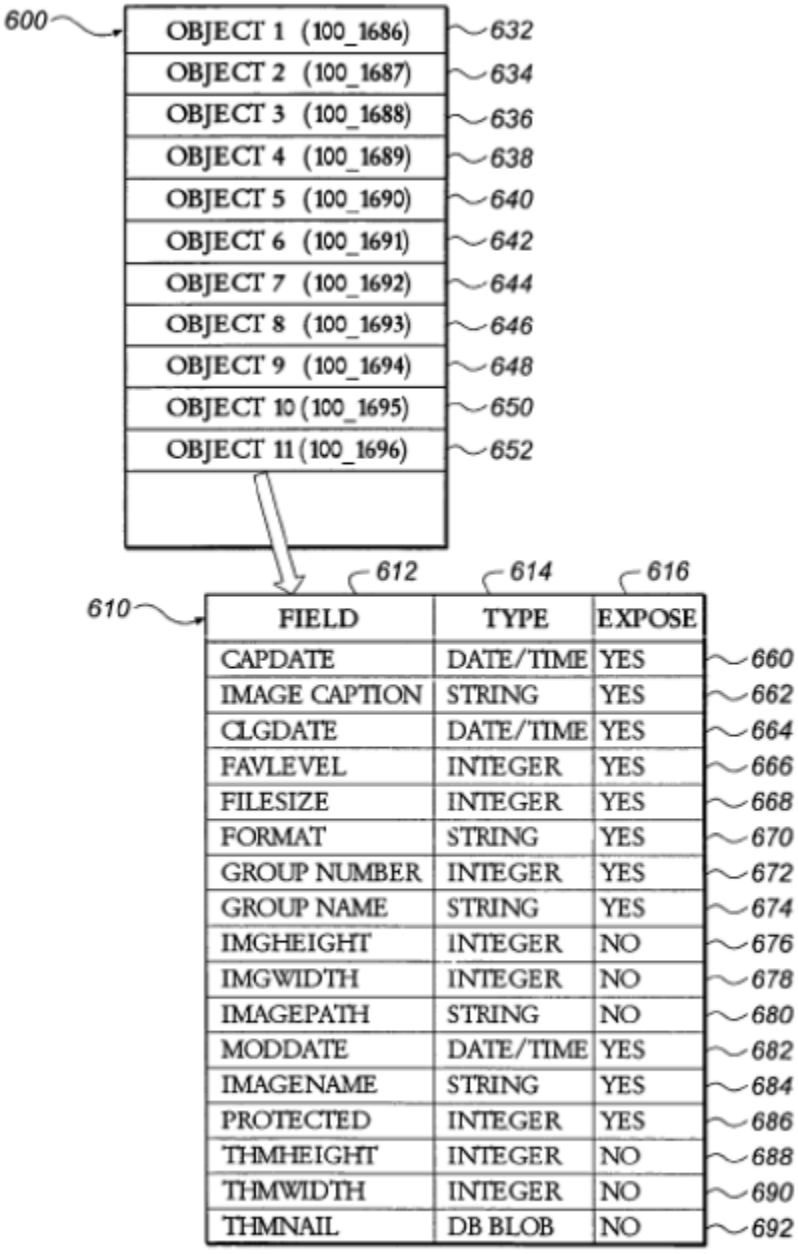


FIG. 8

LG-1005, FIG. 8

75. The "thmnail" metadata, *i.e.* thumbnail image, corresponding to each of the eleven media objects is shown in area 820 of FIG. 9A, and "[a]djacent the

top left of each thumbnail image 822A-822K is a text box indicating the group to which the image belongs," and "[a]djacent the top right of thumbnail images 822B, 822G, and 822J is an icon including an object indicating a favorite image." LG-1005, [0091]-[0092]. Thus, Bryant makes clear that a given media file can simultaneously belong to multiple classifications. For example, the crane, 100_1690 (822G), is both a "favorite" and an "ANIMAL/Group 11." *See* LG-1005, FIGS. 9B and 9C.

76. Bryant also discloses that even if a media object (*e.g.*, the soccer player 100_1695, 822B) is both classified as a "Favorite" and "All Images" or "12" video information, but is removed as a favorite, the media object will continue to be included in the "All Images" and "12" groups of video information. *See* LG-1005, [0100]:

> In block 146 of FIG. 3B the user optionally resets images that are no longer considered favorites. This is accomplished using the favorites level selection area 860. The user first selects one of the thumbnail images (e.g., thumbnail images 822B), and the favorites level selection area 860 then displays the current favorites level. If the user has not previously modified the level, the images are either "Normal" or "Favorite". Using the selector 862, the user can change the level of the selected image to be an "Extra Favorite", a "Favorite", a "Normal" image, or a "Dislike" image.

Rather than deleting the underlying file, such that it would no longer be in the "All images" or "12" groups, Bryant discloses that "the favorites metadata is updated in the general assets table 600, and the icon displayed next to each thumbnail image is

also updated, as was described earlier in relation to block 138." LG-1005, [0101]. Bryant further explains, with reference block 156 to FIG. 3B, that "the user optionally sets or changes the name of the group," by "using naming window 880" and "typing in an appropriate name (e.g., 'ANIMALS') in the underline area." *Id.*, [0104]. Additionally, a user can "change the favorites level of one or more images." *Id.*

77. In other words, the groups of video information in at least "Favorites" and "Groups" are "independently editable" with respect to at each other and "All Files" in Bryant.

ii. *Kaplan*

78. U.S. Publ. No. 2001/0056434 to Kaplan et al. ("Kaplan") (LG-1004) was filed on March 29, 2001, claiming benefit to two provisional applications filed in 2000, and is titled "Systems, Methods and Computer Program Products for Managing Multimedia Content." Kaplan was published December 27, 2001, and I am informed that it is prior art to the '449 Patent under at least 35 U.S.C. § 102(b).

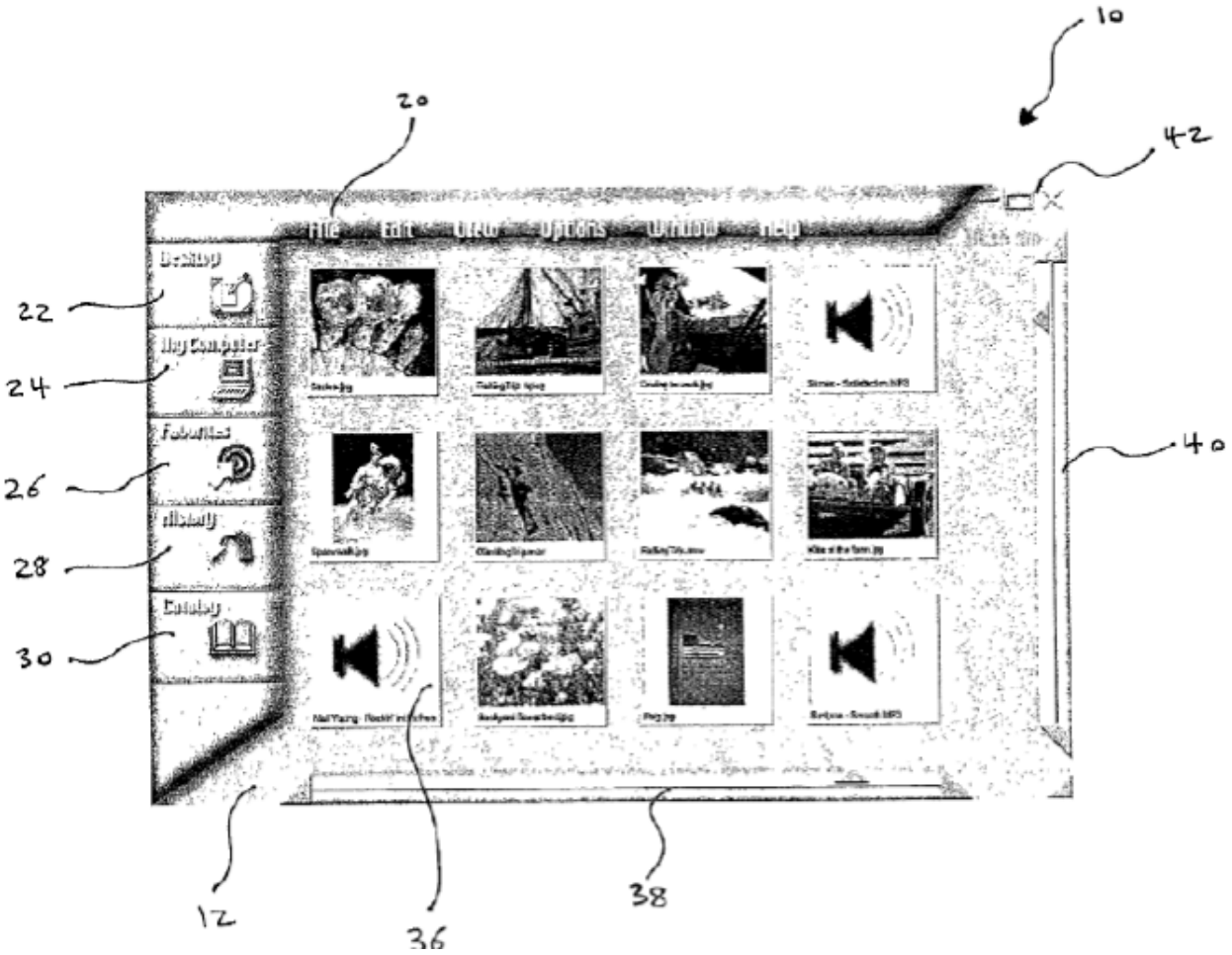
79. Kaplan recognizes that with the increasing amount of multimedia content on computers due to "the ability to stream or download multimedia content, such as movies and music," there is a need for improved ways in which users can "keep track of and organize their computer files containing multimedia content." LG-1004, [0002]-[0003]. As such, Kaplan provides:

> [A] multimedia management system for storing, manipulating, and displaying multimedia content. The system comprises a user interface, a plurality of predefined functions, a multimedia acquisition interface, and system controls. The system provides users with a simple and intuitive method and computer program for reviewing multimedia content, which can include digital video, digital audio and text, still images, animation, and MIDI.

LG-1004, Abstract. The disclosed system "provides users with a simple and intuitive method and computer program for reviewing their multimedia content, which can include digital video, digital audio and text, still images, animation, and MIDI." LG-1004, [0038].

80. Kaplan describes that "one of the advantages to the user interface 12 of the present invention is that all information and multimedia content is displayed through thumbnails 36, which are small image representations of larger images." LG-1004, [0040]. "Generally, thumbnails 36 provide users with a more intuitive method of managing computer files, such as multimedia content, because users do not have to remember file names." *Id*. Kaplan further describes that "[o]ther standard features of user interface 12 include horizontal and vertical screen scrolling actuators 38 and 40 respectively and control functions." *Id*. Additionally, the "user interface 12 may include standard operating system functions 20, which consist of the following pull down menus: FILE, EDIT, VIEW, OPTIONS, WINDOW, and HELP." *Id.*, [0044].

81. This interface 12 may include "a primary set of options," such a "Desktop 22," "My Computer 24," "Favorites 26," "History 28," and "Catalog 30," to display different classifications of video information, which "may be represented on an interface as a 'button.'" LG-1004, [0040]. FIG. 4 of Kaplan, reproduced below, shows an example of interface 12, with the buttons for different classifications shown on the left hand side of the interface, and the thumbnail images for corresponding content shown on the right hand side of the interface. LG-1004, FIG. 4; *see also id.*, FIGS. 4-12, 14, 16, and 17 (each illustrating an interface with a similar layout). The thumbnails may "display images representing movies saved in the AVI and MPEG multimedia file formats." LG-1004, [0050].



LG-1004, FIG. 4

A user can "activate video and audio multimedia content directly within the thumbnails," and use player controls such as play, stop, pause, reverse, and fast forward to control playback of a video corresponding to a selected thumbnail image. LG-1004, [0051]; *see also id.*, [0057], FIGS. 12 and 16.

82. Kaplan further describes that the "Favorites 26 primary option button allows users to store their favorite multimedia content in a convenient and quick to find location." LG-1004, [0042]; *see also id.*, [0044] ("Of course, the user is free

to store the multimedia content file in any container 48 they wish."). In order to "facilitate the storage and subsequent retrieval of the multimedia data files, the multimedia management system user interface provides a plurality of predefined functions to uniquely index multimedia files, create an index database file, and create visual representations of the files for later retrieval." LG-1004, [0044]. "The indexed file stores a pointer in the management system database to the physical file location, while providing a thumbnail image that can be used to represent the file in the management system user interface." *Id*. Thus, using these pointers, if a thumbnail image corresponding to a movie (*i.e.*, pointer) is displayed in both the "Favorites" and "Catalog" options, but the user deletes the movie from the "Favorites" file, the pointer to the movie in the Catalog option will remain while the pointer to the movie in the Favorite option will be removed.

83. In other words, Kaplan discloses "independently editable" groups of video information.

iii. *Horn*

84. U.S. Publ. No. 2004/0177319 to Horn ("Horn") (LG-1021) was filed on July 13, 2003, claiming benefit to a provisional application filed in 2002, and is titled "Computer System for Automatic Organization, Indexing and Viewing of Information from Multiple Sources." Horn was published September 9, 2004, and

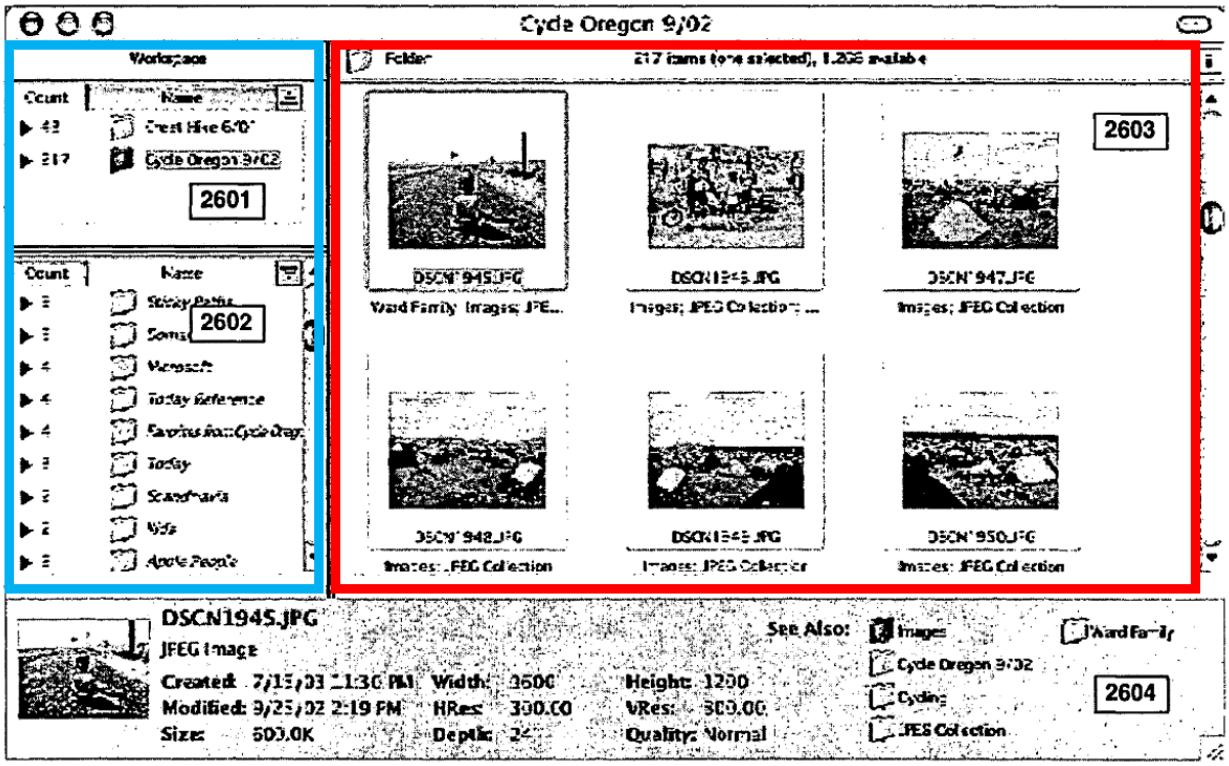
I am informed that it is prior art to the '449 Patent under at least 35 U.S.C. §§ 102(a) and 102(e).

85. Horn describes a "computer data processing system including a central processing unit configured with a novel integrated computer control software for the management of data objects including dynamic and automatic organization, linking, finding, cross-referencing, viewing and retrieval of multiple objects." LG-1021, Abstract. Horn addresses "a long felt need in the art to provide a truly open computer system having data structures, input interfaces, displays and operational systems that permits the organization of information, as data objects, in a wide variety of files and databases," where the "computer system is independent of the source of the information objects, is dynamic and automatic, permitting faster archiving, retrieval and viewing of the information and providing more meaningful and useful links for better organization and indexing of the information." *Id.*, [0013].

86. In response, Horn offers a "metadata filing system," or "MFS," that "includes one or more novel software applications that provide both a user-interface and underlying component architecture." LG-1021, [0038]. The "underlying component architecture [has] an object-oriented database structure and a metadata database structure which is unique in storing only one instance of each object while linking the object to multiple collections and domains by unique

metadata links for the grouping into and retrieval from any of the collections." *Id.*, Abstract. Horn explains that the objects in the MFS can include "all types of text and image information," including "multimedia," "illustrations, images, movies, and photographs." LG-1021, [0103]. Thus, while many of the examples in Horn relate to image files in the metadata filing system (MFS), a POSITA would have understood that these examples also extend to scenarios where the files include other types of multimedia, including "movies." *See, e.g., id.*, FIGS. 5, 7a, 7b, 7c, 9a, 10a, 11a, 12a, 12b, 14.

87. With reference to Figure 26 (below), Horn shows an example "Workspace view" of its MFS, which shows various information in four separate panes. LG-1021, [0016], [0153]-[0158]. In particular, the "Workspace view" displays (1) "the original folders from which the images were examined (the working set)" 2601 and (2) "a list of all collections defined by MFS and the user" (2602)—(1) and (2) collectively circled blue, (3) "a content pane," circled red, "which dynamically displays the contents of whatever item is selected in the first two views (2603)," and (4) "a metadata pane, which describes the currently-selected item's metadata. LG-1021, [0154]-[0157], FIG. 26. Horn explains that a "user may double-click on any of the folders in the top-left pane, collections in the bottom-left pane, or any item in the metadata collection set to open them in a new window." Id., [0158].



LG-1021, FIG. 26 (annotated)

88. Horn also explains how objects can be manually categorized into collections. LG-1021, [0164]. For example, Horn explains that users "view images from any of the source folders, and by dragging their icon representations to either the collection window or the icon representation in the Workspace, add those images to the collection," which "does not move the images, nor modify them in any way." LG-1021, [0165]. Rather, "it simply updates the links in the catalog indicating that they belong to the collection." *Id.* Additionally, "items may be removed from a collection by choosing the Remove command, which

removes the items from the collection but does not otherwise delete the item from the source (e.g. the file system) or any other collections." *Id.*, [0167].

B. Ground 1: Claims 1-16 are obvious over Bryant

89. To the extent it is argued that Bryant does not disclose a limitation of a Challenged Claim, any such limitation would have been obvious to one of skill in the art at the time of the purported invention. *See* §VI (Technical Background), §VII.A (Admitted Prior Art).

i. *Claim 1*

[1.pre] An information processing apparatus comprising:

90. To the extent the preamble is limiting, Bryant discloses or renders obvious an information processing apparatus, an information processing system, and an information processing method. LG-1005, Abstract, [0006], [0007], [0011], [0014] ("FIGS. 3A and 3B … depict a flow diagram showing … a method for grouping images, identifying favorite images, and organizing the images…"), [0029], [0037], [0089], claim 1, FIGS. 1, 3B. In particular, Bryant discloses a "method for producing a plurality of electronic job pages using a ***digital camera and a computer***," including "produc[ing] a first electronic job page including the first group of digital images and a second electronic job page including the second group of digital images." LG-1005, Abstract (emphasis added). Thus, a POSITA would have understood that Bryant discloses an apparatus and/or system that

performs a method for processing information. LG-1005, FIG. 1. For instance, the home computer 10 alone, shown below of Figure 10, is an apparatus or a system. *Id.* Additionally, or alternatively, the home computer 10 with a docked digital camera 300 provides an apparatus or system. *Id.* In each of these examples, the apparatus or system performs methods for processing information, such as data files (including digital image data) and presentation of those files. *Id.*, FIGS. 1, 3A-3B.

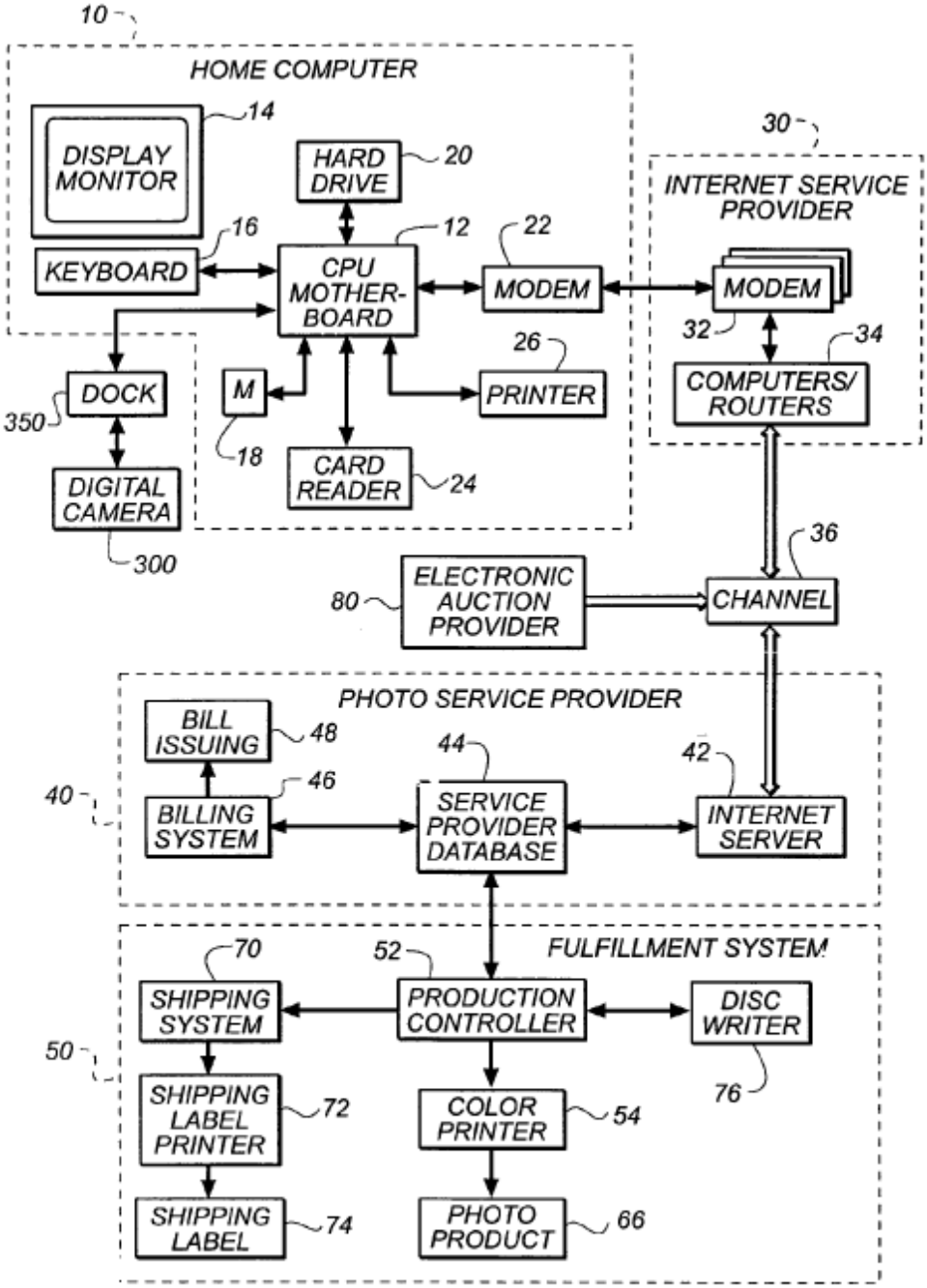


FIG. 1

LG-1005, FIG. 1

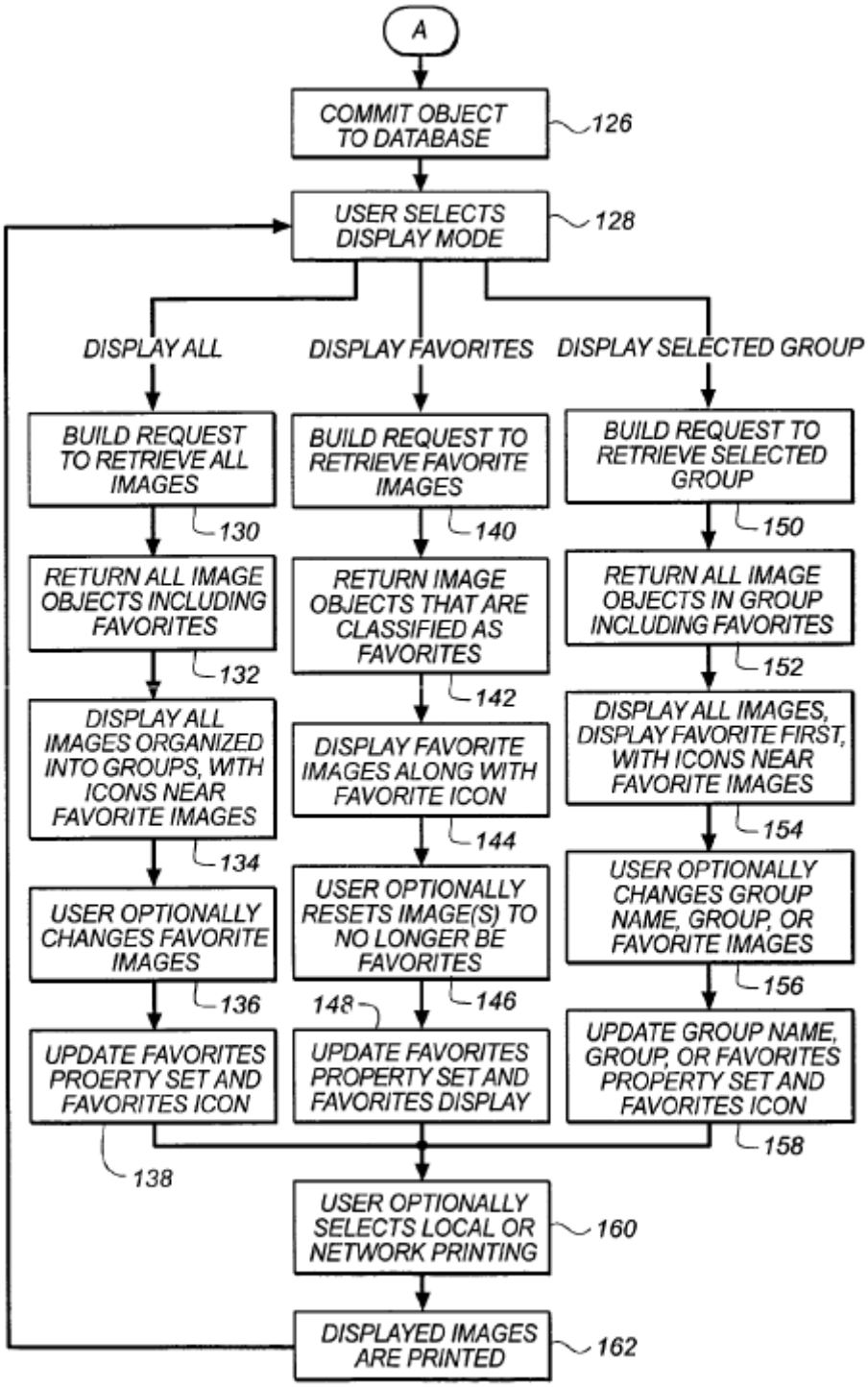


FIG. 3B

LG-1005, FIG. 3B

[1.a] a recording unit configured to record a plurality of video information on a recording medium;

91. Bryant discloses or renders obvious a recording unit that records a plurality of video information on a recording medium. LG-1005, [0007], [0032], [0036], [0037] ("The hard drive 20 is one type of memory associated with the home computer 10. Other types of memory could alternatively be used with the home computer 10 to store downloaded image…"), [0038], [0039], [0067], [0080], [0081], FIG. 1. In particular, Bryant discloses a computer that receives files captured by and/or stored on a digital camera. LG-1005, [0007] ("transferring the first and second group of digital images, and the data identifying the first and second groups of digital images, from the digital camera to the computer"), [0032] ("the images are transferred from the digital camera to a host computer"), [0038] ("transfer images and control files to the home computer 10"), [0039] ("alternative way of transferring images and control files from the digital camera 300 to the home computer 10"), [0067] ("images which are captured by the digital camera 300 and transferred to the home computer 10"), [0080] ("the user connects the digital camera 300 to the dock 350, which is connected to the home computer 10 via an interface such as USB, and presses a "transfer" button (not shown) to initiate the image transfer"). The files from the digital camera includes "still and ***motion video images***," which are a plurality of video information. LG-

1005, [0036] (emphasis added). After the computer receives the transferred image files (or transferred "motion video images"), the files are stored in the "hard drive 20 of the home computer 10" in "a default directory, such as in a 'my collection' directory," where the "hard drive 20" is a recording medium. LG-1005, [0081].

92. A POSITA would have understood that the "hard drive 20" of Bryant necessarily includes a circuitry ("recording unit"), e.g., a hard disk controller, that serves as an intermediary between the CPU and the physical storage platter of the hard drive in order for "the hard drive 20 … to store images downloaded from the digital camera." LG-1005, [0037], FIG. 1. Indeed, this kind of circuitry in hard drives was well known long before the Critical Date and included in hard drives to provide buffering, error correction, servo control, etc. for writing data to the hard drive.

93. For instance, Wang describes a "[h]ard disk drive storage devices [that] enable computer systems to quickly store data in a non-volatile manner and to retrieve the stored data when needed." LG-1023, 1:11-13; *see also id.*, 1:13-46. The "hard disk drive 100 includes a head disk assembly (HDA) 105 having one or more disks 102 with a magnetic media 101 formed on each surface 103 of a disk 102." *Id.*, 2:64-3:2; *see also id.*, 3:2-4:18, FIGS. 1-2. The hard disk drive 100 further includes a "control system 202 [that] sends to and receives signals from

the head 114 during read and write operations performed on the disk 102." *Id.*, 3:16-18.

94. Similarly, Sharma teaches a hard disk drive with an "embedded disk controller Printed Circuit Board (PCB) 100" that "uses a program system 2000, a collection of buffers 1500-1580, and parameters 1590-1620, interacting through the servo-controller 1030," which act together to "implement[] the control signal flow in the hard disk drive 10." LG-1024, 5:50-6:4, FIG. 2. Jeppeson also discusses a "servo block," which "refers to general logic used in aiding the spinning of the discs and in the positioning of the actuator on the disc." LG-1025, Abstract, 3. Given that Bryant teaches the use of a hard drive for storing multimedia data, a POSITA would have found obvious that the hard drive includes necessary circuitry (recording unit) for storing/recording data in the hard drive and retrieving data from the hard drive for display on the computer.

[1.b] an output unit configured to output a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

95. Bryant discloses or renders obvious an output unit that performs the function of outputting a menu display for a user to select one group of video information (e.g., "All Images," "All Favorites," "Group") among a plurality of groups of video information (circled in blue in FIGS. 9A-9C, e.g., "All Images,"

"All Favorites," "Group") by specifying a position of a character ("By moving a selector 842 within a display section area 840, the user can select a display of … ") corresponding to the one group of video information. LG-1005, [0037]-[0038], [0087], [0089], [0149], [0154], FIGS. 9A-9C; *see also* discussion of Elements [1.e]-[1.f].

96. In particular, Bryant teaches "user interface screens" that facilitate user selection of desired video information to be played back and a "display monitor 14" that is a display device on which "images and information" are displayed "as a computer user interface screen (GUI screen)." LG-1005, [0029], [0036]-[0038], [0088]-[0090], [0149], FIGS. 1, 9A-9C. Bryant's "display monitor" is an output/display unit configured to output a menu display, as further discussed below. Bryant explains that images from a digital camera are transferred from a digital camera and stored on the computer, and then "[e]ach group of digital images is then organized as an electronic album, using the data in the local database, and is displayed on the display monitor 14." LG-1005, [0154].

97. With reference to Figure 9A, Bryant describes a "GUI screen 800A [that] includes an area 820 for displaying the thumbnail images," where, "[b]y moving a selector 842 within a display selection area 840, the user can select a display of 'All Images', a display of 'All Favorites', or a display of a 'Group' of images selected using a group number/name box 843." LG-1005, [0089]. The

user interface of Bryant's GUI screen provides a menu display for a user to select one group of video information (e.g., "All Images," "All Favorites," "Group") from among a plurality of groups of video information (circled in blue in FIGS. 9A-9C below, e.g., "All Images," "All Favorites," "Group"). A user selects a group of video information "[b]y moving a selector 842 within a display section 840" to a selected group, thus specifying a position of a character corresponding to the one group of video information.

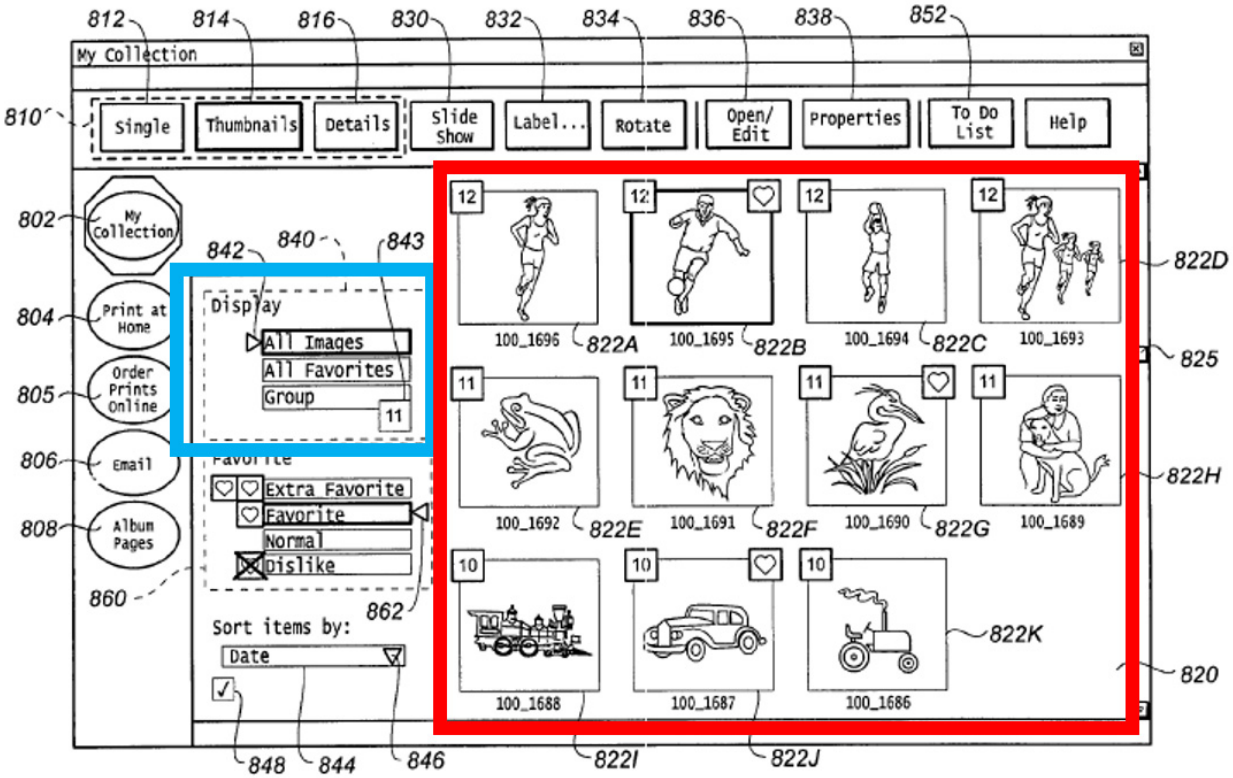


FIG. 9A

LG-1005, FIG. 9A (annotated)

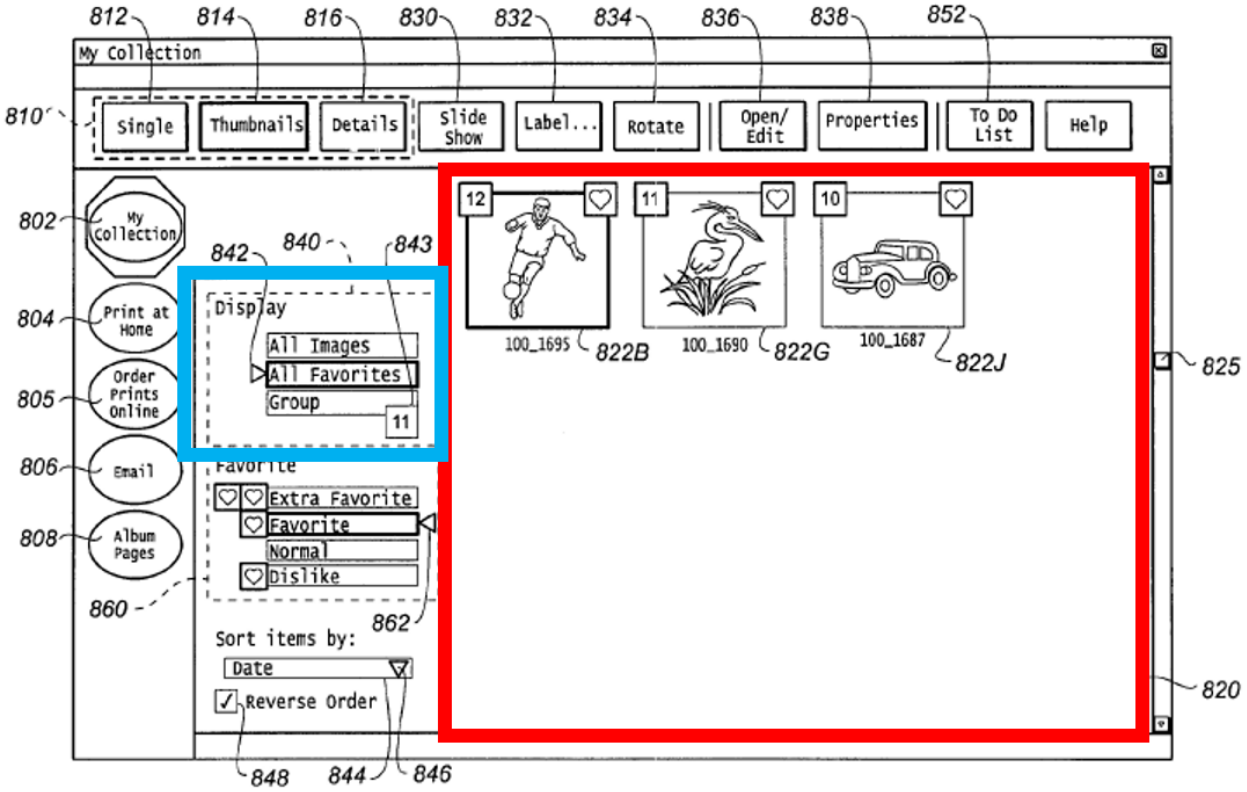


FIG. 9B

LG-1005, FIG. 9B (annotated)

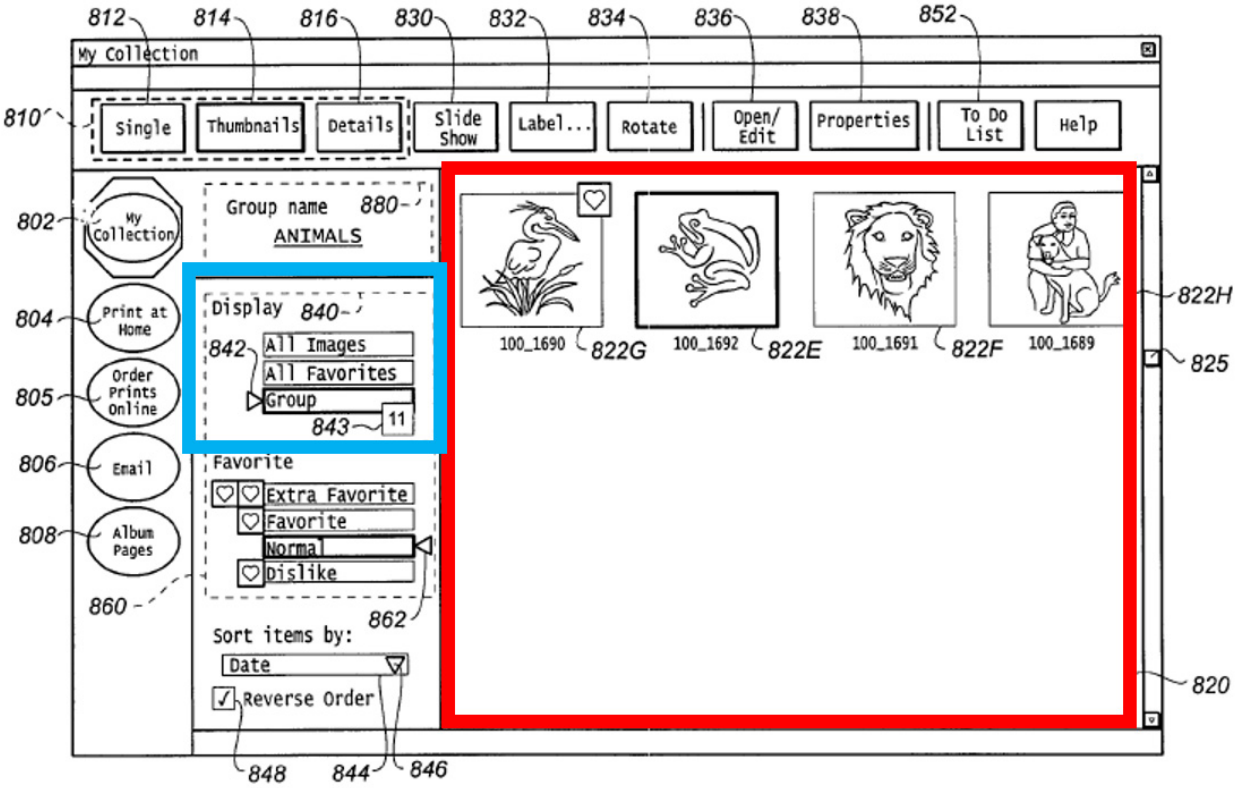


FIG. 9C

LG-1005, FIG. 9C (annotated)

98. In FIG. 9A, above, for example, a user has selected "All Images" and has done so by specifying a position of a character corresponding to the one group of video information in at least one of two ways. *See* LG-1005, [0089] ("By moving a selector 842 within a display selection area 840, the user can select a display of 'All Images', a display of 'All Favorites', or a display of a 'Group' of images selected using a group number/name box 843"). First, the user has clicked on the position of one or more characters in the name of the group (e.g., "All Images"). *Id.* ("selected using a group number/name box 843"), thus specifying a

position of a character by clicking on that character's position. Additionally, or alternatively, the user has moved the triangle selector character 842 to a position next to the name of the group (e.g., "All Images" in FIG. 9A), thus specifying a position of a character by specifying a position for the selector 842 next to the name of the group. *Id.* ("moving a selector 842 within a display selection area 840").

[1.c] a reproducing unit configured to reproduce selected video information read out from the recording medium; and

99. Bryant discloses or renders obvious a reproducing unit configured to reproduce selected video information read out from the recording medium. LG-1005, [0029] ("The present invention defines methods for grouping and classifying digital still images and digital motion images captured using a handheld digital camera."), [0036] ("still and motion video images"), [0037]-[0038] ("The home computer 10 includes a CPU motherboard 12, having for example, an Intel Pentium IV processor as well as RAM memory (not shown). The CPU motherboard 12 executes software stored on a hard drive 20, for example, the well-known Windows XP operating system software and the Internet Explorer web browser software, both provided by Microsoft Corp. of Redmond, Wash. The hard drive 20 is also used to store application software that can be provided along with the digital camera 300 using any suitable software distribution media or method,

such as a CD-ROM, floppy disc, or Internet download, as is well-known to those skilled in the art. As will be described later with reference to FIG. 3, the hard drive 20 is also used to store images downloaded from the digital camera 300 and to store a local database of information associated with these downloaded images. The hard drive 20 is one type of memory associated with the home computer 10. Other types of memory could alternatively be used with the home computer 10 to store downloaded images, such as solid-state Flash EPROM memory and optical read/write discs, such as recordable and erasable DVD discs."), [0080]-[0081] ("In block 122, the home computer 10 reads the control files 412-416 and transfers the image files 432-452 (see FIG. 5) to the hard drive 20 of the home computer 10. The image files are stored in a default directory, such as in a 'my collection' directory, or in a directory selected by the user when the software was installed in block 100. In block 124, an object is created for each transferred image, and the favorite and group properties of each object are set to correspond to the information read from the control file in block 122. In block 126 shown in FIG. 3B, the object created for each transferred image is committed to the local database stored on the hard drive 20 of the home computer 10. It will be understood that while in a preferred embodiment, the local database stores objects in an object oriented database management system (OODBMS). In alternative embodiments, the local database can use many different types of more primitive data structures,

including arrays, tables, lists, registries, and the like, to store the data identifying favorite images and groups of images."), FIGS. 1, 3B, 9A-9C.

100. As discussed above for Element [1.a], Bryant discloses recording a plurality of video information on a recording medium (e.g., "hard drive"). LG-1005, [0029], [0037]-[0039]; *see* discussion of Element [1.a].

101. A POSITA would have understood that Bryant at least renders obvious reproducing selected video information from the recording medium ("hard drive"). Specifically, Bryant describes a "digital photography system" capturing "motion video images" and loading them onto a home computer on which the images can be "***viewed***, stored, retrieved and printed." LG-1005, [0003] (emphasis added), [0036] ("still and motion video images"), [0037] ("The digital photography system of FIG. 1 also includes a home computer system 10"), [0038], [0080]-[0081]. A POSITA would have understood that a reason to transfer a video ("motion video image") to a user's computer is to reproduce for display and viewing (e.g., playback) the video from the recording medium when the user wants to view it. LG-1005, [0036]. Indeed, Bryant explains, with reference to Figure 3, "the user selects a display mode, and the appropriate transferred images are displayed." *Id.*, [0088]. Bryant further describes [p]roviding a copy of each thumbnail image," which "allows all of the thumbnails to be quickly retrieved from the hard drive 20 for display on the display monitor 14." *Id.*, [0087], FIG. 1.

Thus, Bryant discloses or renders obvious reproduction from a recording medium with a reproducing unit for display, for example, on display monitor 14. LG-1005, FIG. 1.

102. A POSITA would have understood that the purpose of Bryant's multimedia platform is to organize, display, and ***play back*** digital content, such as video. To the extent it is argued that [1.c] is not disclosed by Bryant, it would have been obvious in view of Bryant. Reproducing the user selected video information ("motion video images") from a plurality of video information recorded on a recording medium by a recording unit were well-known and commonplace. *See* §VI (Technology Background)). Moreover, a POSITA would have understood that the purpose of a multimedia platform is to organize, display, and play back digital content, such as video.

103. It was well-known that processing used for storage and management of pictures could also be used for the storage and management of video. For example, Bryant states that: "[t]he present invention defines methods for grouping and classifying digital still images and ***digital motion images*** captured using a handheld digital camera." LG-1005, [0029] (emphasis added); *see also id.*, [0036]. Therefore, a POSITA reading this reference would understand that Bryant's disclosure of "images" encompasses videos.

104. Moreover, a POSITA would have understood that a computer coupled to a display device, "execut[ing] software stored on a hard drive 20, for example, the well-known Windows XP operating system software and the Internet Explorer web browser software" would have been capable of playing back video. *See* LG-1005, [0037]-[0038]; *see* §VI (Technology Background). That is, a POSITA would have understood that Bryant's system would play back the videos using the known programs that were commonly available at that time. *See id.*

105. Additionally, a POSITA would have been motivated to incorporate video playback in the system of Bryant as users in this time frame would have wanted to use the available functions on their computer to access all of the media produced by their digital cameras, and would have expected as much given the state of the art. Because digital cameras as of the date of the invention were capable of recording still images and video (*see, e.g.,* LG-1005, [0036]), and because standard computers, e.g. those running Windows, were similarly capable of displaying still images and playing back videos, a POSITA would have been motivated to incorporate a video media player in the computer user interface of Bryant. The inclusion of such a standard feature would have been well within the skill of a POSITA.

106. Moreover, a POSITA would have understood that the "hard drive 20" of Bryant necessarily includes a circuitry ("reproducing unit"), e.g., a hard disk

controller, that serves as an intermediary between physical storage platter of the hard drive and the CPU in order to retrieve data from memory to display "images and information … on the display monitor 14 as a computer user interface screen (GUI screen)." LG-1005, [0149], FIGS. 7A-7B, 9A-9C, 15-16. Indeed, such circuitry was well known long before the Critical Date to include in hard drives to provide buffering, error correction, servo control, etc. for reading data from the hard drive.

107. For instance, Wang describes a "[h]ard disk drive storage devices [that] enable computer systems to quickly store data in a non-volatile manner and to retrieve the stored data when needed." LG-1023, 1:11-13; *see also id.*, 1:13-46. The "hard disk drive 100 includes a head disk assembly (HDA) 105 having one or more disks 102 with a magnetic media 101 formed on each surface 103 of a disk 102." *Id.*, 2:64-3:2; *see also id.*, 3:2-4:18, FIGS. 1-2. The hard disk drive 100 further includes a "control system 202 [that] sends to and receives signals from the head 114 during read and write operations performed on the disk 102." *Id.*, 3:16-18.

108. Similarly, Sharma teaches a hard disk drive with an "embedded disk controller Printed Circuit Board (PCB) 100" that "uses a program system 2000, a collection of buffers 1500-1580, and parameters 1590-1620, interacting through the servo-controller 1030," which act together to "implement[]

the control signal flow in the hard disk drive 10." LG-1024, 5:50-6:4, FIG. 2. Jeppeson also discusses a "servo block," which "refers to general logic used in aiding the spinning of the discs and in the positioning of the actuator on the disc." LG-1025, Abstract, 3. Given that Bryant teaches the use of a hard drive for storing multimedia data, a POSITA would have found obvious that the hard drive includes necessary circuitry (recording unit) for storing data in the hard drive and retrieving data from the hard drive for display on the computer. In particular, the hard drive necessarily includes circuitry to send and receive signals from a transducer head in the hard drive "during read and write operations performed on the [hard] disk," or such circuitry would have at least been obvious in view of well known hard drive components. *See, e.g.* LG-1023, 3:16-18.

[1.d] a controller,

109. Bryant discloses or renders obvious a controller. LG-1005, [0037], [0038], [0039], [0088], [0098], FIG. 1. In particular, Bryant teaches a CPU motherboard that is connected to the hard drive that stores the image/video files and to the display monitor 14 and controls the display, by the display monitor, of thumbnails and images. LG-1005, [0038], [0088], [0098], FIG. 1. Thus, the CPU motherboard is a controller that is "coupled to a display monitor 14," which a POSITA would have understood that the CPU motherboard controls what content is displayed by the display monitor 14. *Id.*, FIG. 1, [0038].

[1.e] wherein, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information, the controller controls the output unit to display a first group of thumbnails corresponding to the first group of video information,

110. Bryant discloses or renders obvious that, when a first group of video data is selected in the menu display by specifying a position of a character corresponding to the first group of video information, the controller controls the output unit to display a first group of thumbnails corresponding to the first group of video information. LG-1005, [0088] ("In block 128 of FIG. 3, the user selects a display mode, and the appropriate transferred images are displayed. The user can select a display of 'all images', a display of 'all favorite' images, or a display of a 'selected group' of images. If the user selects the 'display all' option, in block 130 the CPU motherboard 12 in the home computer 10 builds a request to retrieve all of the thumbnail images from the general assets table 600 in FIG. 8. In block 132 all of the image objects are retrieved, which includes the 'favlevel' favorites level metadata 666. In block 134 all of the images are displayed in a way that organizes them into groups, with icons indicating the favorite images in the collection of images."), [0089] ("FIG. 9A depicts an example of a computer user interface screen for displaying all of the transferred images. A GUI screen 800A includes an area 820 for displaying the thumbnail images provided using the 'thmnail' metadata 692 of each object in the general assets table 600 in FIG. 8. By moving a

selector 842 within a display selection area 840, the user can select a display of 'All Images', a display of 'All Favorites', or a display of a 'Group' of images selected using a group number/name box 843" [sic]. In the example of FIG. 9A, the 'All Images' display mode is selected."), [0090]-[0095], [0096]-[0104] (including display of favorites and/or a selected group), FIGS. 3B, 9A-9C.

111. For example, with reference to Figure 9B below, when a first group of video data, "All Favorites" is selected in the menu by specifying a position of a character corresponding to the first group of video information (*see* discussion of Element [1.b] with respect to "video information"), Bryant's display monitor displays on its interface a first group of thumbnails that are in the first group of video data ("All Favorites" thumbnails) in the area circled red in Figure 9B below. LG-1005, FIG. 9B; *see also id.*, [0089]-[0103]. A POSITA would have understood that Bryant's CPU motherboard causes its display monitor to display that content. *See id.*, [0038] ("The CPU motherboard 12 is coupled to a display monitor 14"), FIG. 1.

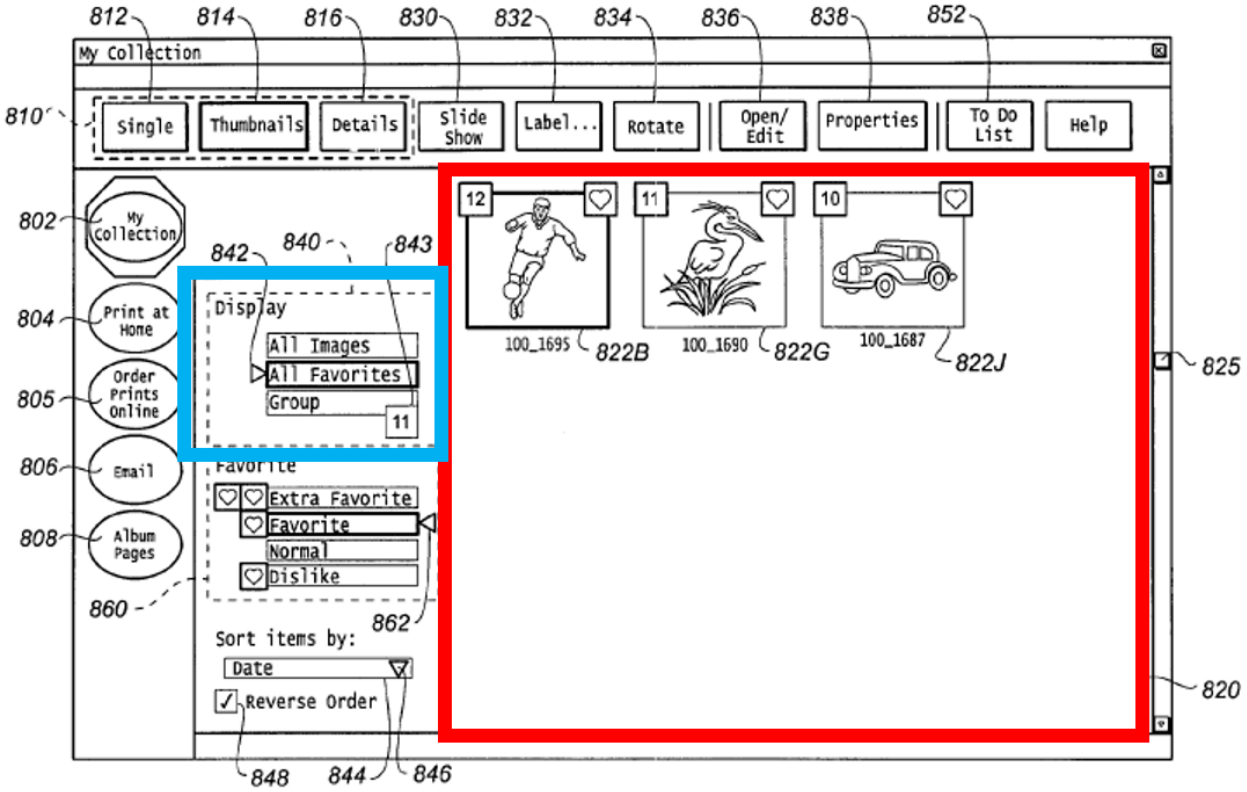


FIG. 9B

LG-1005, FIG. 9B (annotated)

112. Bryant also makes extensive use of thumbnails. For instance, Bryant discloses an "image display area" (the red box shown above) that displays thumbnails corresponding to video information associated with the selected group of video information. *See* LG-1005, [0090] ("The GUI screen 800A also includes a display format selection area 810, which provides three types of display formats. A 'Thumbnails' display icon 814 displays an array of thumbnails in the image display area 820, as shown in the example of FIG. 9."). That is, Bryant discloses that, when a first group of video information (e.g., "All Favorites") is selected, as

shown in the blue box above, the controller controls the display monitor to display, in the "image display area" (the red box shown above), a first group of thumbnails corresponding to the first group of video information (e.g., all images marked "Favorite"). *See, e.g.,* LG-1005, FIG. 9B (showing that, when "All Favorites" is selected, the image display area shows all images that are tagged as "Favorites," as denoted by the heart in the upper right corner of each image); *see also id.*, [0088]-[0089], FIG. 3B. As Bryant further explains:

> If in block 128 the user selects the "Display Favorites" option, for example, by selecting the "All Favorites" option using selection window 840 in FIG. 9A, in block 140 the CPU motherboard 12 in the home computer 10 builds a request to retrieve only those thumbnail images which correspond to favorite and extra favorite images from the general assets table 600 in FIG. 8. In block 142, all of the image objects classified as favorites are retrieved. In block 144, all of the favorite image thumbnails are displayed, with icons indicating the favorite level. FIG. 9B depicts an example of a computer user interface screen for displaying all of the favorite images. A GUI screen 800B displays in area 820 the thumbnail images 822B, 822G and 822J that correspond to favorite images.

LG-1005, [0098]-[0099].

113. To the extent it is argued that Bryant does not disclose [1.e] and/or [1.f], it would have been obvious. Each of these displays was a design choice given the state of the art and knowledge of a POSITA by the Critical Date. *See* §VI (Technology Background). In particular, the claimed features were completely standard and worked in essentially the same way that innumerable

menu systems of the time did, including Windows Explorer, which was distributed with the ubiquitous Microsoft Windows 95 operating system. For example, the figure on page 32 of LG-1010 shows a menu display area with a first area on the left where one could select categories (e.g., folders) and see information displaying the content of those folders on the right (e.g., files). Using this menu structure in the context of the '449 Patent was at most the application of a well-known technique to improve a similar device in the same way by using it with a specific type of information (e.g., video information).

[1.f] wherein, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, the controller controls the output unit to display a second group of thumbnails corresponding to the second group of video information, and

114. Bryant discloses or renders obvious that, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, the controller controls the output unit to display a second group of thumbnails corresponding to the second group of video information. LG-1005, [0089]-[0103], FIGS. 9A-9C.

115. For example, with reference to Figure 9A, Bryant explains that, when a second group of video information (e.g., "All Images") is selected in the menu display (e.g., the user has selected "All Images" "[b]y moving a selector 842 within [the] display selection area 840"), the controller controls the display

monitor to display a second group of thumbnails corresponding to the second group of video information (circled in red below in FIGS. 9A for "All Images"). *Id.*; *see id.*, [0089] (disclosing that when the "All Images" display mode is selected, the thumbnails associated with all images stored on the display device are displayed in the image display area); discussion of Element [1.e]. Bryant further discloses that when "Groups" is selected, the thumbnails associates with images associated with the selected group are displayed in the image display area. *Id.*, [0102] (disclosing that when "Groups" is selected, the thumbnails associated with images associated with the group are displayed in the image display area), FIG. 9C.

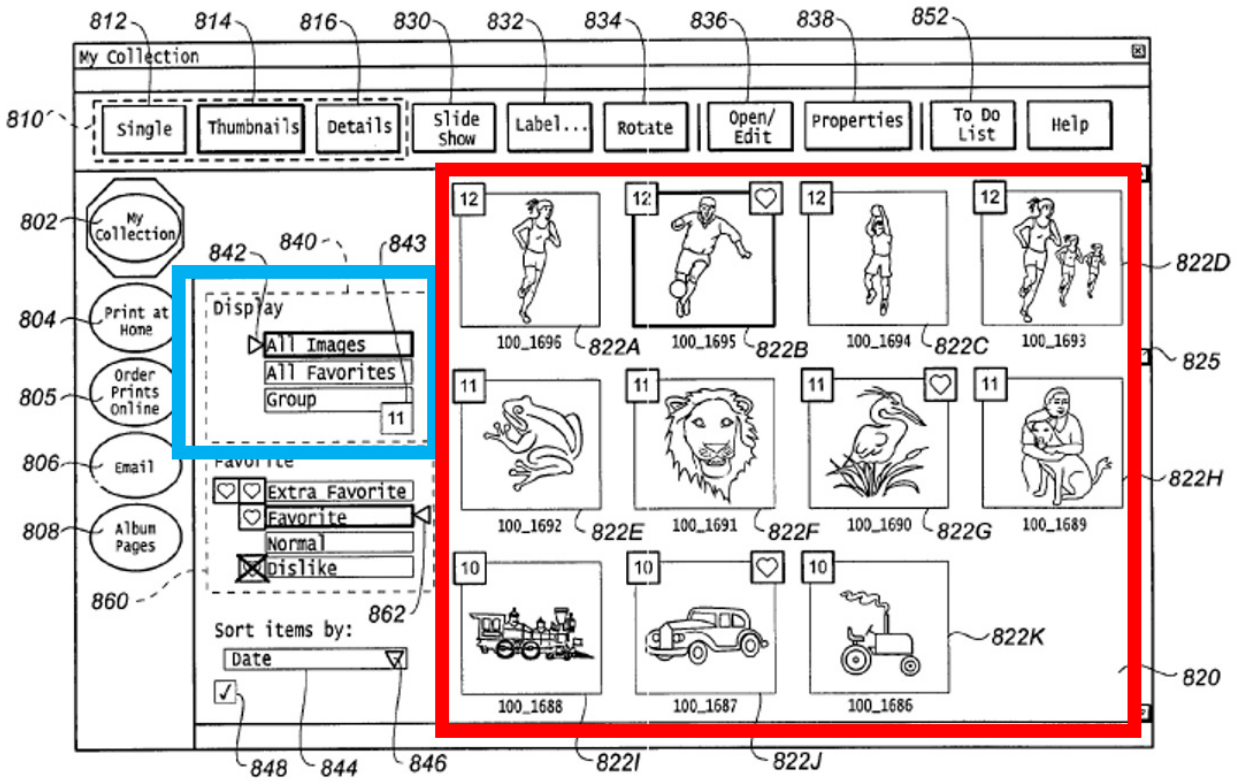


FIG. 9A

LG-1005, FIG. 9A (annotated)

[1.g] ***wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the one video information in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails.***

116. Bryant discloses or renders obvious wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the

one video information in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails. LG-1005, [0082]-[0087], [0096]-[0100] ("In block 146 of FIG. 3B the user optionally resets images that are no longer considered favorites. This is accomplished using the favorites level selection area 860. The user first selects one of the thumbnail images (e.g., thumbnail images 822B), and the favorites level selection area 860 then displays the current favorites level. If the user has not previously modified the level, the images are either 'Normal' or 'Favorite'. Using the selector 862, the user can change the level of the selected image to be an 'Extra Favorite', a 'Favorite', a 'Normal' image, or a 'Dislike' image."), [0101] ("the favorites metadata is updated in the general assets table 600, and the icon displayed next to each thumbnail image is also updated"), FIG. 8.

117. For example, Bryant discloses a local database with general assets table 600 and a table of data fields 610 corresponding to media object 11 (652), shown below in Figure 8. LG-1005, FIG. 8.

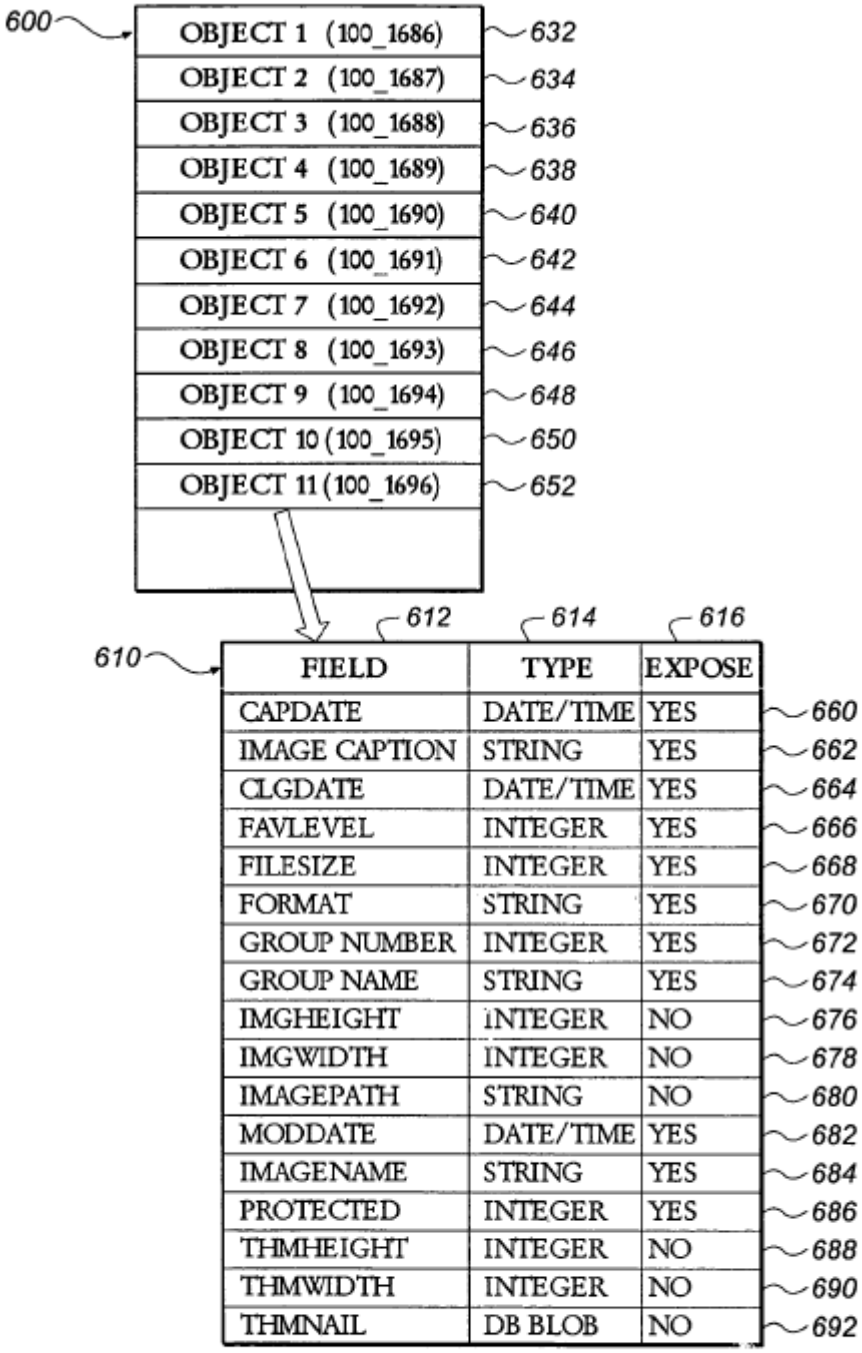


FIG. 8

LG-1005, FIG. 8

118. As made clear by the underlying data structure as well as the interfaces shown in FIGS. 9A-9C, Bryant discloses that a given media file can be simultaneously classified in multiple categories. For example, the media file corresponding to the crane, 100_1690 (822G), is classified as a "Favorite," as part of "Group/ 11," and is included in "All Images." *See* LG-1005, FIGS. 9A-9C. Likewise, the media file corresponding to the soccer player, 100_1695 (822B), is classified as a "Favorite," as part of "Group/12," and is included in "All Images." *See id.*, FIGS. 9A, 9B.

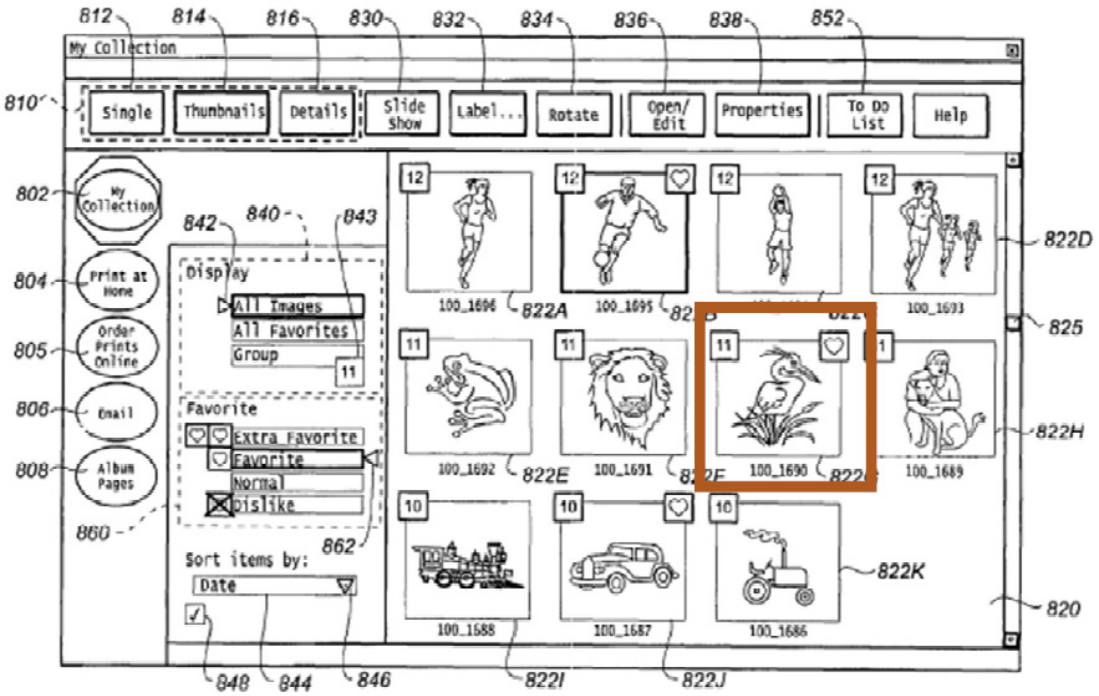


FIG. 9A

LG-1005, FIG. 9A (annotated)

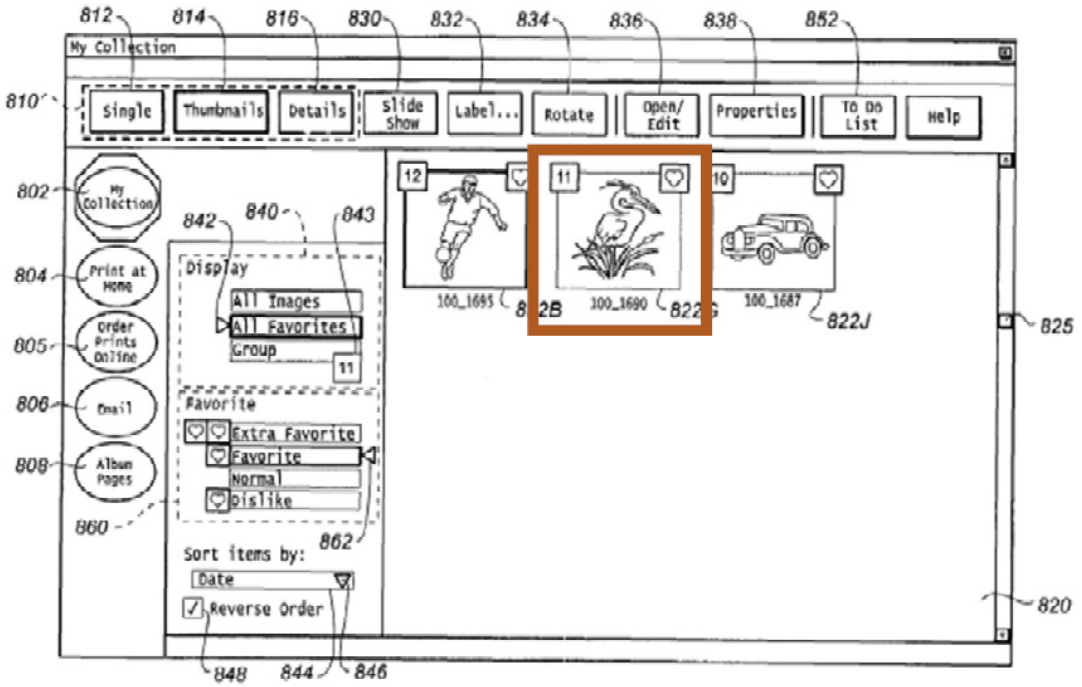


FIG. 9B

LG-1005, FIG. 9B (annotated)

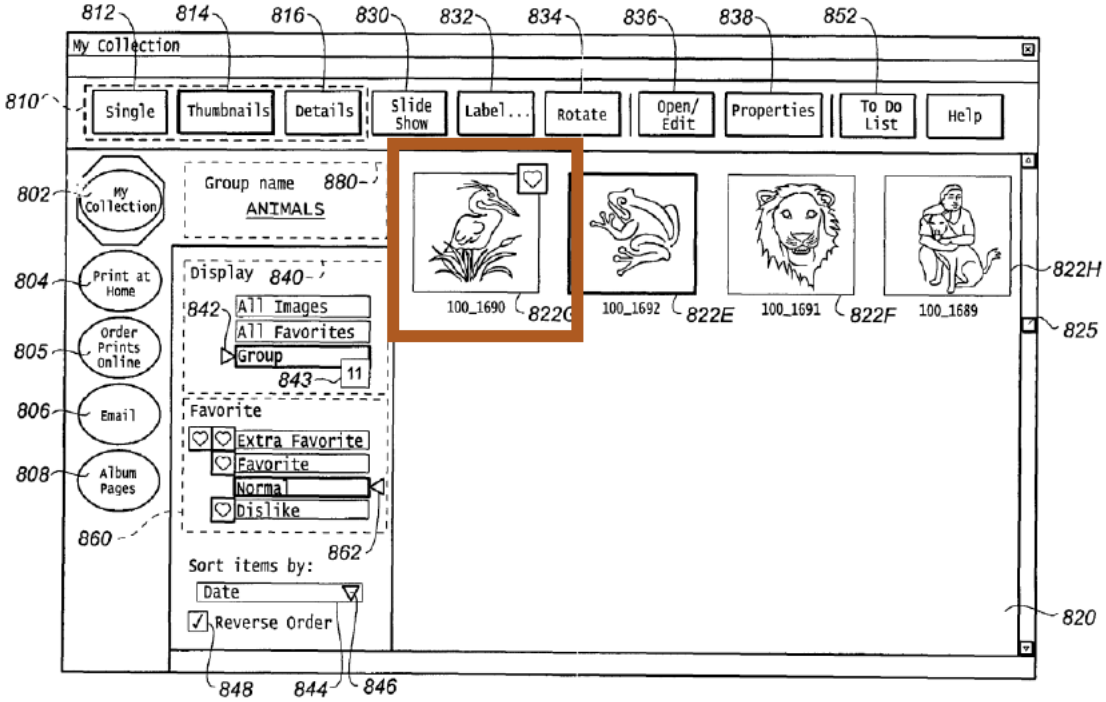


FIG. 9C

LG-1005, FIG. 9C (annotated)

119. Bryant also discloses that, even though a media object (e.g., the crane 100_1690, 822G) is classified as "Favorite," it is also included in "Group/11" and can be found in "All images." A POSITA would have recognized that Bryant discloses that, if the crane media object were removed as a favorite, the media object would continue to be included in the "All images" and "Group/11" groups of video information, and the thumbnail for the crane media object would continue to be displayed with those groups of video information (though without a single heart displayed that would have otherwise indicated the object was a "Favorite"). *See* LG-1005, [0100]:

> In block 146 of FIG. 3B the user optionally resets images that are no longer considered favorites. This is accomplished using the favorites level selection area 860. The user first selects one of the thumbnail images (e.g., thumbnail images 822B), and the favorites level selection area 860 then displays the current favorites level. If the user has not previously modified the level, the images are either "Normal" or "Favorite". Using the selector 862, the user can change the level of the selected image to be an "Extra Favorite", a "Favorite", a "Normal" image, or a "Dislike" image.

That is, Bryant discloses that, even if one video information recorded on the recording medium included in both the first group of video information and the second group of video information is deleted from the first group of video information, the thumbnail associated with one video information continues to be included in (and displayed in) the second group of video information. Rather than

deleting the underlying file, such that it would no longer be in the "All images" or "Group/11" groups, Bryant discloses that "the favorites metadata is updated in the general assets table 600, and the icon displayed next to each thumbnail image is also updated, as was described earlier in relation to block 138." LG-1005, [0101]; *see also id.*, [0082]-[0087], [0096]-[0100].

120. A POSITA would have understood that a user would have expected to be able to modify groups independently by deleting the video from one group (such as its inclusion in All Favorites), without removing its membership in a second group (such as All Images or Group/11). If un-favoriting a video image somehow removed it from its Group (e.g., sports) or from the full catalog of images (e.g., "All Images"), that would have limited the utility of the system and caused confusion for the user.

121. To the extent that it is argued that this element is not disclosed in Bryant, it would have been obvious in view of Bryant. The use of pointers to data objects, such as video files, was well-known and commonplace. *See* §VI (Technology Background). Indeed, Bryant expressly indicates the use of pointers:

> It will be understood that while in a preferred embodiment, the local database stores objects in an object oriented database management system (OODBMS). In alternative embodiments, the local database can use many different types of more primitive data structures, including arrays, tables, lists, registries, and the like, to store the data identifying favorite images and groups of images.

> FIG. 8 depicts information included in the local database stored on the hard drive 20. The database includes a general assets table 600 that includes an image data object 632-652 for each transferred image. In particular, there are 11 data objects which correspond to the 11 image files 432-452, named 100_1686 through 100_1696 shown in FIG. 5.
>
> Each image data object, for example "object 11 (100_1696) 652, which corresponds to the image file 452 named 100_1696 in FIG. 5, includes the table of data fields 610. Each row 660-692 of the table 610 includes a particular type of metadata describing the image. The metadata in the database is preferably stored using XML.

LG-1005, [0081]-[0083]; *see also id.,* [0086].

122. It would have been an obvious design choice to include independently editable groups in Bryant, and the inclusion of such a standard feature would have been well within the skill of a POSITA given the well-known and ubiquitous use of pointers in the field. *See* §VI (Technology Background). For example, Horn explains that "items may be removed from a collection by choosing the Remove command, which removes the items from the collection but does not otherwise delete the item from the source (e.g. the file system) or any other collections." LG-1021, [0167]

123. A POSITA would have recognized from Bryant that if the crane media object were removed as a favorite, the media object would continue to be included in the "All images" and "Group/11" groups of video information, with its thumbnail continuing to be displayed as one of the thumbnails in the All images" and "Group/11" groups of video information. LG-1005, [0100]. Rather than being

deleted from other groups, merely the favorite information is reset and the media object is retained in the, e.g., "All images" group:

> In block 146 of FIG. 3B the user optionally resets images that are no longer considered favorites. This is accomplished using the favorites level selection area 860. The user first selects one of the thumbnail images (e.g., thumbnail images 822B), and the favorites level selection area 860 then displays the current favorites level. If the user has not previously modified the level, the images are either "Normal" or "Favorite". Using the selector 862, the user can change the level of the selected image to be an "Extra Favorite", a "Favorite", a "Normal" image, or a "Dislike" image.

LG-1005, [0100]; *see id.*, [0082]-[0087], [0096]-[0099], [0101] ("the favorites ***metadata is updated*** in the general assets table 600, and the icon displayed next to each thumbnail image is also updated, as was described earlier in relation to block 138") (emphasis added).

ii. *Claim 2*

[2.a] The information processing apparatus according to claim 1, wherein the controller controls the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed,

124. Bryant discloses the controller controlling the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed. LG-1005, [0088]-[0090], [0098]-[0102], [0254]-[0256] ("840 display selection area; 842 selector; 843 group number/name box"), FIGS. 3B, 9A-9C.

125. For example, as shown in FIG. 9B below, Bryant discloses a first area (circled blue) that displays names of groups of video information (e.g., "All Favorites"). LG-1005, FIG. 9B. That is, a first character ("All Favorites" or one or more letters of "All Favorites") corresponding to the first group of video information ("All Favorites" folder) is displayed in a first area (circled blue) when the first group of thumbnails is displayed (circled red). LG-1005, [0099]-[0102], FIG. 9B. Bryant explains that, if "the user selects the 'Display Favorites' option, for example, by selecting the 'All Favorites' option using selection window 840 in FIG. 9A," then, in FIG. 9B, "GUI screen 800B displays in area 820 the thumbnail images 822B, 822G, and 822J that correspond to favorite images." LG-1005, [0098]-[0099]; FIGS. 9A-9B.

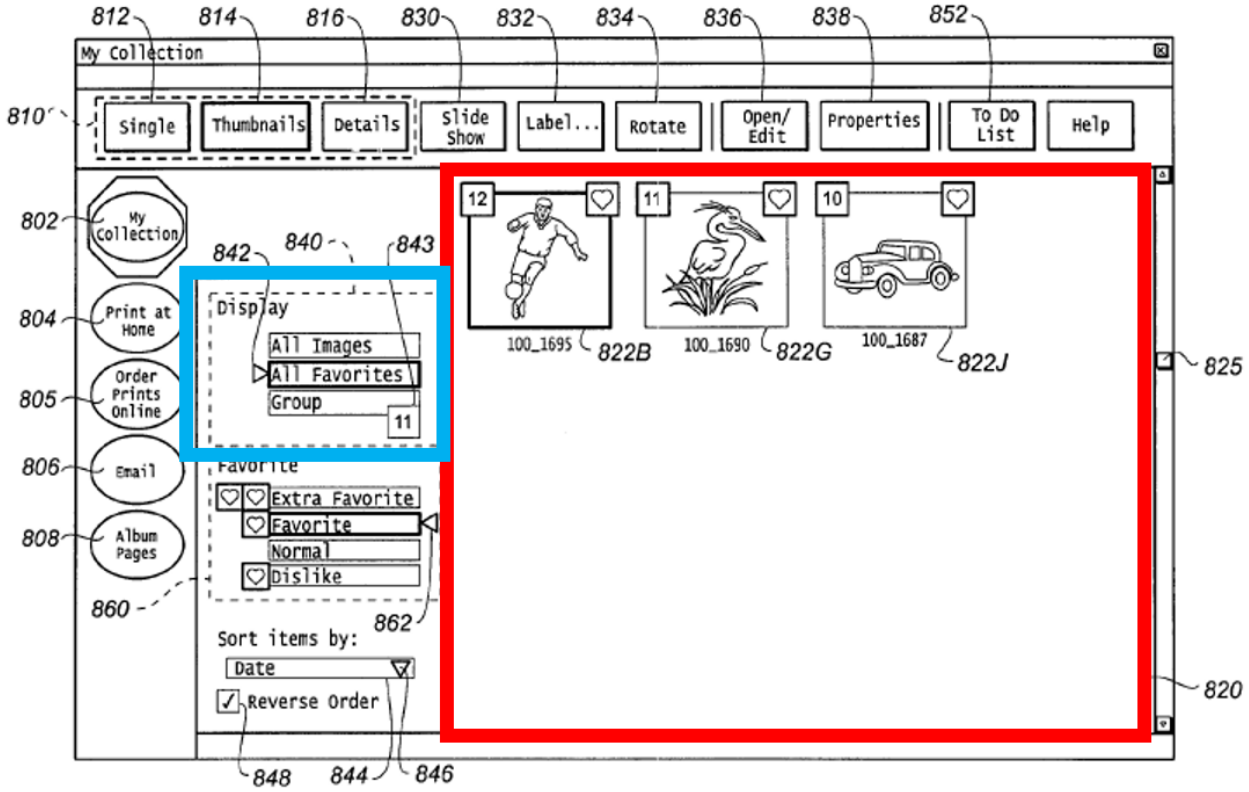


FIG. 9B

LG-1005, FIG. 9B (annotated)

[2.b] wherein the controller controls the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed.

126. Bryant discloses the controller controlling the output unit to display a second character corresponding to the second group of video information (e.g., one or more letters in the name "All Images") in the first area when the second group of thumbnails is displayed. LG-1005, [0088]-[0090], [0098]-[0102], [0254]-[0256] ("840 display selection area; 842 selector; 843 group number/name box"), FIGS. 3B, 9A-9C; *see* discussion of Element [2.a].

127. For example, as shown in FIG. 9A below, Bryant discloses the first area (circled blue) that displays names of groups of video information (e.g., "All Images"). LG-1005, FIG. 9A. That is, a second character ("All Images" or one or more letters of "All Images") corresponding to the second group of video information ("All Images" folder) is displayed in the first area (circled blue) when the second group of thumbnails is displayed (circled red). LG-1005, [0089]-[0098], FIG. 9A. With reference to FIG. 9A, Bryant explains that, "[b]y moving a selector 842 within a display selection area 840, the user can select a display of 'All Images,'" and the thumbnails in the "All Images" folder are displayed. LG-1005, [0089], FIG. 9A.

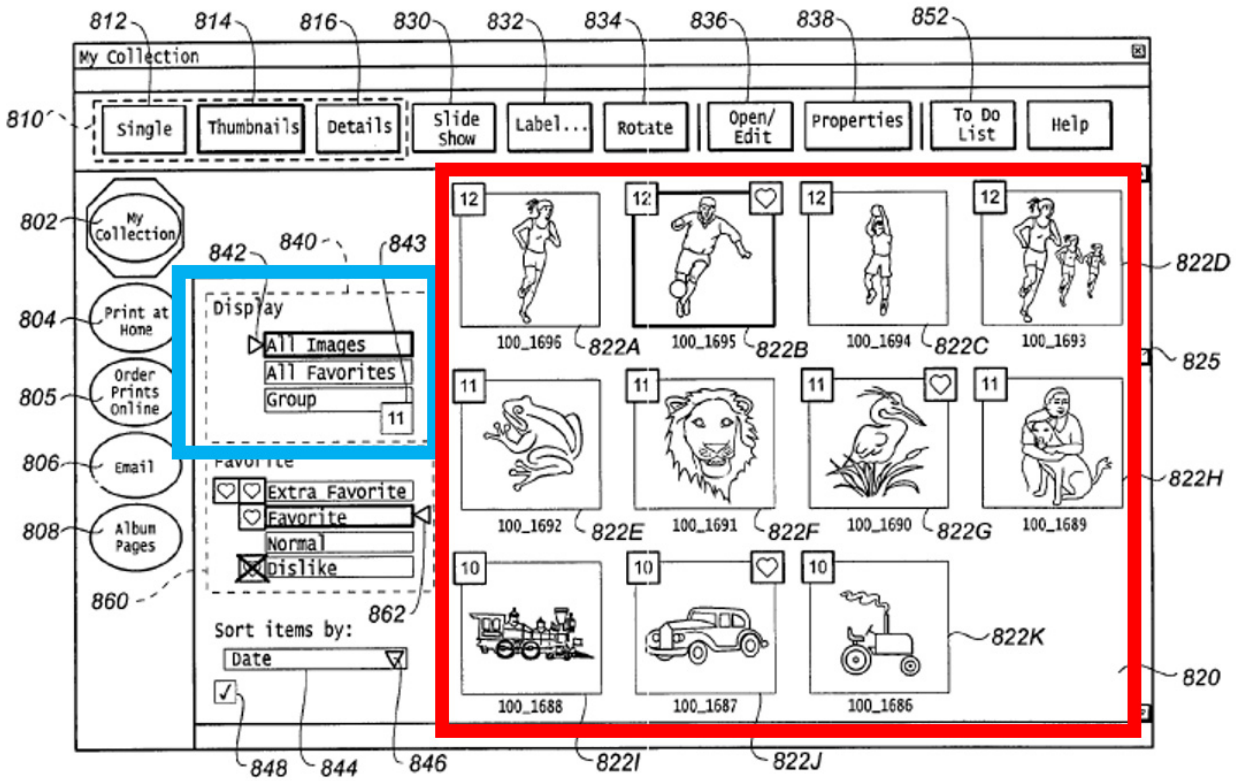


FIG. 9A

LG-1005, FIG. 9A (annotated)

iii. *Claim 3*

[3.a] The information processing apparatus according to claim 2, wherein the controller controls the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area,

128. Bryant discloses the controller controlling the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area. LG-1005, [0088]-[0090], FIGS. 3B, 9A-9C; *see* discussion of Elements [2.a]-[2.b].

129. As shown in FIG. 9B, below, the first group of thumbnails (thumbnails in the "All Favorites" folder) is displayed in a second area (circled red) that is different from the first area (circled blue). LG-1005, [0090] ("The GUI screen 800A also includes a display format selection area 810, which provides three types of display formats. A 'Thumbnails' display icon 814 displays an array of thumbnails in the image display area 820, as shown in the example of FIG. 9."), FIG. 9B.

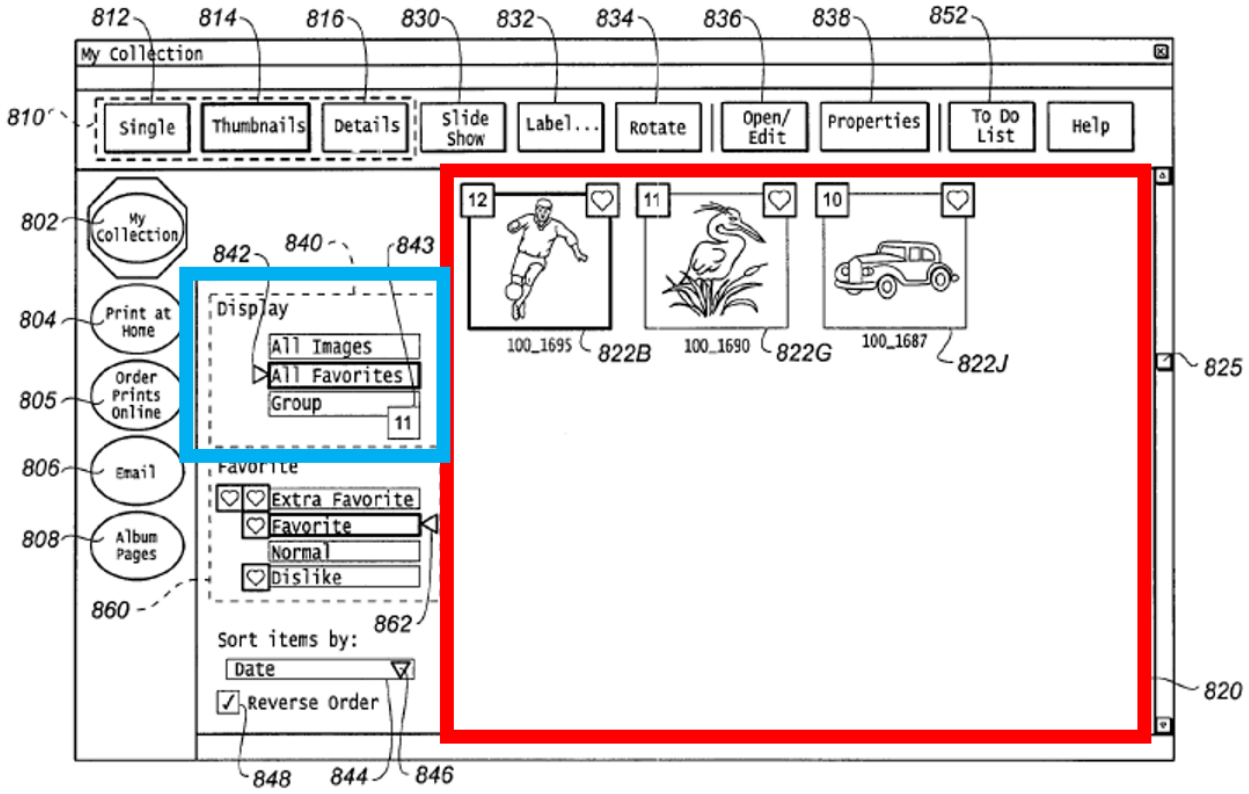


FIG. 9B

LG-1005, FIG. 9B (annotated)

[3.b] wherein the controller controls the output unit to display the second group of thumbnails in the second area when the second group of thumbnails is displayed.

130. Bryant discloses the controller controlling the output unit to display the second group of thumbnails in the second area when the second group of thumbnails is displayed. LG-1005, [0088]-[0090], FIGS. 3B, 9A-9C; *see* discussion of Element [3.a].

131. As shown in the examples of FIG. 9A, below, the second group of thumbnails (thumbnails in the "All Images" folder) is displayed in a second area (circled red) that is different than the first area (circled blue). LG-1005, [0090] ("The GUI screen 800A also includes a display format selection area 810, which provides three types of display formats. A 'Thumbnails' display icon 814 displays an array of thumbnails in the image display area 820, as shown in the example of FIG. 9."), FIG. 9A; *see also id.*, FIG. 9C.

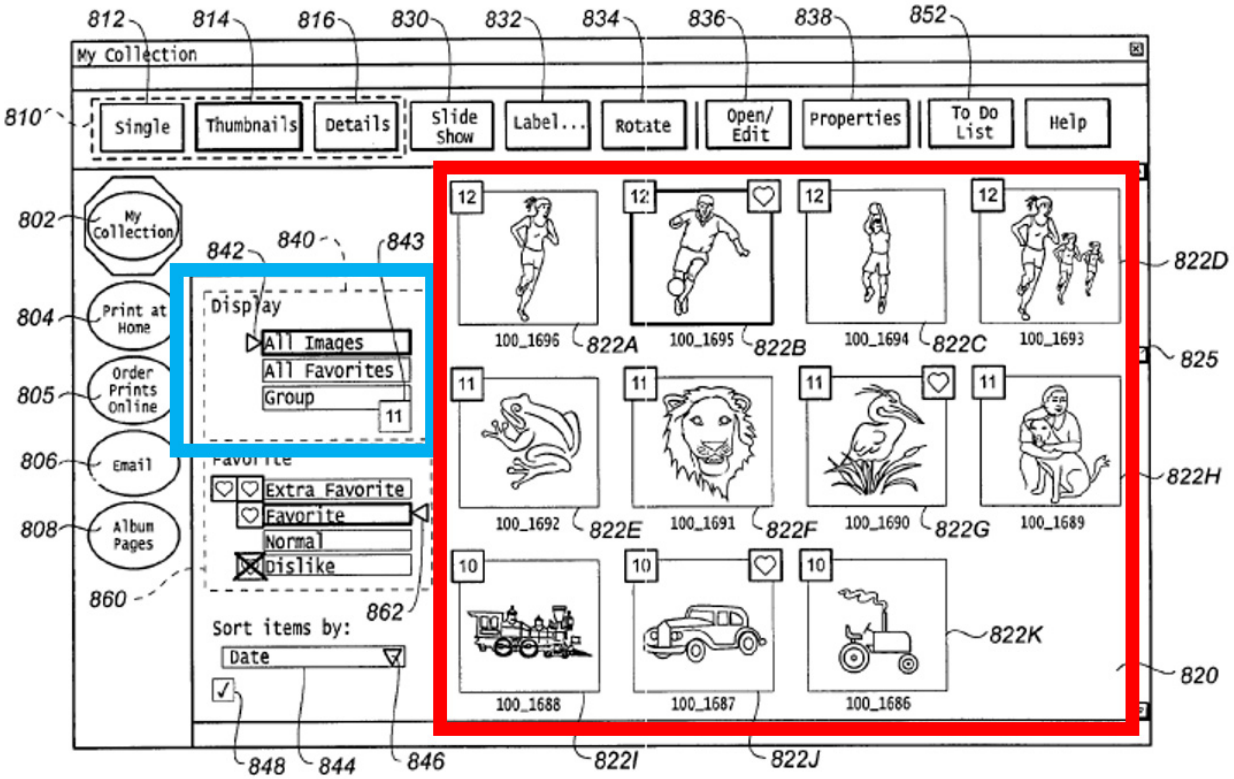


FIG. 9A

LG-1005, FIG. 9A (annotated)

iv. *Claim 4*

[4] ***The information processing apparatus according to claim 3, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.***

132. Bryant discloses or renders obvious when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the

one video information recorded on the recording medium. *See* discussion of Element [1.g].

133. A POSITA would have understood that, if deleting the one video information from the first group of video information does not delete the one video information from the second group of video information, per the discussion of Element [1.g], then it would have been obvious to a POSITA for the one video information to remain recorded on the recording medium, at least so that it can continue to be available in the second group of video information. For example, a POSITA would have found it obvious that deleting one video information from the "All Favorites" group would not remove that information from the "All Images" group. *See* discussion of Element [1.g]. In order for the information to remain in the "All Images" group, a POSITA would have found it obvious for the data to remain recorded on the recording medium. *Id.* As such, Bryant discloses or renders obvious that the one video information is not deleted from the recording medium. *Id.*

v. *Claim 5*

[5.pre] ***An information processing system comprising:***

134. *See* discussion of Element [1.pre].

[5.a] a recording unit configured to record a plurality of video information on a recording medium;

135. *See* discussion of Element [1.a].

[5.b] a reproducing unit configured to reproduce selected video information read out from the recording medium; and

136. *See* discussion of Element [1.c].

[5.c] a display unit configured to output a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

137. *See* discussion of Element [1.b].

[5.d] wherein, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information, a first group of thumbnails corresponding to the first group of video information is displayed on the display,

138. *See* discussion of Element [1.e].

[5.e] wherein, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, a second group of thumbnails corresponding to the second group of video information is displayed on the display, and

139. *See* discussion of Element [1.f].

[5.f] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the one video information continues to be included in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the second group of thumbnails is displayed on the display.

140. *See* discussion of Element [1.g].

vi. Claim 6

[6.a] The information processing system according to claim 5, wherein the display displays a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed on the display,

141. *See* discussion of Element [2.a].

[6.b] wherein the display displays a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed on the display.

142. *See* discussion of Element [2.b].

vii. Claim 7

[7.a] The information processing system according to claim 6, wherein the display displays the first group of thumbnails in a second area when the first group of thumbnails is displayed on the display, the second area being different from the first area,

143. *See* discussion of Element [3.a].

[7.b] wherein the display displays the second group of thumbnails in the second area when the second group of thumbnails is displayed on the display.

144. *See* discussion of Element [3.b].

viii. *Claim 8*

[8] The information processing system according to claim 7, further comprising: a controller, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

145. *See* discussion of Claim [4].

ix. *Claim 9*

[9.pre] An information processing method comprising:

146. *See* discussion of Element [1.pre].

[9.a] recording, by a recording unit, a plurality of video information on a recording medium;

147. *See* discussion of Element [1.a].

[9.b] outputting, by an output unit, a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

148. *See* discussion of Element [1.b].

[9.c] reproducing, by a reproducing unit, selected video information read out from the recording medium;

149. *See* discussion of Element [1.c].

[9.d] controlling, by a controller, the output unit to display a first group of thumbnails corresponding to the first group of video information, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information,

150. *See* discussion of Elements [1.d]-[1.e].

[9.e] controlling, by a controller, the output unit to display a second group of thumbnails corresponding to the second group of video information, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information,

151. *See* discussion of Elements [1.d], [1.f].

[9.f] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the one video information in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails.

152. *See* discussion of Element [1.g].

x. *Claim 10*

[10.a] The information processing method according to claim 9, further comprising: controlling, by the controller, the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed; and

153. *See* discussion of Element [2.a].

[10.b] controlling, by the controller, the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed.

154. *See* discussion of Element [2.b].

xi. *Claim 11*

[11.a] The information processing method according to claim 10, further comprising: controlling, by the controller, the output unit to display the first group of thumbnails in a second area when the first group of

thumbnails is displayed, the second area being different from the first area; and

155. *See* discussion of Element [3.a].

[11.b] controlling, by the controller, the controller controls the output unit to display the second group of thumbnails in the second area when the second group of thumbnails is displayed.

156. *See* discussion of Element [3.b].

xii. *Claim 12*

[12] The information processing method according to claim 11, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

157. *See* discussion of Claim [4].

xiii. *Claim 13*

[13.pre] An information processing system comprising:

158. *See* discussion of Element [1.pre].

[13.a] a recording unit configured to record a plurality of video information on a recording medium;

159. *See* discussion of Element [1.a].

[13.b] a reproducing unit configured to read video information from the recording medium;

160. *See* discussion of Element [1.c].

[13.c] a display unit; and

161. *See* discussion of Element [1.b].

[13.d] a controller, wherein the controller is configured to:

162. *See* discussion of Element [1.d].

[13.e] control the display unit to display a menu display that includes a plurality of selectable characters that respectively correspond to a plurality of groups of video information,

163. *See* discussion of Element [1.b].

[13.f] upon selection of a character corresponding to a first group of video information in the menu display by specifying a position of the character corresponding to the first group of video information, control the display unit to display a first group of thumbnails corresponding to the first group of video information, and

164. *See* discussion of Element [1.e].

[13.g] upon selection of a character corresponding to the second group of video information in the menu display by specifying a position of the character corresponding to the second group of video information, control the display unit to display a second group of thumbnails corresponding to the second group of video information,

165. *See* discussion of Element [1.f].

[13.h] wherein when one video information recorded on the recording medium is included in both the first group of video information and the second group of video information, and upon deletion of the one video information from the first group of video information, the one video information continues to be included in the second group of video information, and the controller controls the display unit to display a thumbnail corresponding to the one video information as one of the thumbnails of the second group of thumbnails.

166. *See* discussion of Element [1.g].

xiv. *Claim 14*

[14.a] The information processing system according to claim 13, wherein upon display of the first group of thumbnails on the display unit, the control unit controls the display unit to display a first character corresponding to the first group of video information in a first area,

167. *See* discussion of Element [2.a].

[14.b] wherein upon display of the second group of thumbnails on the display unit, the controller controls the display unit to display a second character corresponding to the second group of video information in the first area.

168. *See* discussion of Element [2.b].

xv. *Claim 15*

[15.a] The information processing system according to claim 14, wherein upon display of the first group of thumbnails on the display unit, the controller controls the display unit to display the first group of thumbnails in a second area, the second area being different from the first area, and

169. *See* discussion of Element [3.a].

[15.b] wherein upon display of the second group of thumbnails on the display unit, the controller controls the display unit to display the second group of thumbnails in the second area.

170. *See* discussion of Element [3.b].

xvi. *Claim 16*

[16] The information processing system according to claim 15, wherein, upon deletion of the one video information from the first group of video information, the controller removes the one video information from the first group of video information without instructing the deletion of the one video information recorded on the recording medium.

171. *See* discussion of Claim [4].

C. Ground 2: Claims 1-16 are obvious over Kaplan

i. *Claim 1*

[1.pre] An information processing apparatus comprising:

172. To the extent the preamble is limiting, Kaplan discloses or renders obvious an information processing apparatus, an information processing system, and an information processing method. LG-1004, [0004], [0037], [0038] ("multimedia management system 10 for storing, manipulating, and displaying multimedia content"), [0068], [0069].

173. In particular, Kaplan discloses a "multimedia management system for storing, manipulating, and displaying multimedia content" selected by a user, and can be implemented on a number of devices, including a computer. LG-1004, [0004], [0037]-[0038], [0068]-[0069]. Kaplan discloses that computers and/or processors, among other devices, may be used to implement its disclosed system. LG-1004, [0037]-[0038]; [0068]-[0069]. The computer may further include a computer-readable storage medium for storing multimedia content, such as video information. LG-1004, [0034] ("Any suitable computer readable medium may be utilized including hard disks….."), claim 7 ("storing a multimedia data file in a data storage system").

[1.a] a recording unit configured to record a plurality of video information on a recording medium;

174. Kaplan discloses or renders obvious a recording unit configured to record/store a plurality of video data/information on a recording medium. LG-1004, Abstract, [0004], [0034], [0037], [0038], [0043]-[0044], [0068], [0069], [0070] ("high density removable media"), [0071], claim 7 ("storing a multimedia data file in a data storage system"). In particular, Kaplan teaches recording or storing a "multimedia data file" and/or "multimedia content, which can include digital video," on a recording medium, such as "hard disks, flash memory cards, CD-ROMs, optical storage devices, or magnetic storage devices." LG-1004, Abstract, [0004], [0034], [0043]-[0044]. Kaplan explains that the "system provides users with a simple and intuitive method and computer program for reviewing multimedia content, which can include digital video," and that the "multimedia management system [is] for storing, manipulating, and displaying multimedia content," including "digital video." LG-1004, Abstract, [0004]; *see id.*, [0038]. Kaplan explains that "[a]ny suitable computer readable medium may be utilized including hard disks, flash memory cards, CD-ROMs, optical storage devices, or magnetic storage devices." LG-1004, [0034].

175. A POSITA would have understood that, for example, the "hard disk" of Kaplan necessarily includes a circuitry ("recording unit"), e.g., a hard disk

controller, that serves as an intermediary between the CPU and the physical storage platter of the hard drive in order to read data from the disk drive. Indeed, such circuitry was well known long before the Critical Date to include in hard drives to provide buffering, error correction, servo control, etc. for reading data from the hard drive.

176. For instance, Wang describes a "[h]ard disk drive storage devices [that] enable computer systems to quickly store data in a non-volatile manner and to retrieve the stored data when needed." LG-1023, 1:11-13; *see also id.*, 1:13-46. The "hard disk drive 100 includes a head disk assembly (HDA) 105 having one or more disks 102 with a magnetic media 101 formed on each surface 103 of a disk 102." *Id.*, 2:64-3:2; *see also id.*, 3:2-4:18, FIGS. 1-2. The hard disk drive 100 further includes a "control system 202 [that] sends to and receives signals from the head 114 during read and write operations performed on the disk 102." *Id.*, 3:16-18.

177. Similarly, Sharma teaches a hard disk drive with an "embedded disk controller Printed Circuit Board (PCB) 100" that "uses a program system 2000, a collection of buffers 1500-1580, and parameters 1590-1620, interacting through the servo-controller 1030," which act together to "implement[] the control signal flow in the hard disk drive 10." LG-1024, 5:50-6:4, FIG. 2. Jeppeson also discusses a "servo block," which "refers to general logic used in aiding the

spinning of the discs and in the positioning of the actuator on the disc." LG-1025, Abstract, 3. Given that Kaplan teaches the use of a hard disk for storing multimedia data, a POSITA would have found obvious that the hard disk includes necessary circuitry (recording unit) for storing data in the hard disk and retrieving data from the hard disk for display on the computer.

[1.b] an output unit configured to output a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

178. Kaplan discloses or renders obvious an output unit configured to output a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information. LG-1004, [0039]-[0040], [0050]-[0051] ("[T]he user interface 12 displays thumbnails 36 with images that identify the individual multimedia content computer files…. For example, thumbnails 80, 82, and 84 display images representing movies saved in the AVI and MPEG multimedia file formats."), [0056]-[0057], FIGS. 1 ("user interface"), 3 ("user interface"), 4-12 ("user interface 12"), 14 ("user interface 12"), 16 ("user interface 12"), claim 16 ("wherein the plurality of predetermined playback devices are selected from the group consisting essentially of televisions, high definition television (hdtv), a video display associated with a computer system, video

monitors and video displays"), FIGS. 7-12, 14, 16 (interface 12); *see also* discussion of Elements [1.e]-[1.f]. Specifically, Kaplan teaches a computer monitor or television that performs the function of outputting a menu display in the form of user interface 12 for a user to select a group of video information (e.g., "Desktop") among a plurality of groups of video information (e.g., "Desktop," "My Computer," "Favorites," "History," "Catalog") by moving and clicking a mouse pointer over a desired group. *Id.*

179. In more detail, Kaplan teaches that its "multimedia management system 10 may include a user interface 12 as shown in FIG. 2." LG-1004, [0039]. "The interface 12 may also have control buttons 15 for controlling viewing and other options associated with the multimedia management system 10, as well as organizing and handling media and media presentation." LG-1004, [0039]. FIG. 3 shows the functions associated with the user interface 12. LG-1004, [0040]. "These functions may be carried out via control buttons provided in association with an interface such as shown in FIG. 2, or on a further interface accessed by the user, such as shown in FIG. 4." LG-1004, [0040].

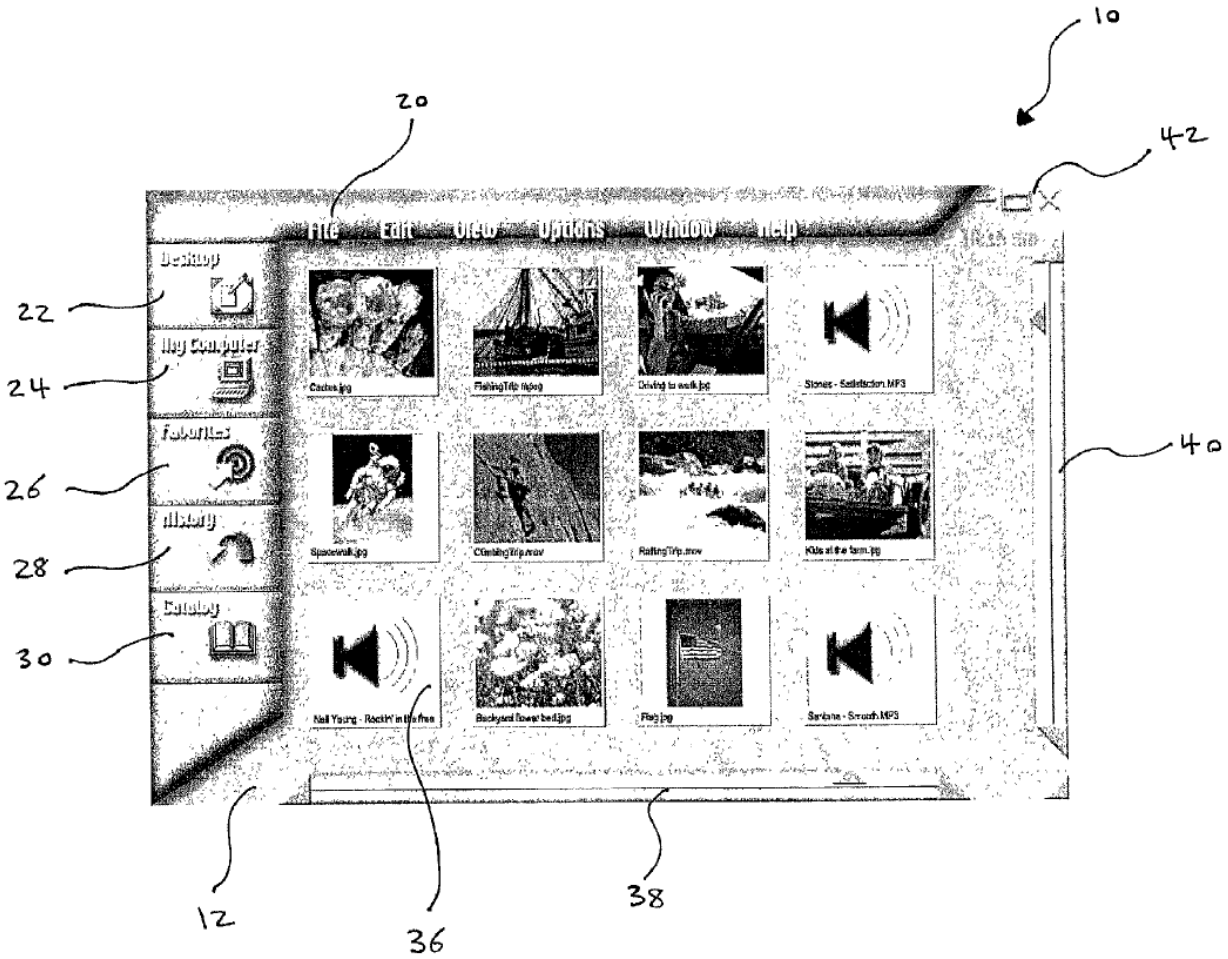


FIG.-4

LG-1004, FIG. 4

180. Kaplan's menu display is shown, for example, in Figure 8 (below), where a user has selected "History" (annotated below). LG-1004, FIG. 8; *see also id.*, FIGS. 7 ("Favorites"), 11 ("Catalog"). A POSITA would have understood that Kaplan's menu (interface 12) displays, for user selection, a group of video information (e.g., the displayed categories, such as "Favorites" or "History") among a plurality of groups of video information (e.g., "Desktop," "My

Computer," "Favorites," "History," "Catalog"). Notably, Kaplan explains that, "[t]o select one of the primary options, the user typically will move and click a mouse pointer over the desired button," thereby specifying a position of a character that corresponds to the one group of video information (e.g., by clicking the mouse pointer on one or more characters in the name of the desired category, such as the "F" of "Favorites"). LG-1004, [0040]. That is, a user specifies a position of a letter in the name of the desired category by clicking on a position of that character/letter where that character/letter is displayed on the user interface. *Id.*

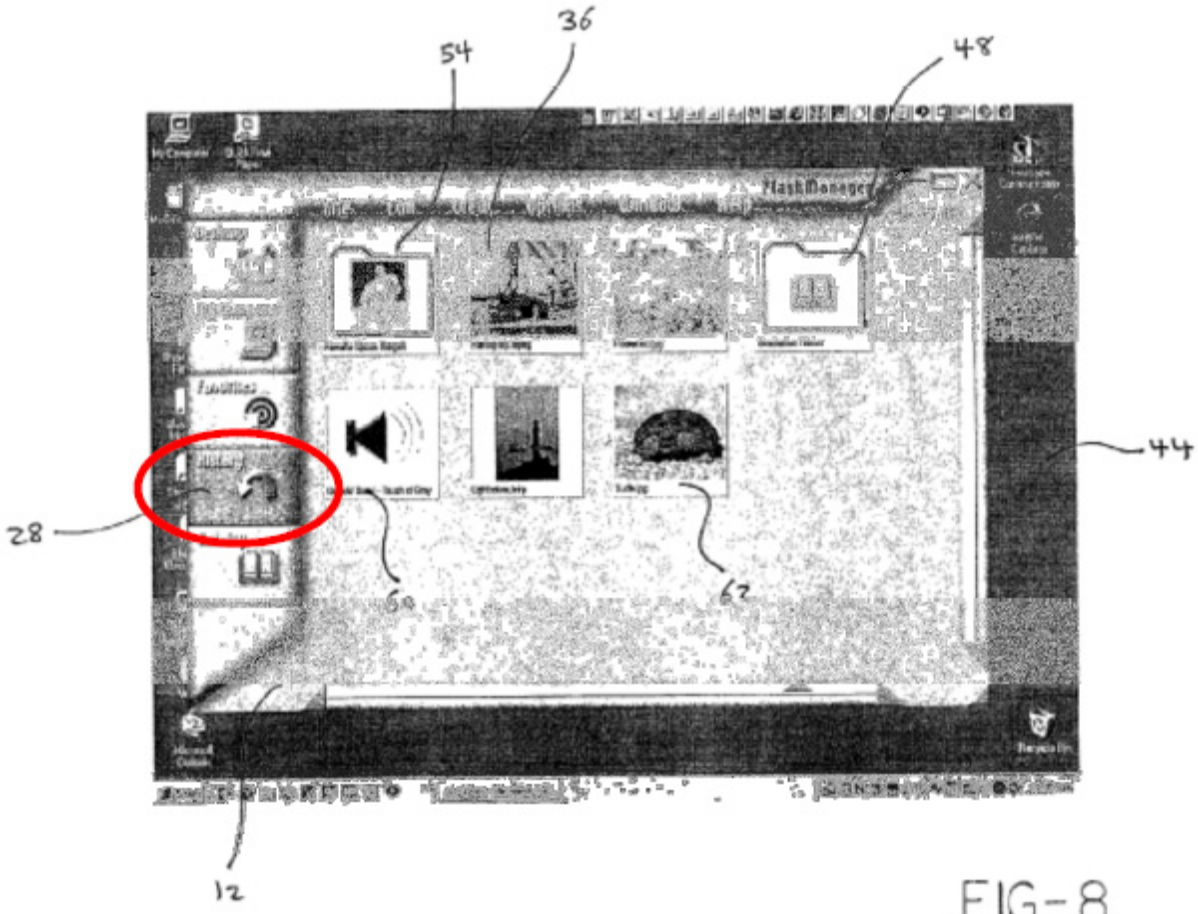


FIG-8

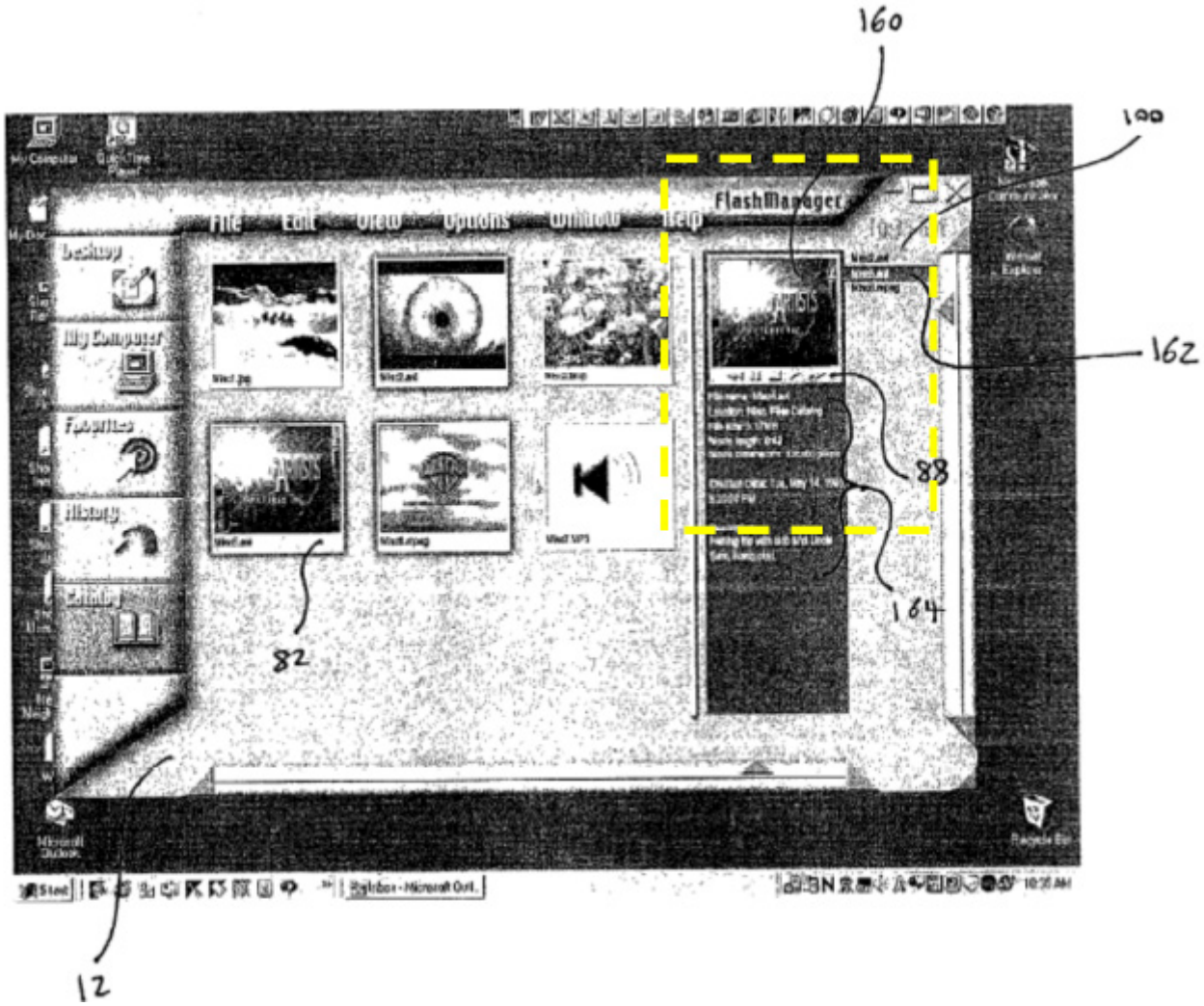
LG-1004, FIG. 8 (annotated)

[1.c] a reproducing unit configured to reproduce selected video information read out from the recording medium; and

181. Kaplan discloses or renders obvious a reproducing unit configured to reproduce selected video information read out from the recording medium. LG-1004, [0004] ("The present invention is a multimedia management system for storing, manipulating, and displaying multimedia content" on a computer), [0006] ("Users activate video and audio multimedia content directly within thumbnails…"), [0034] ("Any suitable computer readable medium may be utilized including hard disks, flash memory cards, CD-ROMs, optical storage devices, or magnetic storage devices."), [0037], [0038] ("displaying multimedia content," "reviewing their multimedia content, which can include digital video"), [0044] ("The management system provides a visual inventory of all multimedia content, whether on the PC or stored on external removable media, to facilitate retrieval of desired content from external removable media such as CD's, DVD's or removable disk drives."), [0050] ("thumbnails 80, 82, and 84 display images representing movies saved in the AVI and MPEG multimedia file formats"), [0051] ("An additional feature of multimedia management system 10 allows users to play multimedia content, such as video and audio recordings, in place."), [0052]-[0056], [0057] ("For the convenience of the user, Player Controls 88 are included within

the thumbnail 160, thereby allowing the user to preview the video/audio thumbnail selected while reviewing the detailed information."), [0068]-[0069]. As discussed above, Kaplan discloses a computer-readable storage medium, such as hard disks, for storing multimedia content, such as video information. LG-1004, [0034] ("Any suitable computer readable medium may be utilized including hard disks …"), claim 7 ("storing a multimedia data file in a data storage system"); *see* discussion of Element [1.a].

182. Additionally, Kaplan describes an interface 12 for reproducing for display user selected video information from among a plurality of video information recorded on a recording medium by the recording unit (*e.g.*, computer). LG-1004, [0038] ("multimedia management system 10 for storing, manipulating, and displaying multimedia content"). The video information in Kaplan includes at least the digital video file. For example, video files can be played back directly from a user-selected thumbnail in the interface, as shown in FIG. 16. LG-1004, [0057] ("For the convenience of the user, Player Controls 88 are included within the thumbnail 160, thereby allowing the user to preview the video/audio thumbnail selected while reviewing the detailed information."), [0051] ("system 10 allows users to play multimedia content … in place"), FIGS. 12, 13A-13B, 14 ("Play List," element 100), 16. Video files can also be played "full screen." LG-1004, [0057].



LG-1004, FIG. 16 (annotated)

183. To the extent that it is argued that [1.c] is not disclosed in Kaplan, it would have been obvious. It would have been an obvious design choice to include reproduction, such that a user could enjoy the video, and the inclusion of such a standard feature would have been well within the skill of a POSITA. The '449 Patent itself admits that reproduction of video from a recording medium, for instance with a playlist, was "conventional." *See* §VII.A.

184. Moreover, a POSITA would have understood that the hard disk of Kaplan necessarily includes a circuitry ("reproducing unit"), e.g., a hard disk controller, that serves as an intermediary between physical storage platter of the hard drive and the CPU in order to retrieve data from memory to display "images and information … on the display monitor 14 as a computer user interface screen (GUI screen)." LG-1005, [0149], FIGS. 7A-7B, 9A-9C, 15-16. Indeed, such circuitry was well known long before the Critical Date to include in hard drives to provide buffering, error correction, servo control, etc. for reading data from the hard drive.

185. For instance, Wang describes a "[h]ard disk drive storage devices [that] enable computer systems to quickly store data in a non-volatile manner and to retrieve the stored data when needed." LG-1023, 1:11-13; *see also id.*, 1:13-46. The "hard disk drive 100 includes a head disk assembly (HDA) 105 having one or more disks 102 with a magnetic media 101 formed on each surface 103 of a disk 102." *Id.*, 2:64-3:2; *see also id.*, 3:2-4:18, FIGS. 1-2. The hard disk drive 100 further includes a "control system 202 [that] sends to and receives signals from the head 114 during read and write operations performed on the disk 102." *Id.*, 3:16-18.

186. Similarly, Sharma teaches a hard disk drive with an "embedded disk controller Printed Circuit Board (PCB) 100" that "uses a program

system 2000, a collection of buffers 1500-1580, and parameters 1590-1620, interacting through the servo-controller 1030," which act together to "implement[] the control signal flow in the hard disk drive 10." LG-1024, 5:50-6:4, FIG. 2. Jeppeson also discusses a "servo block," which "refers to general logic used in aiding the spinning of the discs and in the positioning of the actuator on the disc." LG-1025, Abstract, 3. Given that Kaplan teaches the use of a hard disk for storing multimedia data, a POSITA would have found obvious that the hard disk includes necessary circuitry (recording unit) for storing data in the hard disk and retrieving data from the hard disk for display on the computer. In particular, the hard disk necessarily includes circuitry to send and receive signals from a transducer head in the hard disk "during read and write operations performed on the [hard] disk," or such circuitry would have at least been obvious in view of well known hard disk components. *See, e.g.* LG-1023, 3:16-18.

[1.d] a controller,

187. Kaplan discloses or renders obvious a controller in the form of a "processor." LG-1004, [0037]. In particular, Kaplan explains that "various computers and/or processors may be used to carry out the present invention." LG-1004, [0037] ("it should be understood that the present invention could be implemented using other computers and/or processors, including, but not limited to, mainframe computers and mini-computers").

[1.e] wherein, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information, the controller controls the output unit to display a first group of thumbnails corresponding to the first group of video information,

188. Kaplan discloses or renders obvious that, when a first group of video data is selected in the menu display by specifying a position of a character corresponding to the first group of video information, the controller controls the output unit to display a first group of thumbnails corresponding to the first group of video information. LG-1004, [0040], [0042]-[0047] (discussing button displays, such as "Favorites," "History," and "Catalog"), [0048]-[0050], FIGS. 7-12, 14, 16. In particular, Kaplan explains that when a first group of video data (e.g., "Favorites" or "History") is selected in a menu display interface by a user "mov[ing] and click[ing] a mouse pointer over the desired [Favorites or History] button," Kaplan's device displays a first group of thumbnails corresponding to the first group of video information (circled in red below). *Id.*

189. The user interface 12 of Kaplan includes a first area (illustrated in blue) and a second area (illustrated in red) that are displayed within a menu display (illustrated in green). LG-1004, FIG. 4; *see also id.*, FIGS. 2, 5-12, 14, 16, 17 (each illustrating an interface with a similar layout).

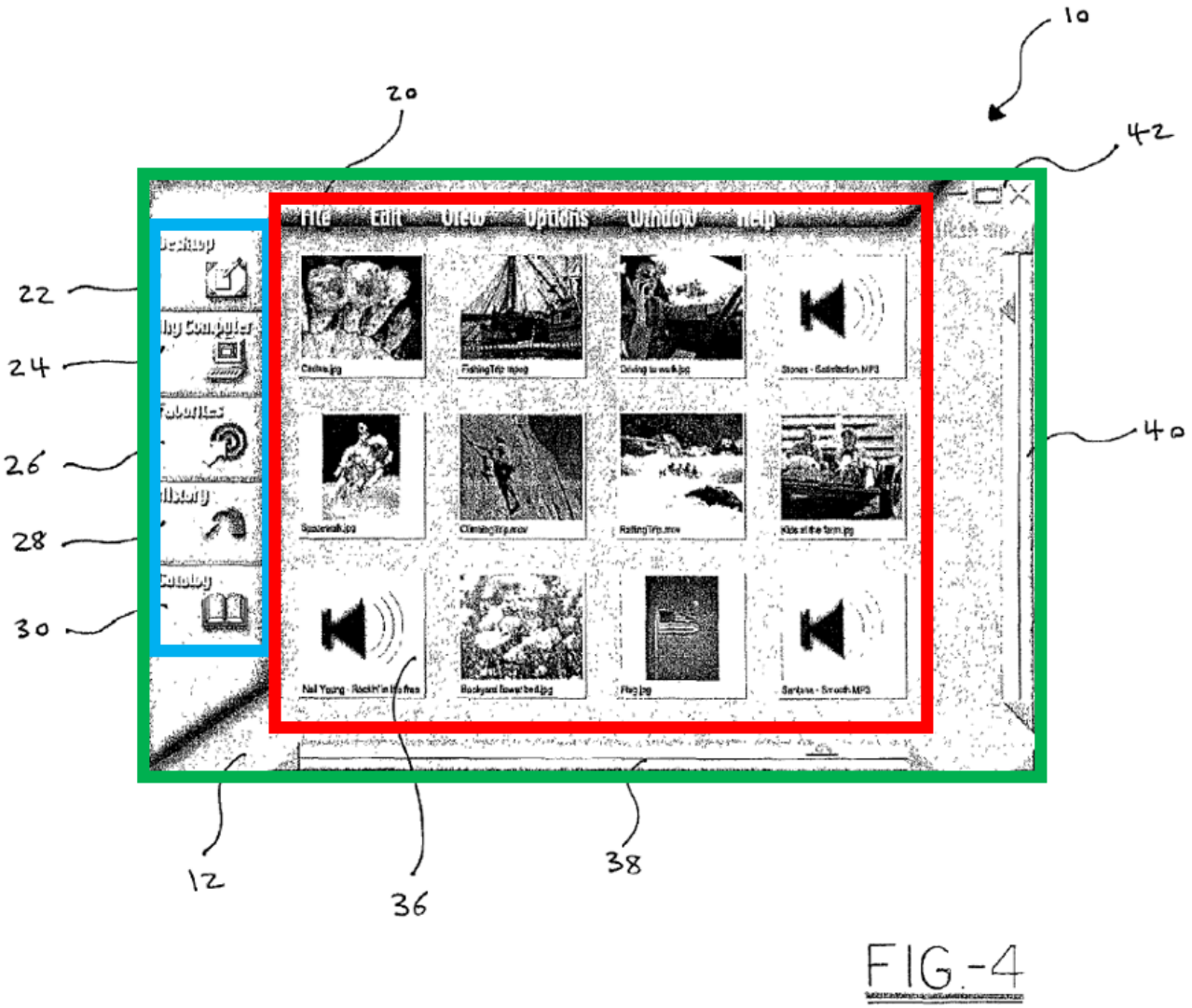
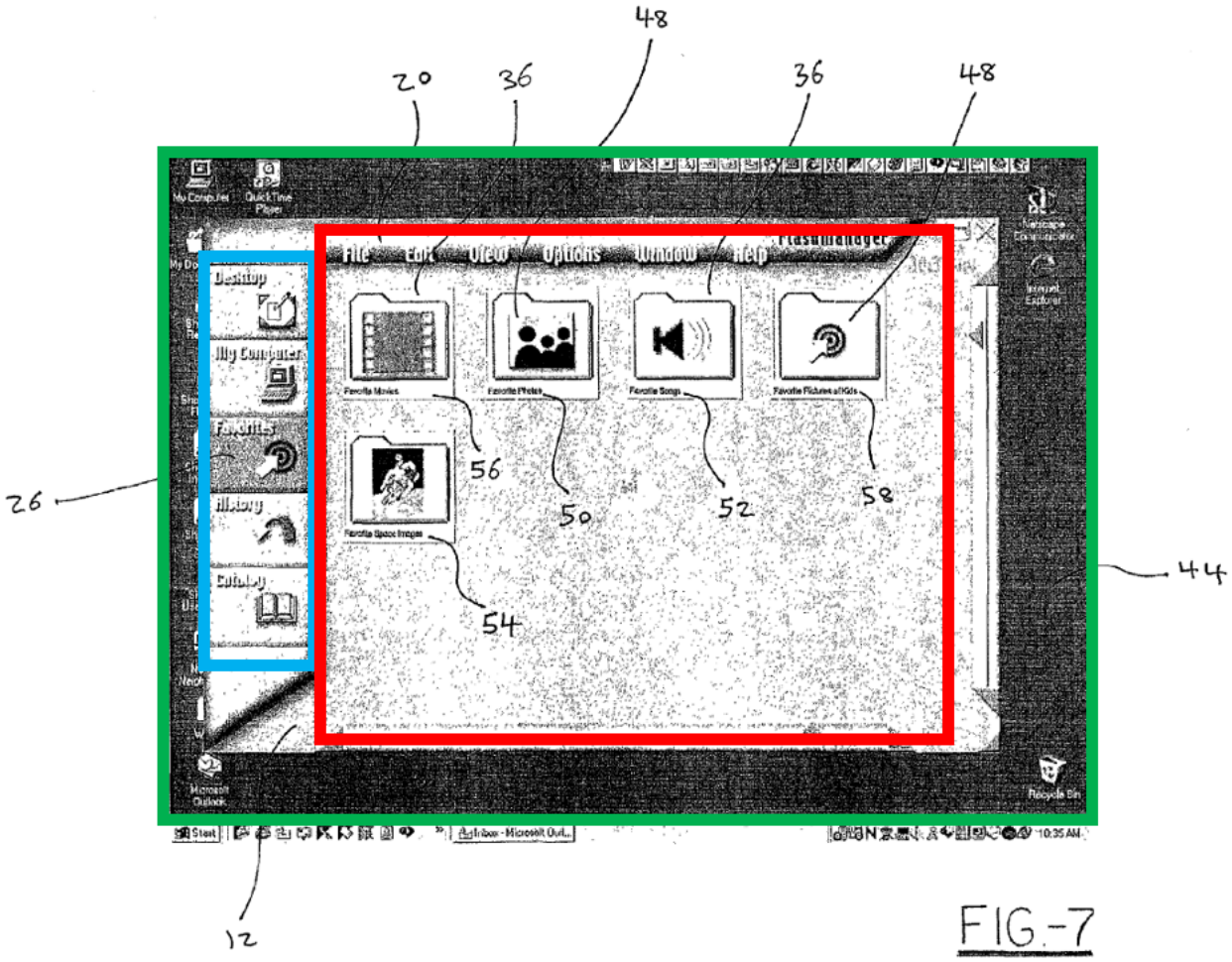


FIG.-4

LG-1004, FIG. 4 (annotated)

190. The first area (blue) is configured to display at least a first group of video information. LG-1004, FIGS. 2, 4-12, 14, 16-17. The second area is configured to display thumbnails corresponding to video information recorded on the recording medium by the recording unit for a given, selected group of video information. LG-1004, [0044]-[0050], FIGS. 2, 4-12, 14, 16-17. For instance, when a user selects "Favorites," as shown in FIG. 7, the thumbnails corresponding

to a user's favorites are displayed on the interface by the display monitor. LG-1004, [0040]-[0042], FIG. 7; *see also id.*, FIG. 8 ("History"), FIG. 11 ("Catalog"). Thus, when a user specifies a position of a character corresponding to one group of video information, the corresponding thumbnails for the associated group of video information are shown in the second area.



LG-1004, FIG. 7 (annotated)

191. To the extent it is argued that Kaplan does not disclose this feature, the claimed menu features would have been obvious. Each of the menu

requirements was an obvious design choice given the state of the art and knowledge of a POSITA at the time of the patent. *See* §VI (Technology Background). In particular, the claimed menu features were completely standard, worked in essentially the same way that innumerable menu systems of the time did, including Windows Explorer which was distributed with the ubiquitous Microsoft Windows 95 operating system. For example, the figure on page 32 of LG-1010 shows a menu display area with a first area on the left where you could select categories (e.g., folders), and see information displaying the content of those folders on the right (e.g., files). Using this menu structure in the context of the '449 Patent was at most the application of a well-known technique to improve a similar device in the same way by using it with a specific type of information (e.g., video information).

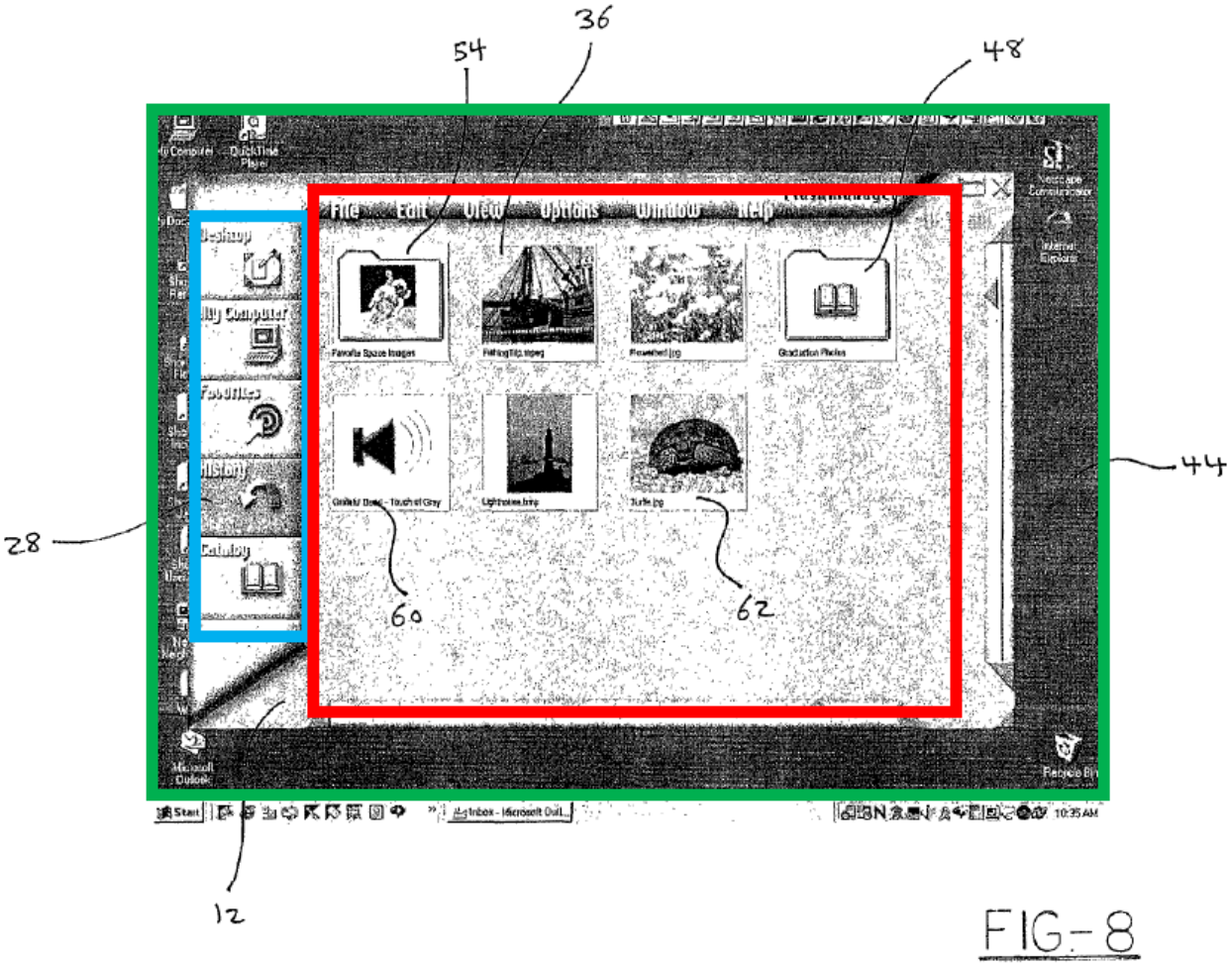
192. The inclusion of such standard menu features and media management techniques would have been well within the skill of a POSITA. Kaplan uses conventional components and programming. *See* LG-1004, [0037]-[0038], [0040], FIG. 3 ("Operating System Standard Functions").

[1.f] wherein, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, the controller controls the output unit to display a second group of thumbnails corresponding to the second group of video information, and

193. Kaplan discloses or renders obvious that, when a second group of video data is selected in the menu display by specifying a position of a character corresponding to the second group of video information, the controller controls the output unit to display a second group of thumbnails corresponding to the second group of video information. LG-1004, [0040], [0042]-[0047] (discussing button displays, such as "Favorites," "History," and "Catalog"), [0048]-[0050], FIGS. 7-12, 14, 16; *see* discussion of Element [1.e]. In particular, Kaplan explains that, when a second group of video data (e.g., "Catalog") is selected in the menu display (circled green) by a user "mov[ing] and click[ing] a mouse pointer over the desired [Catalog] button," the interface displays a second group of thumbnails corresponding to the second group of video information (circled in red below). *Id.*

194. For instance, when a user selects "History" (in first area circled blue) as shown in FIG. 8 below, "a predetermined number of thumbnails that the user has recently accessed" are displayed on the interface by the display monitor (in second area circled red). LG-1004, [0045], FIG. 8; *see also id.*, FIGS. 7 ("Favorites"), FIG. 8 ("History"). Thus, when a user specifies a position of a character corresponding to one group of video information, the corresponding

thumbnails for the associated group of video information are shown in the second area.



LG-1004, FIG. 8 (annotated)

195. To the extent it is argued that Kaplan does not disclose this feature, the claimed menu features would have been obvious. *See* discussion of Element [1.e].

[1.g] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video

information, the controller continues to include the one video information in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails.

196. Kaplan discloses or renders obvious wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the one video information in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails. LG-1004, [0042], [0044] ("The indexed file stores a pointer in the management system database to the physical file location, while providing a thumbnail image that can be used to represent the file in the management system user interface…"), FIGS. 7-12, 14, 16, claim 20.

197. Through its use of an indexed database file and pointers, Kaplan discloses [1.g]. LG-1004, [0042], [0044], FIGS. 7-12, 14, 16, Kaplan claim 20. In particular, the management system of Kaplan "provides a visual inventory of all multimedia content, whether on the PC or stored on external removable media, to facilitate retrieval of desired content from external removable media such as CD's, DVD's or removable disk drives." *Id.*, [0044]. Specifically, "[c]ontent is indexed

by the system for easy retrieval from such removable media or from the PC database by reference to a relevant index file to minimize the searching necessary to locate specific content. *Id.* As Kaplan explains:

> To facilitate the storage and subsequent retrieval of the multimedia data files, the multimedia management system user interface provides a plurality of predefined functions to ***uniquely index multimedia files***, ***create an index database file, and create visual representations of the files for later retrieval***. This function relates to a media library function of the media management system resident on a PC. ***The indexed file stores a pointer in the management system database to the physical file location, while providing a thumbnail image that can be used to represent the file in the management system user interface***. This allows ***multiple pointers in the media management database, which relate to a single physical file stored on computer media***. Thus, there is no need to store multiple physical files of the multimedia data, thereby saving storage space. Additionally, the media management system ***allows organization of the multimedia files into virtual albums of favorite multimedia files for easy access***, while archiving the source material. The indexing system will automatically drop the indexing information into the library files for access.

LG-1004, [0044] (emphasis added).

198. With indexed database file and pointers, the groups of video information in the different categories are "independently editable"—a single data file is represented by multiple representations in the user interface, when a representation in one group (*e.g.*, "Favorites") is deleted, the representation of that file in other groups (*e.g.*, "History" or "Catalog") remain. In fact, Kaplan included a claim to this very concept:

> 20. A system for managing multimedia data files comprising
>
> a database of multimedia data files,
>
> a user interface having representations of the data files, wherein ***multiple representations of a data file can be presented in the user interface***, with any representation of a data file having a ***pointer to a single data file stored on computer readable memory***.

LG-1004, claim 20.

199. A POSITA would have understood from Kaplan's description of its indexing and use of multiple pointers that, even if one video information recorded on the recording medium included in both the first group of video information and the second group of video information is deleted from the first group of video information, the one video information continue to be included in the second group of video information. With its use of multiple pointers to a single, stored file: (1) video information recorded on a recording medium can be included in multiple groups (e.g., first and second groups); and (2), if video information is deleted from a first group (e.g., "Favorites"), it will continue to be in the second group (e.g., "Desktop," "My Computer, "History," and/or "Catalog"). Additionally, a POSITA would have recognized that the way video information is included in a particular group is by including pointers to an indexed video in each of the first and second groups. *See, e.g.,* LG-1004, [0042] ("Referring now to FIG. 7, the Favorites 26

primary option button displays a plurality of thumbnails 36 that each represent and display a container 48. Essentially, containers 48 are graphical representations of the albums or entries in the multimedia database which point to the actual physical file in the computer system."). In this way, if a pointer is removed from either group, the underlying indexed video and pointers to that video in other groups are not affected. A POSITA would further have understood that, because the video remained in the second group, its thumbnail would also remain when the second group of thumbnails is displayed given how Kaplan's system shows thumbnails associated with a group when that group is selected.

200. A POSITA would have understood that a user would have expected to be able to modify groups independently by deleting the video from one group (such as its inclusion in Favorites), without removing its membership in a second group (such as Catalog). Without such a feature (which was standard), the user would not be able to control their favorites without disrupting other groups of videos.

201. To the extent that it is argued that [1.g] is not disclosed in Kaplan, it would have been obvious in view of Kaplan. The use of pointers to data objects, such as video files, was well-known and commonplace. §VI (Technology Background). It would have been an obvious design choice to include independently editable groups in Kaplan, and the inclusion of such a standard

feature would have been well within the skill of a POSITA given the well-known and ubiquitous use of pointers in the field. Indeed, given the state of the art at the time, a user would have found the *absence* of such a feature surprising. Indeed, the well-known nature of this use of pointers is further corroborated by Bryant, whose teachings on this topic are consistent with those of Kaplan and further explicitly taught by Horn. *See* §VI (Technology Background), §VIII.F. In particular, Horn explains that "items may be removed from a collection by choosing the Remove command, which removes the items from the collection but does not otherwise delete the item from the source (e.g. the file system) or any other collections." LG-1021, [0167].

ii. *Claim 2*

[2.a] The information processing apparatus according to claim 1, wherein the controller controls the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed,

202. Kaplan discloses the controller controlling the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed. LG-1004, [0040] ("a primary set of options may be provided via an interface to a user"), [0042]-[0047] (discussing button displays, such as "Favorites, " "History," and "Catalog"), [0048]-[0050], FIGS. 4, 7-12, 14, 16.

203. As shown in FIG. 4 below, Kaplan discloses that its user interface 12 includes a first area (circled blue) and a second area (circled red) that are displayed within a menu display (circled in green). LG-1004, FIG. 4. The first area includes "primary options," including "Desktop 22, My Computer 24, Favorites 26, History 28, and Catalog 30," where each "primary option may be represented on an interface as a 'button.'" *Id.*, [0040]. "To select one of the primary options, the user typically will move and click a mouse pointer over the desired button," though other "means of activating the primary options" are contemplated. *Id.* Kaplan explains that one advantage of this "user interface 12 … is that all information and multimedia content is displayed through thumbnails 36, which are small image representations of larger images." *Id.*

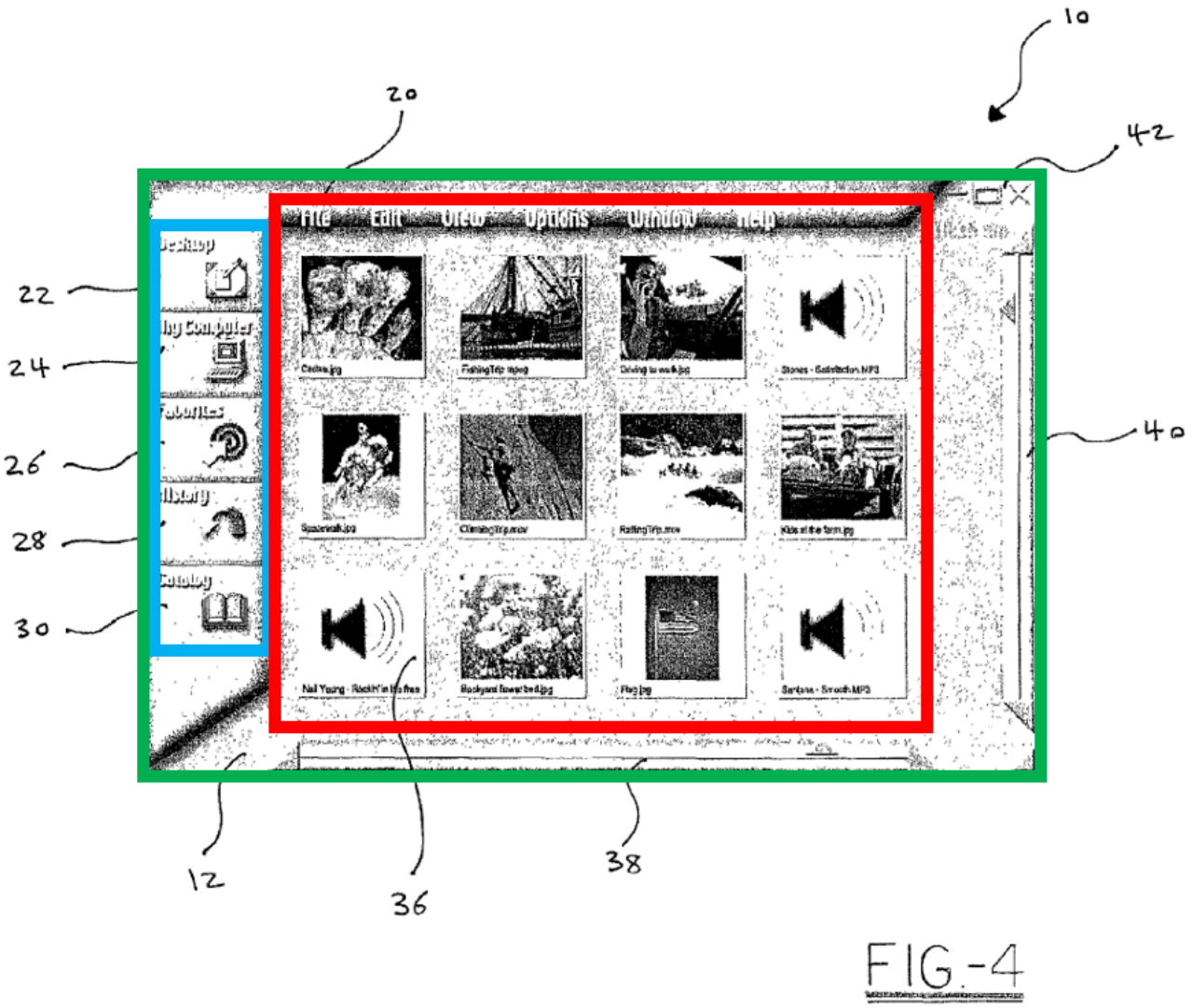


FIG.-4

LG-1004, FIG. 4 (annotated)

204. As shown in FIG. 7 below, Kaplan discloses a first area that displays names of groups of video information (e.g., "Favorites"). LG-1004, FIG. 7. That is, a first character ("Favorites" or one or more letters of "Favorites") corresponding to the first group of video information ("Favorites" group) is displayed in a first area (circled blue) when the first group of thumbnails is

displayed (circled red). *Id.* Kaplan explains that "the Favorites 26 primary option displays a plurality of thumbnails 36 that each represent and display a container 48," where "containers 48 are graphical representations of the albums or entries in the multimedia database which point to the actual physical file in the computer system." *Id.*, [0042].

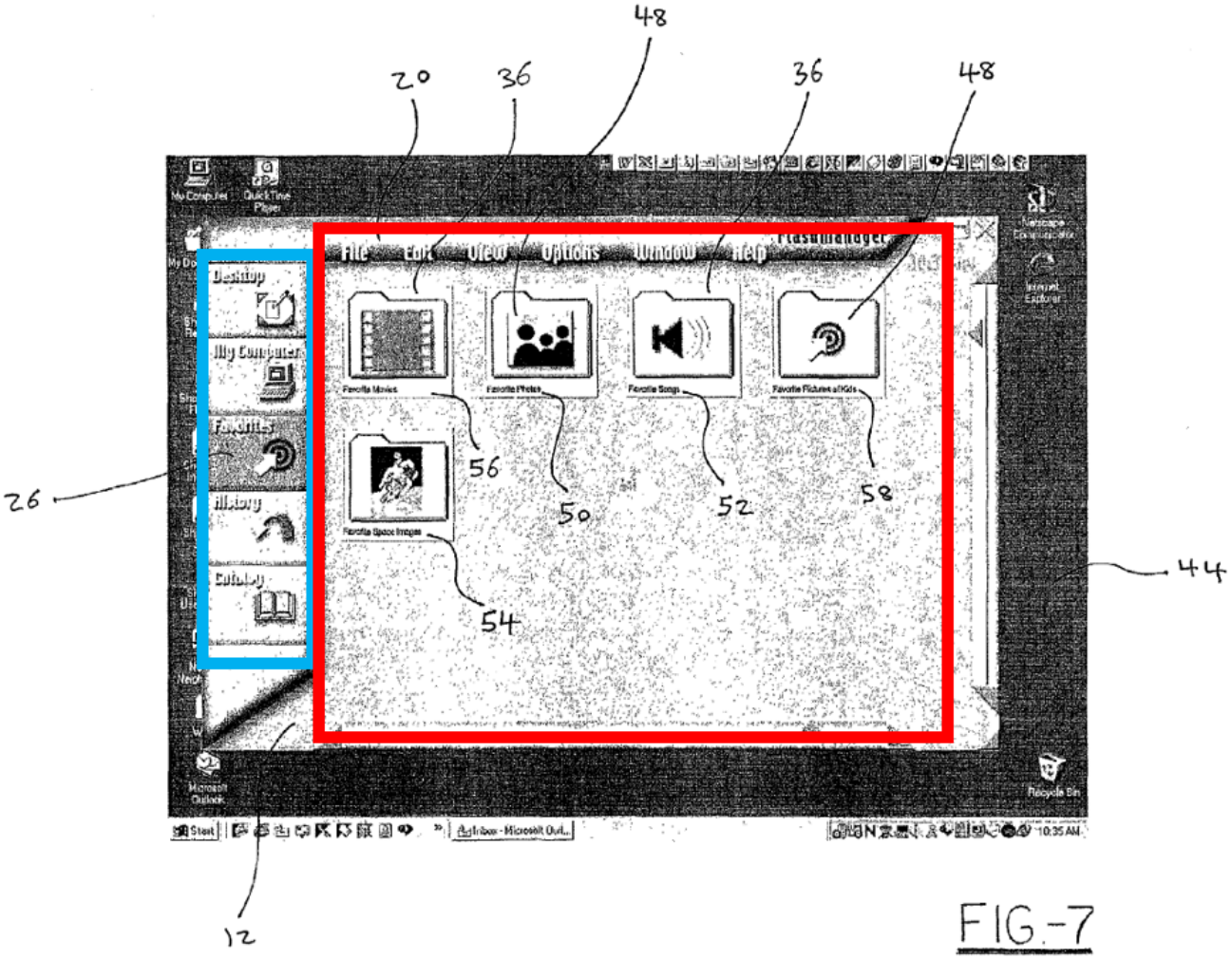


FIG.-7

LG-1004, FIG. 7 (annotated)

[2.b] wherein the controller controls the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed.

205. Kaplan discloses the controller controlling the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed. LG-1004, [0040] ("a primary set of options may be provided via an interface to a user"), [0042]-[0047] (discussing button displays, such as "Favorites, " "History," and "Catalog"), [0048]-[0050], FIGS. 4, 7-12, 14, 16; *see* discussion of Element [2.a].

206. As shown in FIG. 8, below, a second character ("History" or one or more letters of "History") corresponding to the second group of video information ("History" group) is displayed in a first area (circled blue) when the second group of thumbnails is displayed (circled red). LG-1004, FIG. 8. Kaplan explains, with reference to Figure 8, "the History 28 primary option button displays a predetermined number of thumbnails 36 that the user has recently accessed," which "makes it simple for a user to access multimedia content that was most recently accessed." *Id.*, [0045]; *see also id.*, [0047] (discussion of "Catalog" primary option), FIG. 10.

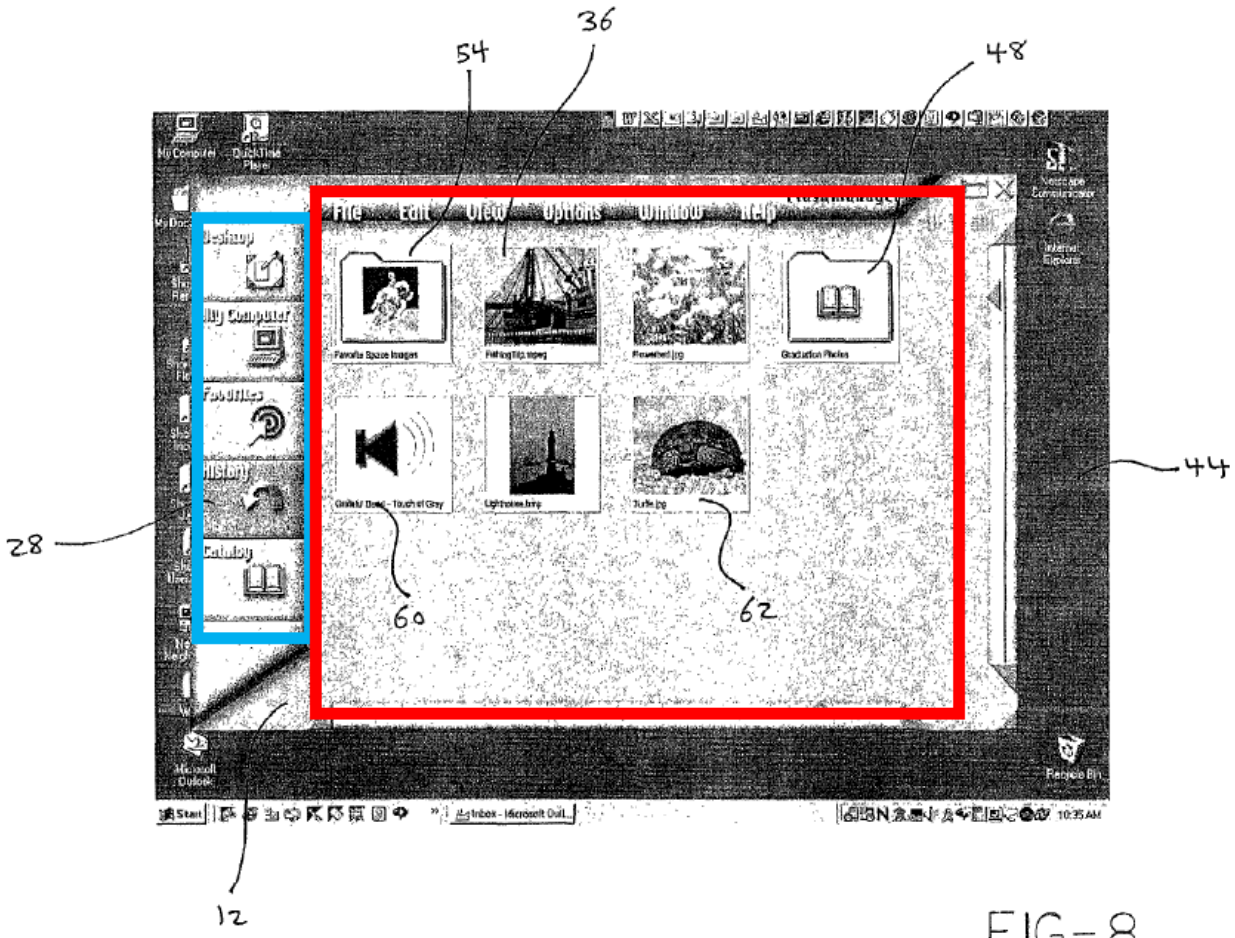


FIG-8

LG-1004, FIG. 8 (annotated)

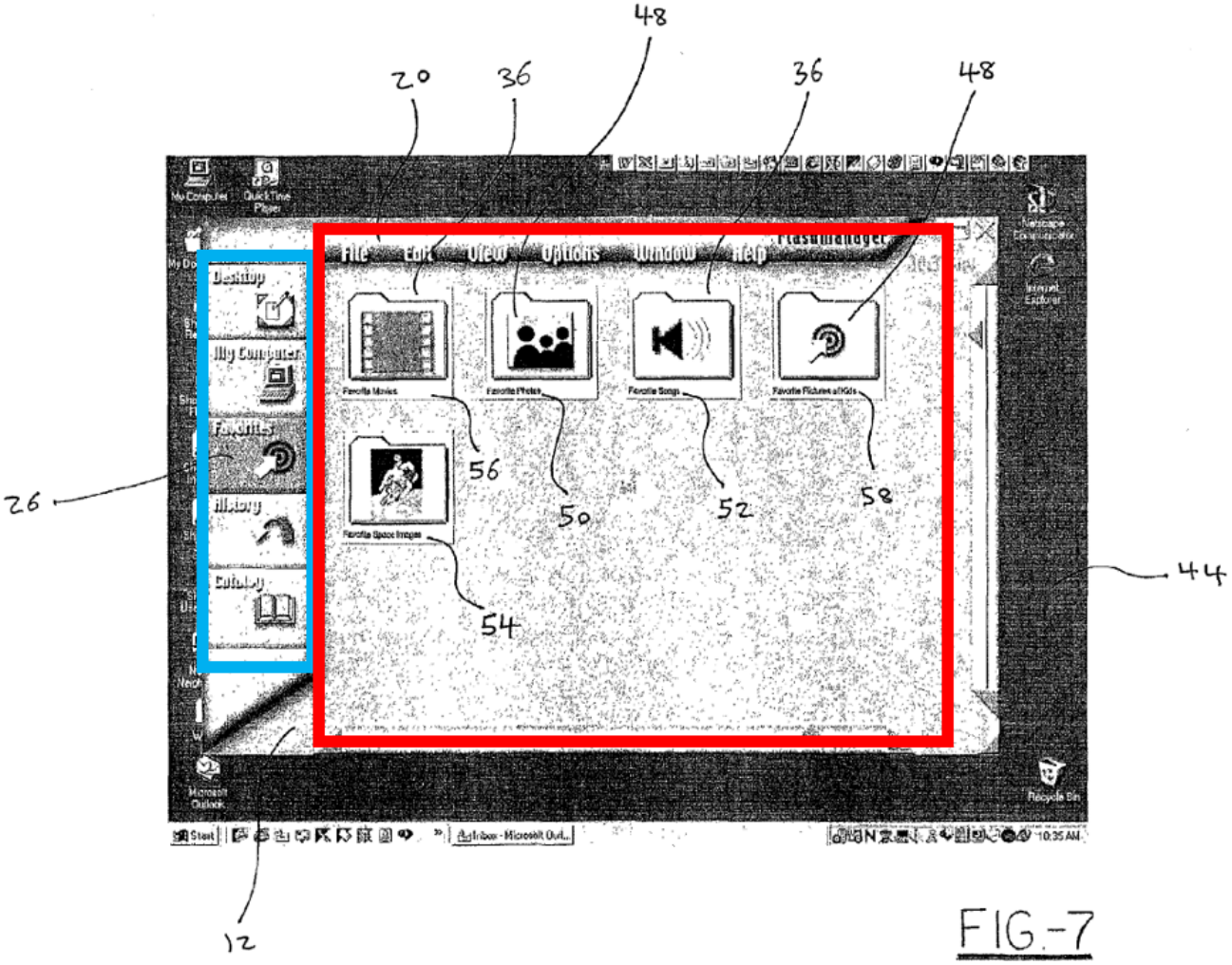
iii. *Claim 3*

[3.a] The information processing apparatus according to claim 2, wherein the controller controls the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area,

207. Kaplan discloses the controller controlling the output unit to display the first group of thumbnails in a second area (circled red) when the first group of

thumbnails is displayed, the second area being different from the first area. LG-1004, FIGS. 7-12, 14, 16; *see* discussion of Elements [2.a]-[2.b].

208. As shown in FIG. 7 below, Kaplan teaches that the first group of thumbnails is displayed in a second area (circled red), which is different than the first area where the first character corresponding to the first group (e.g., "Favorites") is displayed (circled blue). LG-1004, FIG. 7.



LG-1004, FIG. 7 (annotated)

[3.b] wherein the controller controls the output unit to display the second group of thumbnails in the second area when the second group of thumbnails is displayed.

209. Kaplan discloses the controller controlling the output unit to display the second group of thumbnails in the second area (circled red) when the second group of thumbnails is displayed (red area is different than the blue area). LG-1004, FIGS. 7-12, 14, 16; *see* discussion of Element [3.a].

210. As shown in FIG. 7 below, Kaplan teaches that the second group of thumbnails is displayed in a second area (circled red), which is different than the first area where the second character corresponding to the second group (e.g., "History") is displayed (circled blue). LG-1004, FIG. 8.

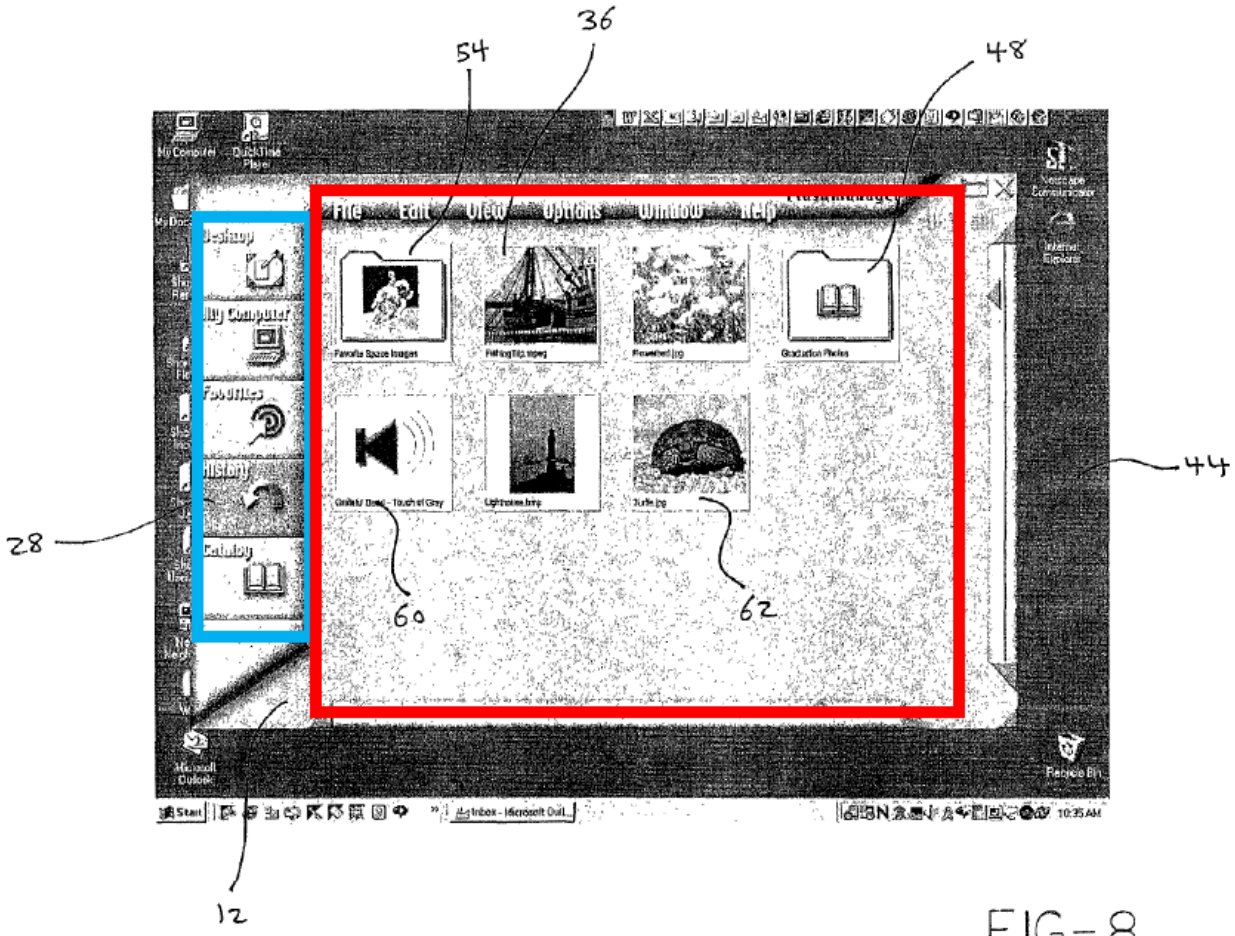


FIG-8

LG-1004, FIG. 8 (annotated)

iv. *Claim 4*

[4] The information processing apparatus according to claim 3, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

211. Kaplan discloses or renders obvious wherein, when the one video information is deleted from the first group of video information, the controller

removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium. *See* discussion of Element [1.g].

212. With reference to the "Favorites 26 primary option button," Kaplan explains that displayed containers 48 are "graphical representations of the albums or entries in the multimedia database which point to the actual physical file in the computer system." LG-1004, [0042]. Kaplan further explains that content can be "stored" in many containers, while the multimedia content is stored in memory with reference to those containers or locations. *Id.*, [0044]. "The management system provides a visual inventory of all multimedia content, whether on the PC or store on external removable media, to facilitate retrieval of desired content," and "[c]ontent is indexed by the system for easy retrieval." *Id.* "The indexed file stores a pointer in the management system database to the physical file location, while providing a thumbnail image that can be used to represent the file in the management system user interface." *Id.* Kaplan explains that this process "allows multiple pointers in the media management database, which relate to a single physical file stored on computer media," such that "There is no need to store multiple physical files of the multimedia data, thereby saving storage space." *Id.*

213. Based on this description, a POSITA would have understood that, if one video information is deleted from the first group of video information in

Kaplan, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium (e.g., without deleting the "single physical file stored on computer media," *Id.*, [0044]). Rather, a POSITA would have understood that deleting the one video information from the first group merely removes the pointer for the one video information in Kaplan's "media management database" that references the first group.

214. Moreover, a POSITA would have understood that, if deleting the one video information from the first group of video information does not delete the one video information from the second group of video information, per Element [1.g], then it would have been obvious for the one video information to remain recorded on the recording medium, at least so that it can continue to be available in the second group of video information.

215. For instance, a POSITA would have found it obvious that deleting one video information from the "Favorites" group would not remove that information from the "My Computer" group or the "History" group. Thus, the one video information is not deleted from the recording medium. Indeed, a POSITA would have understood that if un-favoriting a video image somehow removed it from other groups of images (e.g., from "My Computer" or from "Catalog"), that would have limited the utility of the system and caused confusion for the user.

216. A POSITA would have further found obvious for the information to remain recorded on the recording medium for the video information to remain in the "My Computer" group or the "History" group. *See* LG-1004, claim 20 ("wherein multiple representations of a data file can be presented in the user interface, with any representation of a data file having a pointer to a single data file stored on computer readable memory"). Thus, Kaplan discloses or renders obvious the one video data is not deleted from the recording medium.

v. *Claim 5*

[5.pre] An information processing system comprising:

217. *See* discussion of Element [1.pre].

[5.a] a recording unit configured to record a plurality of video information on a recording medium;

218. *See* discussion of Element [1.a].

[5.b] a reproducing unit configured to reproduce selected video information read out from the recording medium; and

219. *See* discussion of Element [1.c].

[5.c] a display unit configured to output a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

220. *See* discussion of Element [1.b].

[5.d] wherein, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first

group of video information, a first group of thumbnails corresponding to the first group of video information is displayed on the display,

221. *See* discussion of Element [1.e].

[5.e] wherein, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, a second group of thumbnails corresponding to the second group of video information is displayed on the display, and

222. *See* discussion of Element [1.f].

[5.f] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the one video information continues to be included in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the second group of thumbnails is displayed on the display.

223. *See* discussion of Element [1.g].

vi. *Claim 6*

[6.a] The information processing system according to claim 5, wherein the display displays a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed on the display,

224. *See* discussion of Element [2.a].

[6.b] wherein the display displays a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed on the display.

225. *See* discussion of Element [2.b].

vii. *Claim 7*

[7.a] The information processing system according to claim 6, wherein the display displays the first group of thumbnails in a second area when the first group of thumbnails is displayed on the display, the second area being different from the first area,

226. *See* discussion of Element [3.a].

[7.b] wherein the display displays the second group of thumbnails in the second area when the second group of thumbnails is displayed on the display.

227. *See* discussion of Element [3.b].

viii. *Claim 8*

[8] The information processing system according to claim 7, further comprising: a controller, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

228. *See* discussion of Claim [4].

ix. *Claim 9*

[9.pre] An information processing method comprising:

229. *See* discussion of Element [1.pre].

[9.a] recording, by a recording unit, a plurality of video information on a recording medium;

230. *See* discussion of Element [1.a].

[9.b] outputting, by an output unit, a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

231. *See* discussion of Element [1.b].

[9.c] reproducing, by a reproducing unit, selected video information read out from the recording medium;

232. *See* discussion of Element [1.c].

[9.d] controlling, by a controller, the output unit to display a first group of thumbnails corresponding to the first group of video information, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information,

233. *See* discussion of Elements [1.d]-[1.e].

[9.e] controlling, by a controller, the output unit to display a second group of thumbnails corresponding to the second group of video information, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information,

234. *See* discussion of Elements [1.d], [1.f].

[9.f] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the one video information in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails.

235. *See* discussion of Element [1.g].

x. *Claim 10*

[10.a] The information processing method according to claim 9, further comprising: controlling, by the controller, the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed; and

236. *See* discussion of Element [2.a].

[10.b] controlling, by the controller, the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed.

237. *See* discussion of Element [2.b].

xi. *Claim 11*

[11.a] The information processing method according to claim 10, further comprising: controlling, by the controller, the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area; and

238. *See* discussion of Element [3.a].

[11.b] controlling, by the controller, the controller controls the output unit to display the second group of thumbnails in the second area when the second group of thumbnails is displayed.

239. *See* discussion of Element [3.b].

xii. *Claim 12*

[12] The information processing method according to claim 11, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

240. *See* discussion of Claim [4].

xiii. *Claim 13*

[13.pre] An information processing system comprising:

241. *See* discussion of Element [1.pre].

[13.a] a recording unit configured to record a plurality of video information on a recording medium;

242. *See* discussion of Element [1.a].

[13.b] a reproducing unit configured to read video information from the recording medium;

243. *See* discussion of Element [1.c].

[13.c] a display unit; and

244. *See* discussion of Element [1.b].

[13.d] a controller, wherein the controller is configured to:

245. *See* discussion of Element [1.d].

[13.e] control the display unit to display a menu display that includes a plurality of selectable characters that respectively correspond to a plurality of groups of video information,

246. *See* discussion of Element [1.b].

[13.f] upon selection of a character corresponding to a first group of video information in the menu display by specifying a position of the character corresponding to the first group of video information, control the display unit to display a first group of thumbnails corresponding to the first group of video information, and

247. *See* discussion of Element [1.e].

[13.g] upon selection of a character corresponding to the second group of video information in the menu display by specifying a position of the character corresponding to the second group of video information, control the display unit to display a second group of thumbnails corresponding to the second group of video information,

248. *See* discussion of Element [1.f].

[13.h] wherein when one video information recorded on the recording medium is included in both the first group of video information and the second group of video information, and upon deletion of the one video information from the first group of video information, the one video information continues to be included in the second group of video information, and the controller controls the display unit to display a thumbnail corresponding to the one video information as one of the thumbnails of the second group of thumbnails.

249. *See* discussion of Element [1.g].

xiv. *Claim 14*

[14.a] The information processing system according to claim 13, wherein upon display of the first group of thumbnails on the display unit, the control unit controls the display unit to display a first character corresponding to the first group of video information in a first area,

250. *See* discussion of Element [2.a].

[14.b] wherein upon display of the second group of thumbnails on the display unit, the controller controls the display unit to display a second character corresponding to the second group of video information in the first area.

251. *See* discussion of Element [2.b].

xv. *Claim 15*

[15.a] The information processing system according to claim 14, wherein upon display of the first group of thumbnails on the display unit, the controller controls the display unit to display the first group of thumbnails in a second area, the second area being different from the first area, and

252. *See* discussion of Element [3.a].

[15.b] wherein upon display of the second group of thumbnails on the display unit, the controller controls the display unit to display the second group of thumbnails in the second area.

253. *See* discussion of Element [3.b].

xvi. *Claim 16*

[16] The information processing system according to claim 15, wherein, upon deletion of the one video information from the first group of video information, the controller removes the one video information from the first group of video information without instructing the deletion of the one video information recorded on the recording medium.

254. *See* discussion of Claim [4].

D. Ground 3: Claims 1-16 are obvious over Bryant in view of Kaplan

255. The combination of Bryant and Kaplan discloses all features of the Challenged Claims. An identification of where each limitation of the claims is disclosed in each reference is set forth above with respect to Ground 1 and Ground 2. *See* discussion of §§ VIII.B and VIII.C.

256. Just as a POSITA would have been motivated to supplement Kaplan with Bryant, per Ground 4, the converse is also true. That is, a POSITA would have been motivated to supplement the teachings of Bryant with those of Kaplan.

257. For example, based on Bryant, a POSITA would have been motivated to add Kaplan's specific reproduction (e.g., playback) features into the user interface of Bryant (*see, e.g.*, FIGS. 9A-9C). This would include one or more of Kaplan's in-window thumbnail playback mechanism, or the specific full/partial screen playback mechanisms. As explained in Kaplan, a user can "activate video

and audio multimedia content directly within the thumbnails," and use player controls such as play, stop, pause, reverse, and fast forward to control playback of a video corresponding to a selected thumbnail image. LG-1004, [0051], FIG. 16:

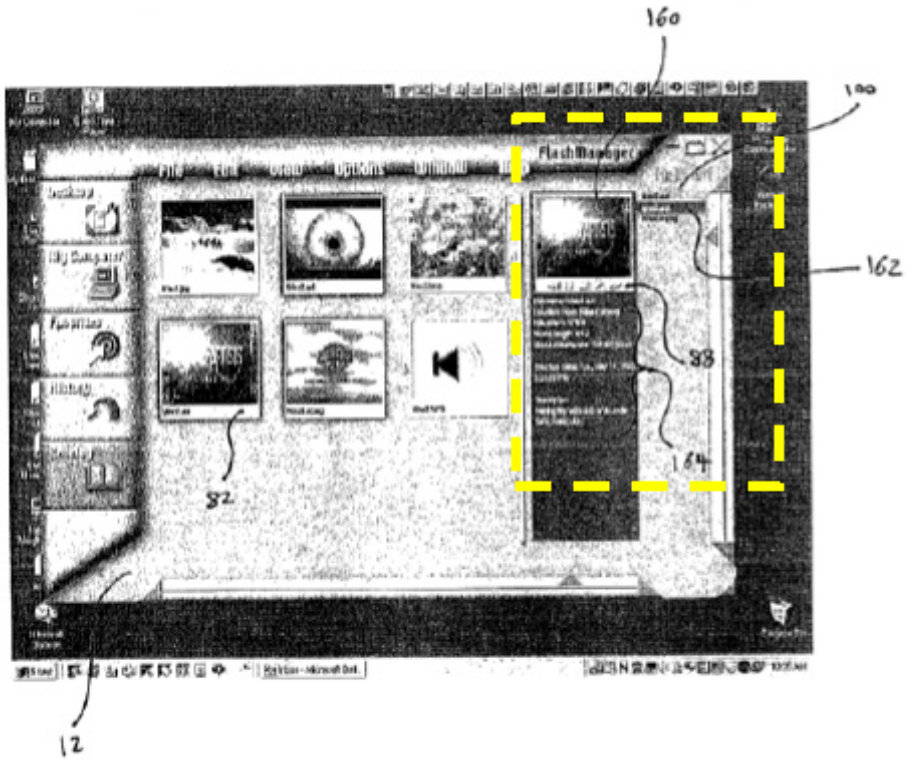


FIG. 16

LG-1004 (annotated); *see also*:

> Referring to FIG. 16, at any time a user can click on a multimedia computer file 162 included in the Play List and obtain detailed information 164, including but not limited to the file name, location of the file within the multimedia management system 10, the file size, the video length in minutes, the video dimensions, the date and time the file was created, and a brief description of the subject matter of the file. The user interface 12 also places an additional copy of the thumbnail 160 for the file selected from the Play List with the detailed information. For the convenience of the user, Player Controls 88 are included within the thumbnail 160, thereby ***allowing the user to preview the video/audio thumbnail selected while reviewing the***

> ***detailed information. Another feature of user interface 12 is the ability to preview any selected video computer file in full screen mode***. Referring to FIG. 17, the user interface 12 shows thumbnail 160 (from FIG. 16) expanded to fill a much larger portion of user interface 12, otherwise referred to as a full screen 170. As with previous embodiments, full screen 170 includes Player Controls 88 at the bottom of the screen ***to allow the user to preview the video file. The Play Controls 88 allow the user to view the movie or audio multimedia content, stop or pause the content, forward or reverse the content, or choose the next selection or previous selection. If desired, the user interface 12 could also be configured to provide optional full, three-quarter, half and other fractional screen sizes. To play a video file in a full screen 170, the user simply double clicks on the thumbnail containing the video file***. The preferred embodiment of the multimedia management system 10 also includes a view option (not shown). The view option is selected from a pull down menu and allows the video file to be displayed within the entire computer screen, not just a full screen 170 within the user interface 12.

LG-1004, [0057]; *see also* discussion of Element [2.1].

258. The motivation for the combination would be to provide an improved playback mechanism for the user. For instance, in-window playback would allow a user to continue to see their other media or adjust their categorization settings while previewing video content. Including this feature would be "[f]or the convenience of the user." *See* LG-1004, [0057]. The concept of providing previews of media in-window was well-known as demonstrated, for example, by the in-window image preview of PhotoMesa. LG-1012, Figure 1, 71. A POSITA would have understood that one of the reasons for this was to let the user keep their eye focused on the area of the screen they were already working with, and without

the need to manage additional windows. Thus, applying this technique with in-window video as taught by Kaplan would have been nothing more than the use of a known technique to improve similar devices in the same way.

259. A POSITA would have recognized that this combination was one of familiar elements, performing their typical functions, and according to known methods. As such, it would have been straightforward, had a reasonable expectation of success, and yielded predictable results. Both Kaplan and Bryant use conventional components and programming. *See* LG-1004, [0037]-[0038] ("The present invention could be written in a number of computer languages including, but not limited to, C, C++, Basic, Visual Basic, Fortran, Cobol, Smalltalk, Java, and other conventional programming languages. It is to be understood that various computers and/or processors may be used to carry out the present invention without being limited to those described herein. The present invention can be implemented on an IBM or IBM-compatible personal computer, preferably utilizing a DOS, Windows 3.1, Windows 95, Windows 98, Windows NT, Unix, Linux or OS/2 operating system…."); [0040] ("common features of the Windows operating system"), FIG. 3 ("Operating System Standard Functions"); LG-1005, [0037]-[0040] ("The home computer 10 includes a CPU motherboard 12, having for example, an Intel Pentium IV processor as well as RAM memory (not shown). The CPU motherboard 12 executes software stored on a hard drive

20, for example, the well-known Windows XP operating system software and the Internet Explorer web browser software, both provided by Microsoft Corp. of Redmond, Wash. The hard drive 20 is also used to store application software that can be provided along with the digital camera 300 using any suitable software distribution media or method, such as a CD-ROM, floppy disc, or Internet download, as is well-known to those skilled in the art."); FIG. 1 ("Home Computer" with a camera and dock). The ability to playback video was already supported by the standard Windows operating systems of both Bryant and Kaplan. For example, a POSITA would have understood that this video playback feature of Windows 95 would have also been available in Windows XP: "High-performance multimedia components. Both the video playback engine (Video for Windows) and CD-ROM file system (CDFS) are new 32-bit components that deliver smoother video and sound reproduction." LG-1010, 21. Thus, incorporating playback of video within Bryant would have been a straightforward use of technology that was already integrated into the operating system and would have been well within the skill of a POSITA. *See also* §VIII.E.

260. A POSITA would additionally have had a reasonable expectation of success in the combination of Bryant and Kaplan because Bryant describes loading files onto a home computer where they can be "viewed, stored, retrieved, and printed," and Kaplan's in-window playback is merely a form of allowing files to be

viewed. LG-1005, [0003]; LG-1004, [0057]. A POSITA thus would have had a reasonable expectation that the modification Bryant with Kaplan would be successful because a POSITA would have found that the teachings of Bryant and Kaplan could have been predictably combined due to the predictability of the computer system art and the known interchangeability of the various elements, including file storage, organization, recording, and playback. *See also* §VIII.E.

E. Ground 4: Claims 1-16 are obvious over Kaplan in view of Bryant

261. The combination of Kaplan and Bryant discloses all features of the Challenged Claims. An identification of where each limitation of the claims is disclosed in each reference is set forth above with respect to Ground 1 and Ground 2. *See* discussion of §§ VIII.B and VIII.C.

262. A POSITA would have been motivated to combine Kaplan and Bryant for at least two reasons.

263. First, a POSITA would have been motivated to supplement the teachings of Kaplan by using Bryant's teachings regarding image capture and obtaining video information with a user's camera. For instance, Kaplan discloses a system that:

> provides users with a simple and intuitive method and computer program for reviewing their multimedia content, which can include digital video, digital audio and text, still images, animation, and MIDI. The various types of multimedia content are typically in the

> form of digital computer file formats. Today there are dozens of multimedia file formats such as JPEG, GIF, TIFF, MOV, WAV, AVI, and MP3.

LG-1004, [0038]. The camera and upload system of Bryant similarly provides "digital still images and digital motion images." LG-1005, [0029], [0036]. A benefit of using a digital camera, as disclosed in Bryant, is that it can include user controls for categorizing the images, including metadata that enables subsequent organization. *See, e.g.*, LG-1005, [0003]-[0005], [0029]. Moreover, Bryant explains that by using multimedia according to its systems and methods, a particular user's "affective information" can be captured, which can be stored with the still or video images. LG-1005, [0029]-[0034]. A POSITA would have recognized that inclusion of the richer metadata in Bryant would have improved the Kaplan system, allowing for more effective (e.g., more detailed or more personalized) organization and retrieval of multimedia information. *See, e.g.*, LG-1005, [0029] ("can later be used in retrieving"), [0030] ("One very important type of affective information is the level of importance a user associates with an image, such as whether the image is a 'favorite.'"), [0032]-[0033] ("Different users…"); *see also* LG-1004, [0042]-[0049], FIG. 7. In this respect, the teachings of Bryant itself motivate the combination.

264. Second, a POSITA would have been motivated to use Bryant's robust disclosure of user-customizable metadata, such as "groups" (e.g., Animals, Sports)

and corresponding areas of the interface menu. *See* discussion of Elements [1.b] and [1.e]-[1.g] in §VIII.B; *see also* LG-1005, FIGS. 8, 9A-9C. For instance, a POSITA would have used the display arrangement and controls set forth in Bryant's FIGS. 9A-9C, which would allow for more effective (e.g., more detailed or more personalized) organization and retrieval of multimedia information. *See, e.g.*, LG-1005, [0100] ("In block 146 of FIG. 3, the user optionally resets images that are no longer considered favorites. This is accomplished using the favorites level selection area 860. The user first selects one of the thumbnail images (e.g., thumbnail image 822B), and the favorites level selection area 860 then displays the current favorites level. If the user has not previously modified the level, the images are either 'Normal' or 'Favorite'. Using the selector 862, the user can change the level of the selected image to be an 'Extra Favorite', a 'Favorite', a 'Normal' image, or a 'Dislike' image."). For instance, the metadata of Bryant would be useful with respect to the search functions in Kaplan. *See* LG-1004, [0065]-[0066]. With its emphasis on user-customization and control, Bryant itself motivates the combination.

265. A POSITA would have recognized that this combination was one of familiar elements, performing their typical functions, and according to known methods. As such, it would have been straightforward, had a reasonable expectation of success, and yielded predictable results. Both Kaplan and Bryant

use conventional components and programming. *See* LG-1004, [0037]-[0038] ("The present invention could be written in a number of computer languages including, but not limited to, C, C++, Basic, Visual Basic, Fortran, Cobol, Smalltalk, Java, and other conventional programming languages. It is to be understood that various computers and/or processors may be used to carry out the present invention without being limited to those described herein. The present invention can be implemented on an IBM or IBM-compatible personal computer, preferably utilizing a DOS, Windows 3.1, Windows 95, Windows 98, Windows NT, Unix, Linux or OS/2 operating system…."); [0040] ("common features of the Windows operating system"), FIG. 3 ("Operating System Standard Functions"); LG-1005, [0037]-[0040] ("The home computer 10 includes a CPU motherboard 12, having for example, an Intel Pentium IV processor as well as RAM memory (not shown). The CPU motherboard 12 executes software stored on a hard drive 20, for example, the well-known Windows XP operating system software and the Internet Explorer web browser software, both provided by Microsoft Corp. of Redmond, Wash. The hard drive 20 is also used to store application software that can be provided along with the digital camera 300 using any suitable software distribution media or method, such as a CD-ROM, floppy disc, or Internet download, as is well-known to those skilled in the art."); FIG. 1 ("Home Computer" with a camera and dock). Given that Kaplan already included

metadata, such as Favorites, adding additional metadata fields such as those taught by Bryant would have been a straight forward application of known programming techniques. A POSITA would have understood how to modify any data structures and user interfaces to include additional metadata because modifying data structures and user interfaces was well within their skill, and they had already created those data structures and user interfaces to create the system of Kaplan in the first place.

266. Thus, adding the metadata of Bryant to Kaplan would have been no more than the use of a known technique to improve similar a device in the same way. *See also* §VIII.D.

F. Ground 5: Claims 1-16 are obvious over Horn

i. *Claim 1*

[1.pre] An information processing apparatus comprising:

267. To the extent the preamble is limiting, Horn discloses or renders obvious an information processing apparatus, an information processing system, and an information processing method. LG-1021, Abstract, [0016], [0038]-[0041], [0045] ("inventive MFS-configured system provides an organizational structure and methodology for information management"), [0046], [0047], [0101], [0141], [0144], FIGS. 1, 26, claims 11 ("[m]ethod of management of informational objects"), 12. In particular, Horn discloses a "computer data processing system

including a central processing unit configured with a novel integrated computer control software system for the management of data objects including dynamic and automatic organization, linking, finding, cross-referencing, viewing and retrieval of multiple objects regardless of nature or source." LG-1021, Abstract. Horn describes a "Metadata Filing System, abbreviated herein MFS" that is an "inventive integrated software system for the management of informational objects on a computer system … for recognizing, organizing, creating and viewing relationships between such objects which comprises one or more software applications that provide both a user-interface and an underlying component architecture for the management and display of the user's information." LG-1021, [0016]. Horn explains that the "computer(s) of the invention can be configured in a system architecture, for example, as one or more client or server computer(s), database computer(s), routers, interfaces and peripheral input and output devices, that together implement the system and network(s) to which a client computer system may be connected." LG-1021, [0041]. Thus, a POSITA would have understood that Horn discloses an apparatus (e.g., computer) that processes information (e.g., informational objects). Moreover, a POSITA would have understood that Horn's disclosure further provides a system and method for processing that information.

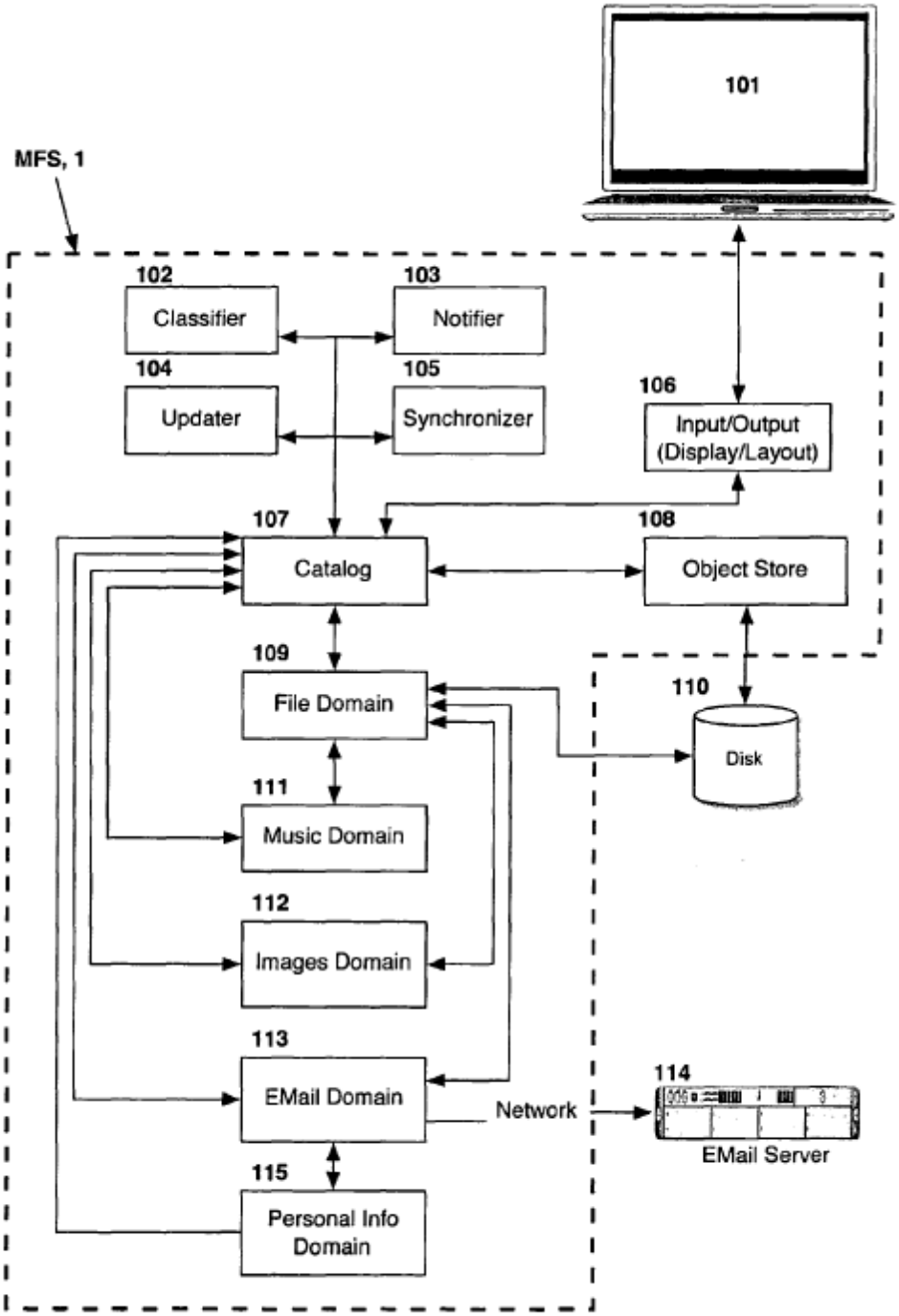


Figure 1

LG-1021, FIG. 1

[1.a] a recording unit configured to record a plurality of video information on a recording medium;

268. Horn discloses or renders obvious a recording unit that records a plurality of video information on a recording medium. LG-1021, Abstract ("storing only one instance of each object"), [0003] ("storage of information of a variety of types"), [0016], [0018] ("stored efficiently on disk"), [0019] ("storage location in memory or on disk where objects and their associated metadata properties may be very quickly retrieved"), [0020], [0028], [0029], [0038] ("metadata filing system," "object-oriented database structure," "object store"), [0039], [0045], [0046], [0052], [0102] ("hard drive, 110"), [0103], [0107]. Specifically, Horn discloses storing, among other files, movies onto a memory unit, such as a hard drive 110. *Id.*

269. Horn explains that the "MFS maintains for each kind of object the conventional, ordinary types of properties that common operating systems support—name and modification date, and the folder in which the file is stored—as well as links and annotations in the form of corresponding metadata defined by the MFS itself." LG-1021, [0107]. In particular, Horn explains that its system "comprises one or more application(s) for organizing all types of text and image information," including "movies," which a POSITA would have understood are "video information." LG-1021, [0103].

270. Additionally, Horn states that its "MFS-enabled computer system" includes, among other elements, "an object store data structure in which data," including "movies" (video information), for example, "is stored persistently on a device such as a disk drive." LG-1021, [0180]-[0188]; *see also id.*, [0041] ("The memory typically includes volatile memory (e.g., RAM) and fixed and/or removable non-volatile memory (e.g., ROM, Flash, hard disk including in RAID arrays, floppy disc, mini-drive, Zip, Memory stick, PCMCIA card, tape, optical (CD-ROM, etc.), DVD, magneto-optical, and the like), to provide for storage of information"). Various other types of recording medium are also contemplated. *Id.*, [0041].

271. A POSITA would have understood that the "disk drive" or "hard disk" of Horn necessarily includes a circuitry ("recording unit"), e.g., a hard disk controller, that serves as an intermediary between the CPU and the physical storage platter of the hard drive in order for the disk drive to persistently store data (i.e., record a plurality of video information on a recording medium). LG-1005, [0180]-[0188], [0041]. Indeed, such circuitry was well known long before the Critical Date to include in hard drives to provide buffering, error correction, servo control, etc. for writing data to the hard drive.

272. For instance, Wang describes a "[h]ard disk drive storage devices [that] enable computer systems to quickly store data in a non-volatile manner and

to retrieve the stored data when needed." LG-1023, 1:11-13; *see also id.*, 1:13-46. The "hard disk drive 100 includes a head disk assembly (HDA) 105 having one or more disks 102 with a magnetic media 101 formed on each surface 103 of a disk 102." *Id.*, 2:64-3:2; *see also id.*, 3:2-4:18, FIGS. 1-2. The hard disk drive 100 further includes a "control system 202 [that] sends to and receives signals from the head 114 during read and write operations performed on the disk 102." *Id.*, 3:16-18.

273. Similarly, Sharma teaches a hard disk drive with an "embedded disk controller Printed Circuit Board (PCB) 100" that "uses a program system 2000, a collection of buffers 1500-1580, and parameters 1590-1620, interacting through the servo-controller 1030," which act together to "implement[] the control signal flow in the hard disk drive 10." LG-1024, 5:50-6:4, FIG. 2. Jeppeson also discusses a "servo block," which "refers to general logic used in aiding the spinning of the discs and in the positioning of the actuator on the disc." LG-1025, Abstract, 3. Given that Horn teaches the use of a hard drive for storing multimedia data, a POSITA would have found obvious that the hard drive includes necessary circuitry (recording unit) for storing data in the hard drive and retrieving data from the hard drive for display on the computer.

[1.b] an output unit configured to output a menu display for a user to select one group of video information among a plurality of groups of video

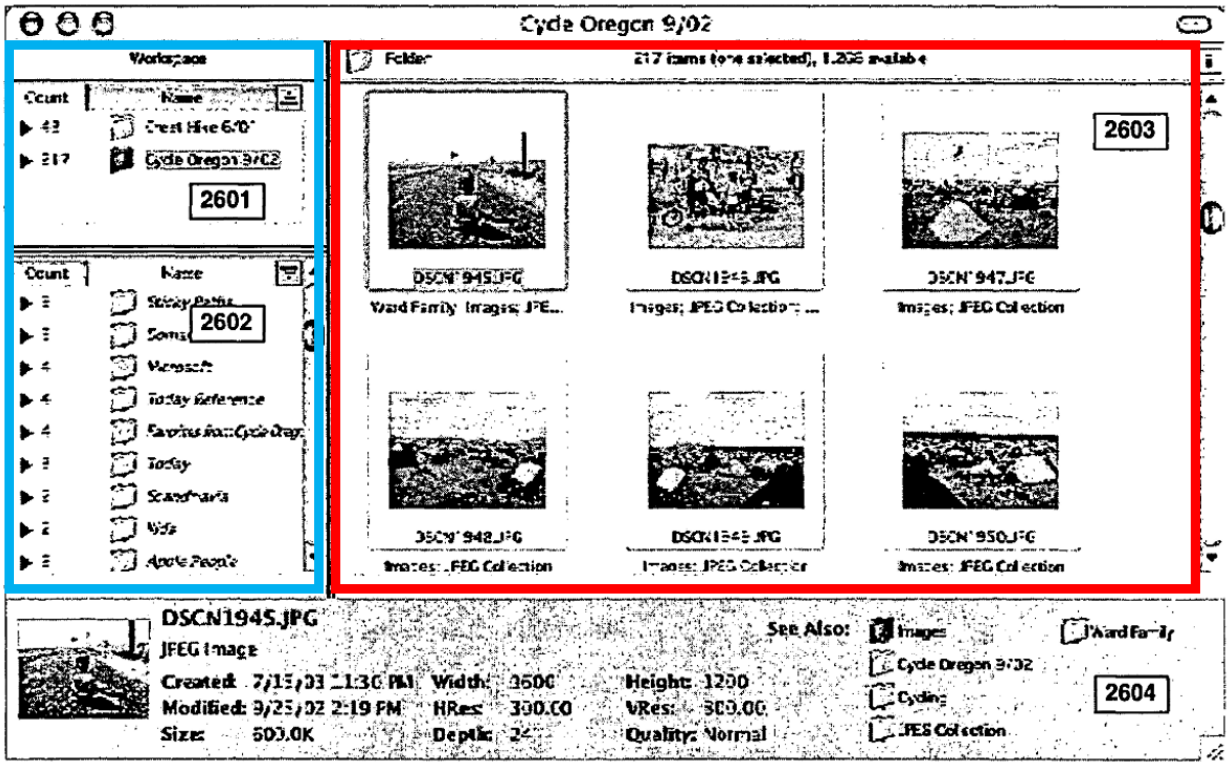
information by specifying a position of a character corresponding to the one group of video information;

274. Horn discloses or renders obvious an output unit ("output display screen") that performs the function of outputting a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information. LG-1021, [0016], [0038] ("rendering of these objects to a display viewable by a user in response to user input"), [0039], [0040] ("a computer display connected to said memory means for displaying said objects, a computer-operator (user) interface device for inputting information to specify objects or properties of objects"), [0050], [0103] ("multimedia," "movies") [0121], [0122], [0123], [0153]-[0157], [0159], [0165], [0166], [0197], [0198], [0203], [0204]-[0211], [0294], [0295], [0299]-[0303], [0304], FIGS. 1 (101), 5, 7A-C, 11A, 12A-B, 14, 26, 30-31, claim 1; *see also* discussion of Elements [1.e]-[1.f]. Specifically, for example, Horn discloses that its output display screen outputs a Workspace view user interface for a user to select a group of movies or multimedia data among other groups (circled in blue in FIG. 26, e.g., "Crest Hike 6/01," "Cycle Oregon 9/02") by selecting an item/group. *Id.*

275. More particularly, with reference to FIG. 1, Horn first teaches "a computer system comprising a computer 101 with an output display screen." LG-

1021, [0102]. FIG. 26 (below) "shows the workspace view" of the MFS where "the original folders from which the images were examined" and "a content pane, which dynamically displays the contents of whatever item is selected" are shown on the display. LG-1021, [0085], [0153]-[0157], FIG. 26.

276. In FIG. 26, for example, a user has selected "Cycle Oregon 9/02" by specifying a position of a character corresponding to the one group of information (by selecting "Cycle Oregon 9/02"), which, a POSITA would have understood from Horn's disclosure, could be movies. LG-1021, [0103], [0153]-[0158], FIG. 26. Horn explains that a "content pane … dynamically displays the contents of whatever item is selected in the first two views (2603)." LG-1021, [0156]. The "plurality of groups of video information" in Horn includes the folders shown at 2601 and/or the collections shown at 2602 in the areas circled in FIG. 26 below, for example. LG-1021, [0049] ("Users can select predetermined collections provided in a basic menu, such as Family, Friends, Work, To Do, Activities, and Vacation when running the MFS program for the first time, and can create and set up user-defined collections as well."), [0153]-[0156], FIG. 26.



LG-1021, FIG. 26

[1.c] a reproducing unit configured to reproduce selected video information read out from the recording medium; and

277. Horn discloses or renders obvious a reproducing unit configured to reproduce selected video information read out from the recording medium. LG-1021, Abstract, [0038] ("rendering of these objects to a display viewable by a user in response to user input"), [0050], [0110], [0112], [0114] ("objects may also be viewed directly in their own windows"), [0121], [0122], [0153]-[0157], [0159], [0160], [0161], [0163], [0165], [0166], [0205], [0211], [0294], [0295], [0299], [0300], [0301], [0304], FIGS. 5, 7A-C, 11A, 12A-B, 14, 26, 27, 30, 31, claim 1.

278. In particular, Horn teaches that its system provides "management of data objects including … viewing and retrieval of multiple objects regardless of nature or source." LG-1021, Abstract. In an example that references FIG. 14, Horn explains that "a collection of all JPEG files may be created by the user selecting (via a MFS-provided popup menus, and/or a type-in query line) all objects in the system that have names that end in .jpg or .jpeg, or have a file type of JPEG," and "[t]he objects are immediately retrieved and displayed in the collection window." LG-1021, [0121], FIG. 14.

279. With reference to FIG. 26, Horn shows that the "MFS also provides a Workspace view" where information is visible in "four separate panes." LG-1021, [0153]. A "content pane … dynamically displays the contents of whatever item is selected in the first two views," and "in the case of an individual item, the item itself is shown in detail (such as the full image or contact information)." LG-1021, [0156], FIG. 26. A POSITA would have understood that if the individual item were a "movie," which Horn teaches (LG-1021, [0103]), then the system would reproduce the movie (e.g., by playing the movie) from memory (e.g., hard drive 110). *See id.* Indeed, reproduction of files is further taught or rendered obvious by Horn's explaining that "[d]ouble-clicking on any item opens a window on that item, at which point the user may choose how to view the item's contents. *Id.*, [0160] ("For example, a music file would be able to show the music genre, album

name, and so on, while an image file would show image width and height, along with other image-specific metadata."); *see also id.*, [0336] ("application and document files must have the appropriate icons associated with them, and behaviors such as opening a document must be defined to launch the correct application").

280. A POSITA would have additionally understood that the "hard drive 110" of Horn necessarily includes a circuitry ("reproducing unit"), e.g., a hard disk controller, that serves as an intermediary between physical storage platter of the hard drive and the CPU in order to retrieve data from memory to "dynamically display[] the contents of whatever item is selected." LG-1021, [0156]. Indeed, such circuitry was well known long before the Critical Date to include in hard drives to provide buffering, error correction, servo control, etc. for reading data from the hard drive.

281. For instance, Wang describes a "[h]ard disk drive storage devices [that] enable computer systems to quickly store data in a non-volatile manner and to retrieve the stored data when needed." LG-1023, 1:11-13; *see also id.*, 1:13-46. The "hard disk drive 100 includes a head disk assembly (HDA) 105 having one or more disks 102 with a magnetic media 101 formed on each surface 103 of a disk 102." *Id.*, 2:64-3:2; *see also id.*, 3:2-4:18, FIGS. 1-2. The hard disk drive 100 further includes a "control system 202 [that] sends to and receives signals from

the head 114 during read and write operations performed on the disk 102." *Id.*, 3:16-18.

282. Similarly, Sharma teaches a hard disk drive with an "embedded disk controller Printed Circuit Board (PCB) 100" that "uses a program system 2000, a collection of buffers 1500-1580, and parameters 1590-1620, interacting through the servo-controller 1030," which act together to "implement[] the control signal flow in the hard disk drive 10." LG-1024, 5:50-6:4, FIG. 2. Jeppeson also discusses a "servo block," which "refers to general logic used in aiding the spinning of the discs and in the positioning of the actuator on the disc." LG-1025, Abstract, 3. Given that Horn teaches the use of a hard drive for storing multimedia data, a POSITA would have found obvious that the hard drive includes necessary circuitry (reproducing unit) for storing data in the hard drive and retrieving data from the hard drive for display on the computer. In particular, the hard drive necessarily includes circuitry to send and receive signals from a transducer head in the hard drive "during read and write operations performed on the [hard] disk," or such circuitry would have at least been obvious in view of well known hard drive components. *See, e.g.* LG-1023, 3:16-18.

[1.d] a controller,

283. Horn discloses or renders obvious a controller. LG-1021, [0039], [0043]-[0046], [0049], [0101]. In particular, Horn teaches a "central processing unit" that is a controller. *Id.*

284. More particularly, Horn explains that its "MFS computer data processing system" includes "at least one central processing unit configured with client operating system and applications software," and "peripheral input and output devices linked to said client/server central processing unit in an architecture so as to provide client and/or site operation and functionality; said central processor unit includes at least one memory," "said central processing unit reading data input so as to implement system functionality selected from operational, computational, archival, sorting, screening, classification, formatting, rendering, printing and communication functions and processes." LG-1021, [0039]; *see also id.*, [0101] ("CPU to provide(s) the functionalities described above").

[1.e] wherein, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information, the controller controls the output unit to display a first group of thumbnails corresponding to the first group of video information,

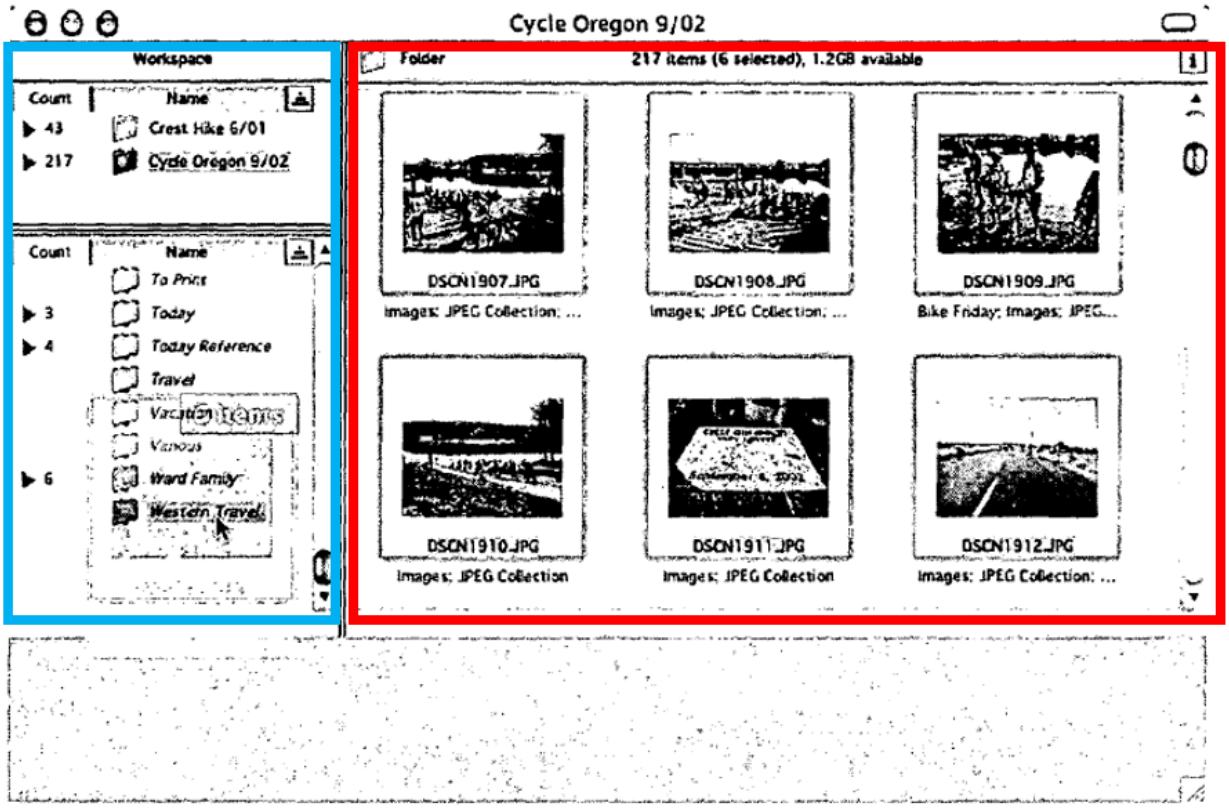
285. Horn discloses or renders obvious that, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information, the controller controls the

output unit to display a first group of thumbnails corresponding to the first group of video information. LG-1021, [0152] ("windows display the images in a variety of ways, including well-known icon and list views showing icons representing the type of the file (such as a Photoshop JPEG file) or a miniature 'slide' view (thumbnail) of the image itself"), [0153], [0154] ("the original folders from which the images were examined (the working set); (2601)"), [0155] ("a list of all collections defined by MFS and the user; (2602)"), [0156] ("the contents of the folder or collection is shown in an icon or list view"), [0157]-[0158], FIGS. 26, 30; *see also* discussion of Element [1.f]. Specifically, Horn discloses or renders obvious that, when a first group of information ("Western Travel"), including video information, is selected in the menu display by the user selecting the "Western Travel" folder (in the area circled blue in FIG. 30), the controller controls the output unit to display a first group of thumbnails corresponding to the first group of video information in an area circled in red below in FIG. 30. *Id.*

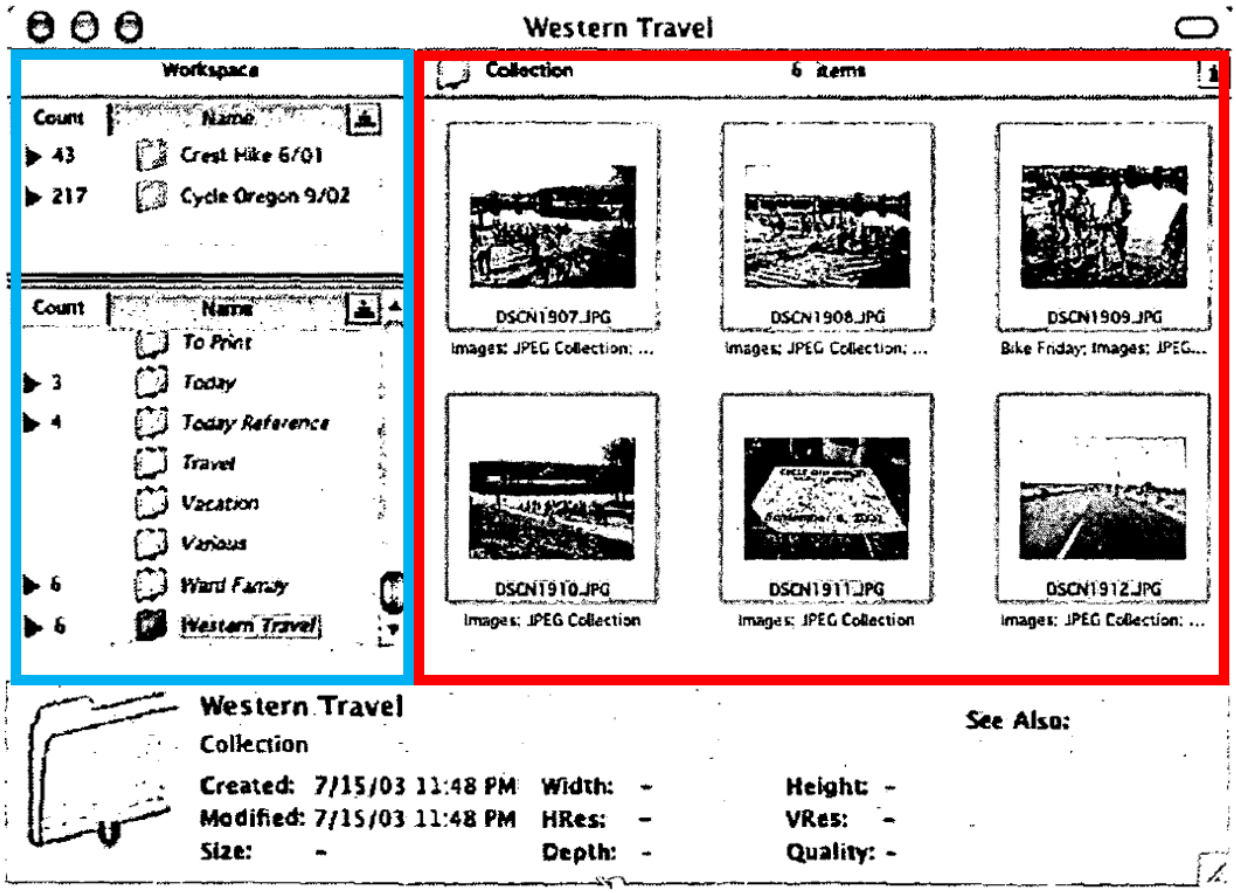
286. Horn explains that the "content pane" (circled red in FIG. 30 below) "dynamically displays the contents of whatever item is selected in the first two views." LG-1021, [0156], FIGS. 26, 30. Therefore, when the first group, "Western Travel," is selected, the thumbnails corresponding to the first group are

displayed.[4] *Id.* A modified figure based on Figures 29 and 30 from Horn is provided below to illustrate.

[4] Figure 30 is offered in Bryant to show how objects in source folders (e.g., "Cycle Oregon 9/02") can be dragged to other collections (e.g., "Western Travel"), adding those objects to the collection. LG-1021, [0165]. Figure 30 does not, however, show an example where a user has selected "Western Travel," so the thumbnails from "Western Travel" are not displayed in the area circled red in Figure 30. If "Western Travel" had been selected, however, the thumbnails in the content pane would display the thumbnails associated with "Western Travel." *Id.*, [0154]-[0156].



LG-1021, FIG. 30 (annotated) (excerpted)



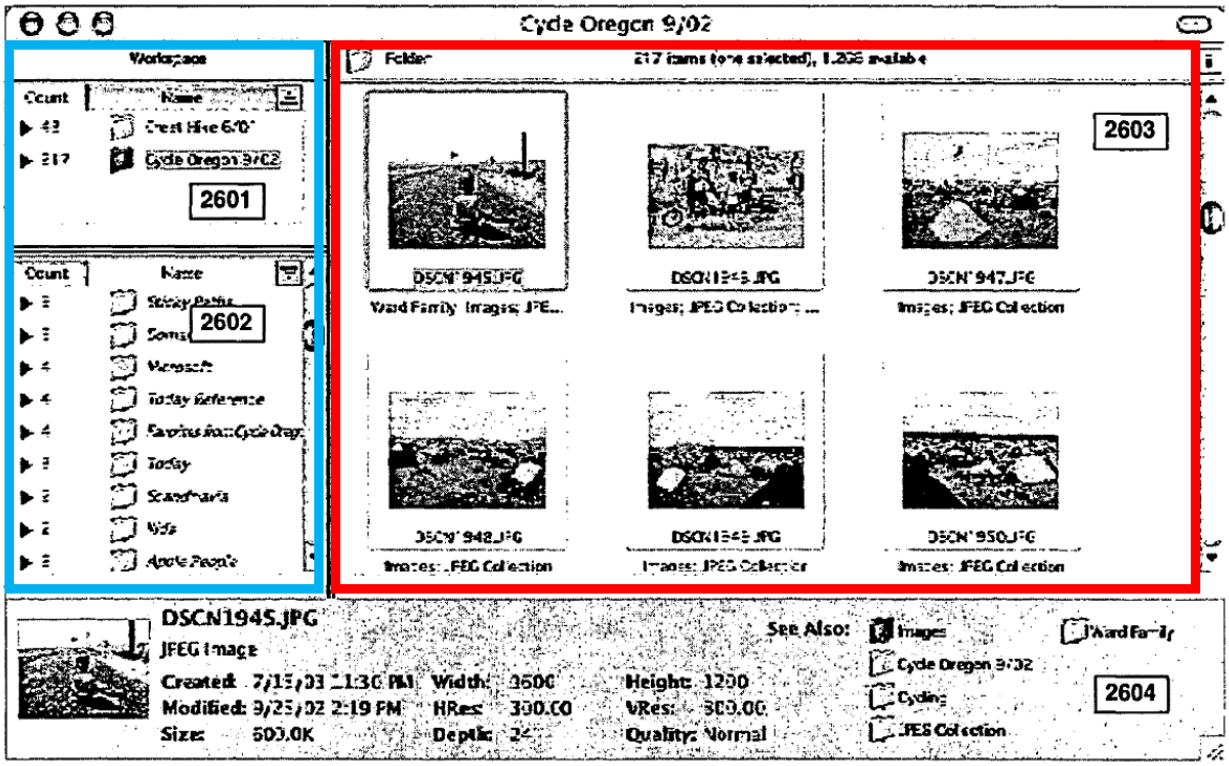
Modified image based on LG-1021, FIGS. 29-30

[1.f] ***wherein, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, the controller controls the output unit to display a second group of thumbnails corresponding to the second group of video information, and***

287. Horn discloses or renders obvious wherein, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, the controller controls the output unit to display a second group of thumbnails corresponding to the second group of video information. *See also* discussion of Element [1.e]. LG-

1021, [0152] ("windows display the images in a variety of ways, including well-known icon and list views showing icons representing the type of the file (such as a Photoshop JPEG file) or a miniature 'slide' view (thumbnail) of the image itself"), [0153]-[0155], [0156] ("the contents of the folder or collection is shown in an icon or list view"), [0157]-[0158], FIG. 26. Specifically, Horn discloses or renders obvious that, when a second group of information ("Cycle Oregon 9/02"), including video information, is selected in the menu display by the user selecting the "Cycle Oregon 9/02" folder (within area 2601 of FIG. 26), the controller controls the output unit to display a second group of thumbnails corresponding to the second group (circled in red below in FIG. 26). *Id.*

288. Horn explains that the "content pane" (circled red in FIG. 26 below) "dynamically displays the contents of whatever item is selected in the first two views (2603)." LG-1021, [0156], FIG. 26. Therefore, when the second group, "Cycle Oregon 9/02," is selected (which is evidenced by the box drawn around the name of the group, "Cycle Oregon 9/02," within area 2601 of FIG. 26), the thumbnails corresponding to the second group are displayed. *Id.*



LG-1021, FIG. 26 (annotated)

[1.g] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the one video information in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails.

289. Horn discloses or renders obvious when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the one video information in the second group of video information, and a thumbnail

corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails. LG-1021, [0049], [0124] ("objects may be classified into several different collections at once"), [0130], [0132], [0142], [0154] ("the original folders from which the images were examined (the working set)"), [0165] ("This does not move the images, nor modify them in any way; it simply updates the links in the catalog indicating that they belong to the collection"), [0167] ("items may be removed from a collection"), [0196], [0198], [0199], [0230], [0233], [0244], FIG. 13, claim 10.

290. In particular, Horn explains that "items may be removed from a collection by choosing the Remove command, which removes the items from the collection but does not otherwise delete the item from the source (e.g. the file system) or any other collections." LG-1021, [0167]; *see id.*, [0124] (explaining that a single object (e.g., image) can be classified into several collections at a time by modifying metadata links), [0130]. Thus, in Horn, if a video was included in both a first group (e.g., "Western Travel") and a second group (e.g., "Cycle Oregon 9/02") and then deleted from the first group, it would continue to be included in the second group—including having its thumbnail continue to be displayed with the second group—because it is not "otherwise delete[d] … from the source (e.g. the file system) or any other collections" (e.g., second group). *Id.*

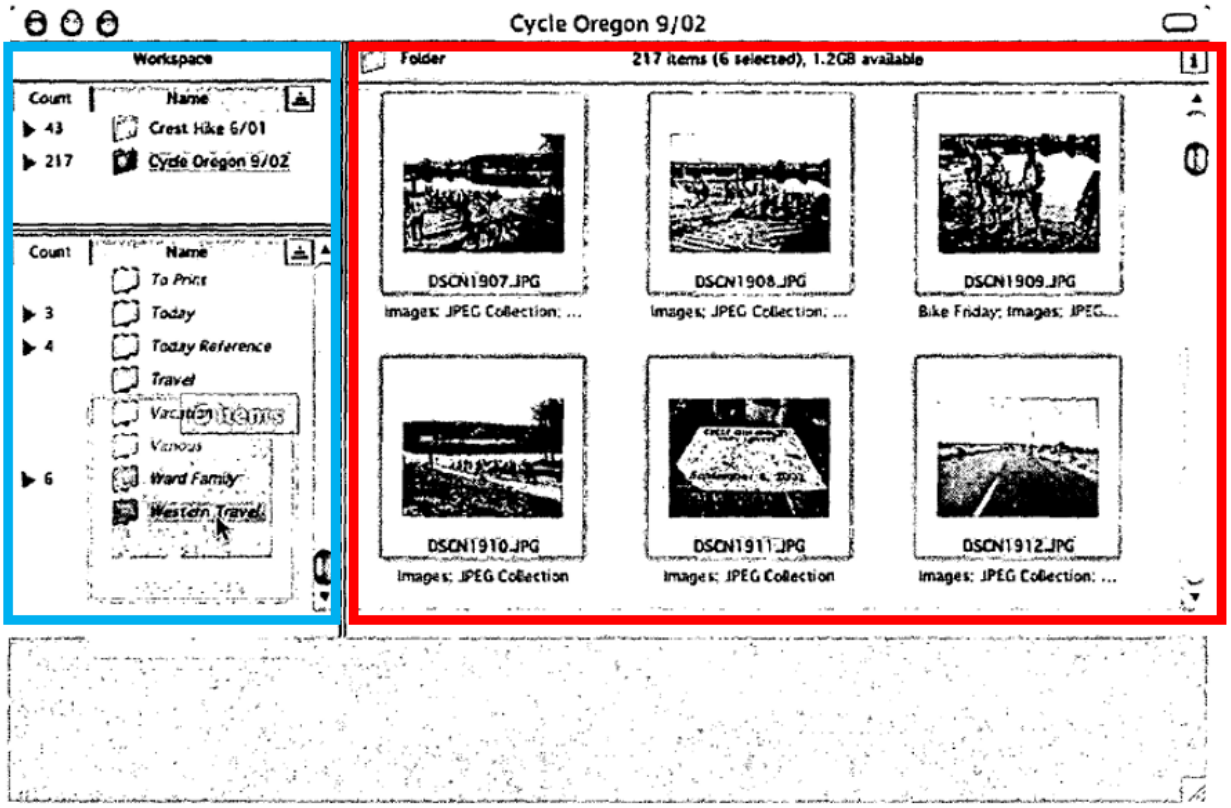
291. Moreover, Horn explains that its "MFS-configured CPU control program simultaneously classifies objects into multiple containers using link metadata rather than duplication." LG-1021, [0049]; *see id.*, [0130], [0132], [0142], [0165], [0167], [0196], [0198], [0199], [0230], [0233], [0244], FIG. 13, claim 10. "Objects are attached to the object store to allow them to be stored persistently within the object store, and are detached from the object store when they are no longer persistent." LG-1021, [0196]. Because objects are stored in this manner in Horn, "[a]ll storable objects maintain a reference count for memory management" and are "removed from memory when their reference counts reach one (e.g. are only referenced by the object store)." LG-1021, [0198]. Thus, a POSITA would have understood that deletion of an object from one group would bring the object's reference count down by one but would not affect the object's storage from memory or from other groups, nor would it remove the object's thumbnail from being displayed when the groups with which it is associated are displayed.

ii. *Claim 2*

[2.a] The information processing apparatus according to claim 1, wherein the controller controls the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed,

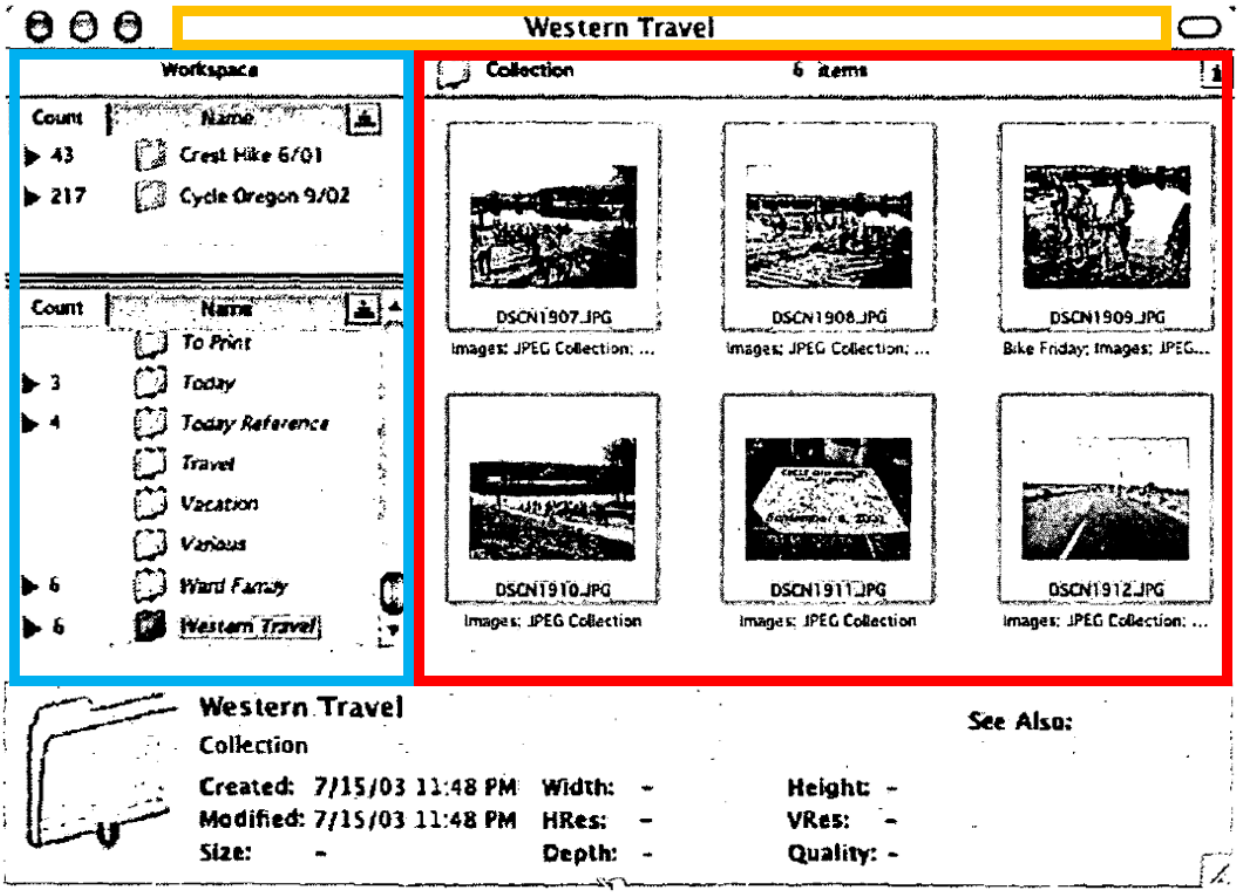
292. Horn discloses the controller controlling the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed. LG-1005, FIGS. 26, 30. In particular, Horn discloses that its device displays the name of the selected group (e.g., "Western Travel") in a first area when the thumbnails from the selected group are displayed. *Id.*

293. As shown in FIG. 30, below, a first character ("Western Travel" or one or more of its letters) corresponding to the first group of video information ("Western Travel" collection) is displayed in a first area (circled blue) when the first group of thumbnails is displayed (circled red). LG-1021, [0153]-[0158], FIGS. 26, 30. Horn explains that the "content pane … dynamically displays the contents of whatever item is selected in the first two views (2603)," where, "[i]n the case of a folder or collection, the contents of the folder or collection is shown in an icon or list view." LG-1021, [0156].



LG-1021, FIG. 30 (annotated) (excerpted)

A modified image of Horn's FIGS. 29 and 30 similarly shows this. Additionally or alternatively, the modified image shows a first character ("Western Travel" or one or more of its letters) corresponding to the first group ("Western Travel") is displayed in another first area (circled orange) when the first group of thumbnails is displayed (circled red). *See, e.g.*, LG-1021, FIG. 26.

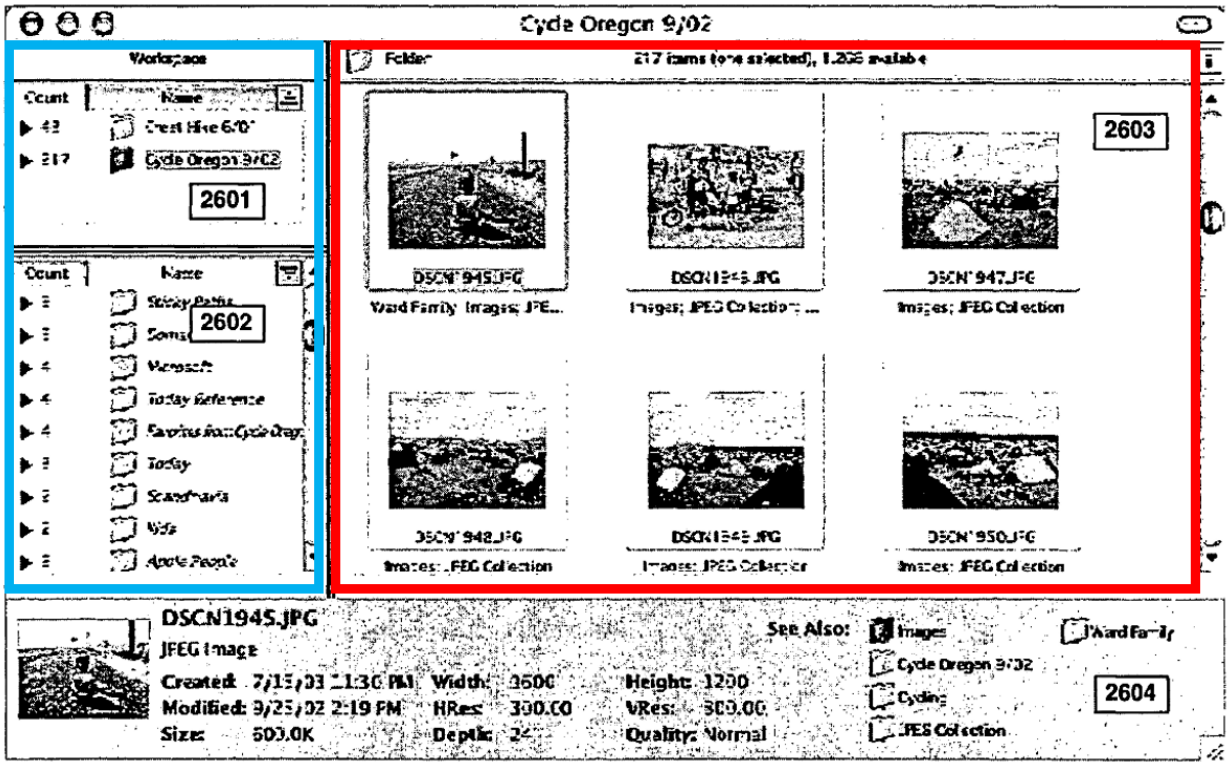


Modified image based on LG-1021, FIGS. 29-30

[2.b] wherein the controller controls the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed.

294. Horn discloses the controller controlling the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed. LG-1005, FIG. 26; *see* discussion of Element [2.a]. In particular, Horn discloses that its device displays the name of the selected group (e.g., "Cycle Oregon 9/02") in a first area when the thumbnails from the selected group are displayed. *Id.*

295. As shown in FIG. 26, below, a second character ("Cycle Oregon 9/02" or one or more of its letters) corresponding to the second group of video information ("Cycle Oregon 9/02" folder) is displayed in a first area (circled blue) when the second group of thumbnails is displayed (circled red). LG-1021, [0153]-[0158], FIG. 26. Horn explains that the "content pane … dynamically displays the contents of whatever item is selected in the first two views (2603)," where, "[i]n the case of a folder or collection, the contents of the folder or collection is shown in an icon or list view." LG-1021, [0156]. Additionally or alternatively, FIG. 26 shows a second character ("Cycle Oregon 9/02" or one or more of its letters) corresponding to the second group of video information ("Cycle Oregon 9/02") is displayed in another first area (circled orange) when the second group of thumbnails is displayed (circled red). *See* LG-1021, FIG. 26.



LG-1021, FIG. 26 (annotated)

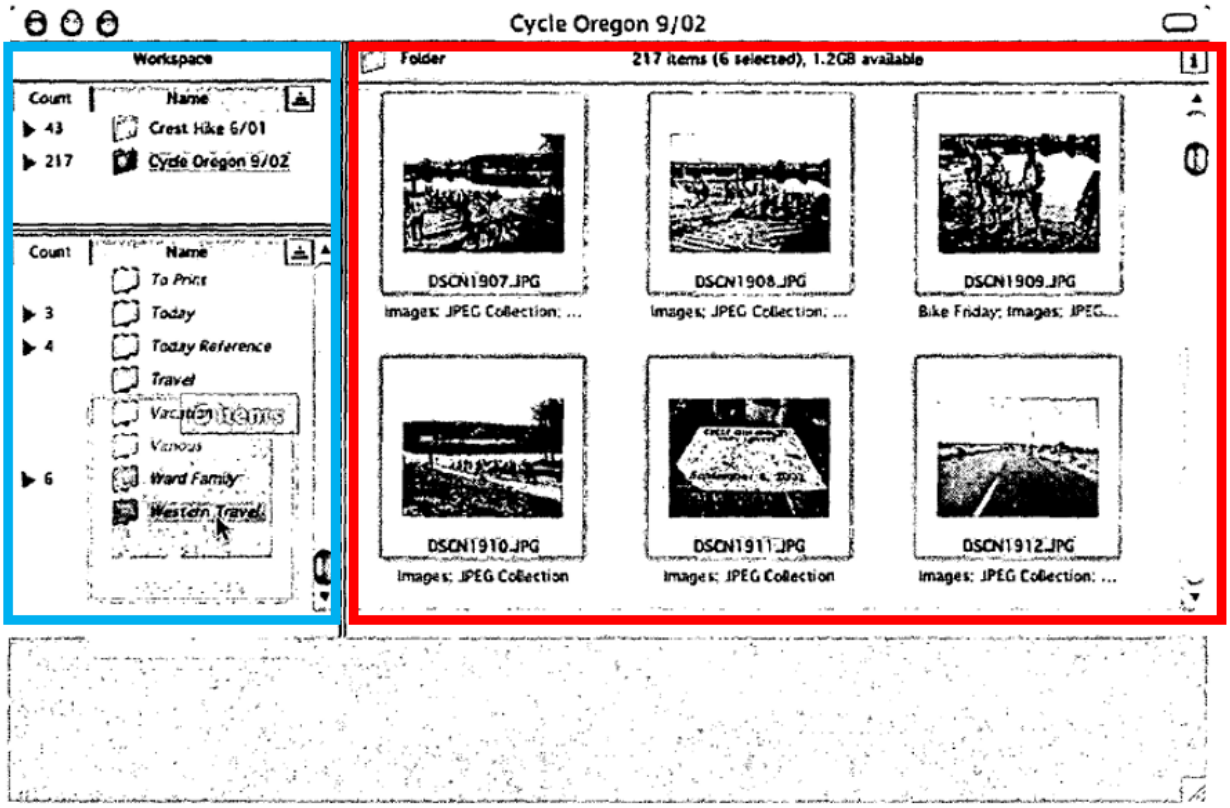
iii. *Claim 3*

[3.a] The information processing apparatus according to claim 2, wherein the controller controls the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area,

296. Horn discloses the controller controlling the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area. LG-1021, FIGS. 26, 30; *see* discussion of Elements [2.a]-[2.b].

297. In particular, as shown in FIG. 30, below, Horn discloses that the first group of thumbnails (e.g., thumbnails in the group "Western Travel") is displayed

in a second area (circled red) that is different from the first area (circled blue) where the first character corresponding to the first group of video information is displayed. *Id.*

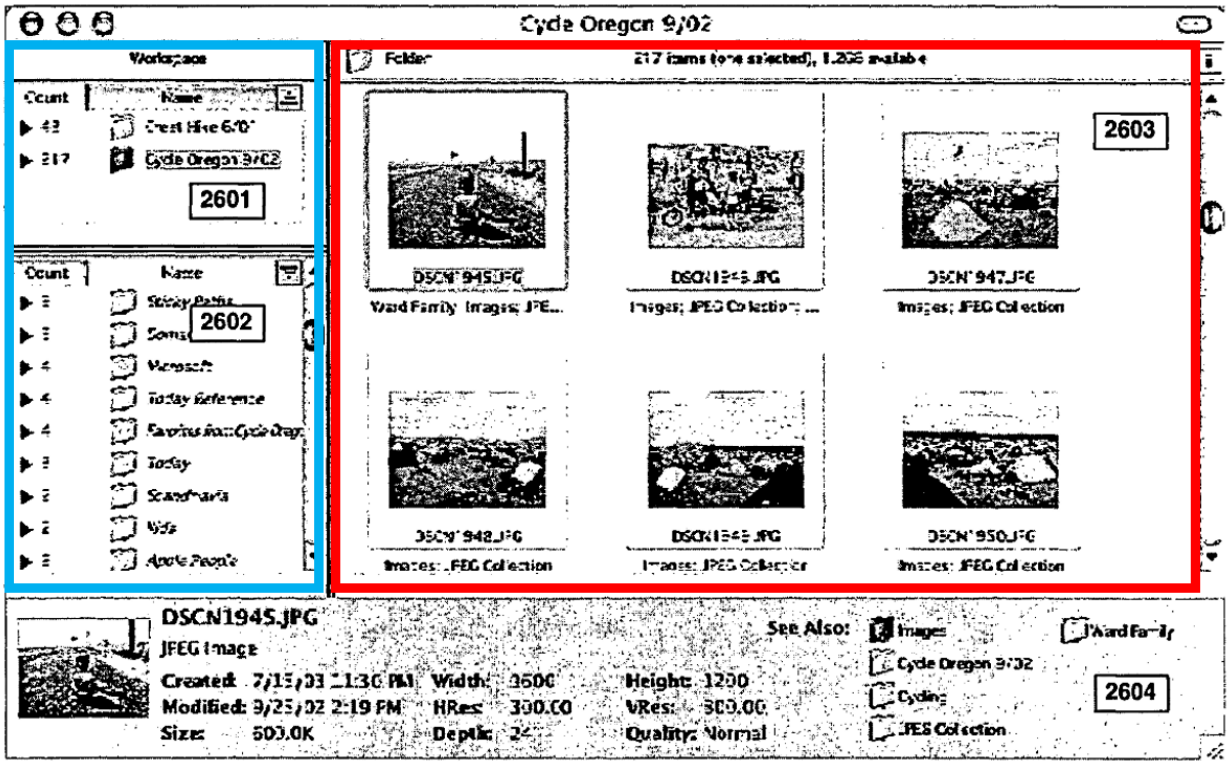


LG-1021, FIG. 30 (annotated) (excerpted)

[3.b] wherein the controller controls the output unit to display the second group of thumbnails in the second area when the second group of thumbnails is displayed.

298. Horn discloses the controller controlling the output unit to display the second group of thumbnails in a second area when the second group of thumbnails is displayed, the second area being different from the first area. LG-1021, FIG. 26; *see* discussion of Element [3.a].

299. In particular, as shown in FIG. 26, below, Horn discloses that the second group of thumbnails (e.g., thumbnails in the group "Cycle Oregon 9/02") is displayed in a second area (circled red) that is different from the first area (circled blue) where the second character corresponding to the second group of video information is displayed. *Id.*



LG-1021, FIG. 26 (annotated)

iv. *Claim 4*

[4] The information processing apparatus according to claim 3, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

300. Horn discloses wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium. *See* discussion of Element [1.g]. Horn explains that "items may be removed from a collection by choosing the Remove command, which removes the items from the collection but does not otherwise delete the item from the source (e.g. the file system)." LG-1021, [0167].

v. *Claim 5*

[5.pre] An information processing system comprising:

301. *See* discussion of Element [1.pre].

[5.a] a recording unit configured to record a plurality of video information on a recording medium;

302. *See* discussion of Element [1.a].

[5.b] a reproducing unit configured to reproduce selected video information read out from the recording medium; and

303. *See* discussion of Element [1.c].

[5.c] a display unit configured to output a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

304. *See* discussion of Element [1.b].

[5.d] wherein, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information, a first group of thumbnails corresponding to the first group of video information is displayed on the display,

305. *See* discussion of Element [1.e].

[5.e] wherein, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information, a second group of thumbnails corresponding to the second group of video information is displayed on the display, and

306. *See* discussion of Element [1.f].

[5.f] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the one video information continues to be included in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the second group of thumbnails is displayed on the display.

307. *See* discussion of Element [1.g].

vi. <u>*Claim 6*</u>

[6.a] The information processing system according to claim 5, wherein the display displays a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed on the display,

308. *See* discussion of Element [2.a].

[6.b] wherein the display displays a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed on the display.

309. *See* discussion of Element [2.b].

vii. *Claim 7*

[7.a] The information processing system according to claim 6, wherein the display displays the first group of thumbnails in a second area when the first group of thumbnails is displayed on the display, the second area being different from the first area,

310. *See* discussion of Element [3.a].

[7.b] wherein the display displays the second group of thumbnails in the second area when the second group of thumbnails is displayed on the display.

311. *See* discussion of Element [3.b].

viii. *Claim 8*

[8] The information processing system according to claim 7, further comprising: a controller, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

312. *See* discussion of Claim [4].

ix. *Claim 9*

[9.pre] An information processing method comprising:

313. *See* discussion of Element [1.pre].

[9.a] recording, by a recording unit, a plurality of video information on a recording medium;

314. *See* discussion of Element [1.a].

[9.b] outputting, by an output unit, a menu display for a user to select one group of video information among a plurality of groups of video information by specifying a position of a character corresponding to the one group of video information;

315. *See* discussion of Element [1.b].

[9.c] reproducing, by a reproducing unit, selected video information read out from the recording medium;

316. *See* discussion of Element [1.c].

[9.d] controlling, by a controller, the output unit to display a first group of thumbnails corresponding to the first group of video information, when a first group of video information is selected in the menu display by specifying a position of a character corresponding to the first group of video information,

317. *See* discussion of Elements [1.d]-[1.e].

[9.e] controlling, by a controller, the output unit to display a second group of thumbnails corresponding to the second group of video information, when a second group of video information is selected in the menu display by specifying a position of a character corresponding to the second group of video information,

318. *See* discussion of Elements [1.d], [1.f].

[9.f] wherein, when one video information recorded on the recording medium that is included in both the first group of video information and the second group of video information is deleted from the first group of video information, the controller continues to include the one video information

in the second group of video information, and a thumbnail corresponding to the one video information is displayed as one of the thumbnails of the second group of thumbnails when the controller controls the output unit to display the second group of thumbnails.

319. *See* discussion of Element [1.g].

x. *Claim 10*

[10.a] The information processing method according to claim 9, further comprising: controlling, by the controller, the output unit to display a first character corresponding to the first group of video information in a first area when the first group of thumbnails is displayed; and

320. *See* discussion of Element [2.a].

[10.b] controlling, by the controller, the output unit to display a second character corresponding to the second group of video information in the first area when the second group of thumbnails is displayed.

321. *See* discussion of Element [2.b].

xi. *Claim 11*

[11.a] The information processing method according to claim 10, further comprising: controlling, by the controller, the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area; and

322. *See* discussion of Element [3.a].

[11.b] controlling, by the controller, the controller controls the output unit to display the second group of thumbnails in the second area when the second group of thumbnails is displayed.

323. *See* discussion of Element [3.b].

xii. *Claim 12*

[12] The information processing method according to claim 11, wherein, when the one video information is deleted from the first group of video information, the controller removes the one video information from the first group of video information without deleting the one video information recorded on the recording medium.

324. *See* discussion of Claim [4].

xiii. *Claim 13*

[13.pre] An information processing system comprising:

325. *See* discussion of Element [1.pre].

[13.a] a recording unit configured to record a plurality of video information on a recording medium;

326. *See* discussion of Element [1.a].

[13.b] a reproducing unit configured to read video information from the recording medium;

327. *See* discussion of Element [1.c].

[13.c] a display unit; and

328. *See* discussion of Element [1.b].

[13.d] a controller, wherein the controller is configured to:

329. *See* discussion of Element [1.d].

[13.e] control the display unit to display a menu display that includes a plurality of selectable characters that respectively correspond to a plurality of groups of video information,

330. *See* discussion of Element [1.b].

[13.f] upon selection of a character corresponding to a first group of video information in the menu display by specifying a position of the character corresponding to the first group of video information, control the display

unit to display a first group of thumbnails corresponding to the first group of video information, and

331. *See* discussion of Element [1.e].

[13.g] upon selection of a character corresponding to the second group of video information in the menu display by specifying a position of the character corresponding to the second group of video information, control the display unit to display a second group of thumbnails corresponding to the second group of video information,

332. *See* discussion of Element [1.f].

[13.h] wherein when one video information recorded on the recording medium is included in both the first group of video information and the second group of video information, and upon deletion of the one video information from the first group of video information, the one video information continues to be included in the second group of video information, and the controller controls the display unit to display a thumbnail corresponding to the one video information as one of the thumbnails of the second group of thumbnails.

333. *See* discussion of Element [1.g].

xiv. *Claim 14*

[14.a] The information processing system according to claim 13, wherein upon display of the first group of thumbnails on the display unit, the control unit controls the display unit to display a first character corresponding to the first group of video information in a first area,

334. *See* discussion of Element [2.a].

[14.b] wherein upon display of the second group of thumbnails on the display unit, the controller controls the display unit to display a second character corresponding to the second group of video information in the first area.

335. *See* discussion of Element [2.b].

xv. *Claim 15*

[15.a] The information processing system according to claim 14, wherein upon display of the first group of thumbnails on the display unit, the controller controls the display unit to display the first group of thumbnails in a second area, the second area being different from the first area, and

336. *See* discussion of Element [3.a].

[15.b] wherein upon display of the second group of thumbnails on the display unit, the controller controls the display unit to display the second group of thumbnails in the second area.

337. *See* discussion of Element [3.b].

xvi. *Claim 16*

[16] The information processing system according to claim 15, wherein, upon deletion of the one video information from the first group of video information, the controller removes the one video information from the first group of video information without instructing the deletion of the one video information recorded on the recording medium.

338. *See* discussion of Claim [4].

IX. SECONDARY CONSIDERATIONS

339. At this time, I am not aware of any objective evidence (or "secondary considerations") that would suggest claims 1-16 are not obvious. For example, I am not aware of any evidence relating the purported invention to any commercial success, evidence of a long-felt need that was solved by the purported invention, evidence that others have copied the purported invention, failure of others facing the same state of the art to develop a satisfactory solution, professional approval or

skepticism, or evidence that the purported invention achieved a surprising result. It is my opinion that claims 1-16 would have been obvious to one of skill in the art.

340. I understand that if Patent Owner argues that objective evidence supports a finding of non-obviousness, I may be asked to review such evidence and formulate an opinion in response to Patent Owner's arguments. I reserve my right to do so.

APPENDIX A

Andy Cockburn
B.Sc.(Hons) Ph.D.

Curriculum Vitae

Full legal name	Andrew Jeremy Gavin Cockburn
University Address	Department of Computer Science and Software Engineering University of Canterbury Christchurch 8140 New Zealand
Telephone	+64 3 369 2119
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Consultancy Address	Cockburn Human Interface Consulting Ltd. 20 Gilmour Terrace, Lyttelton 8082 New Zealand
Telephone	+64 21 296 2307
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Date of birth	23rd July 1966
Date	June 24, 2024

Brief Summary

International research reputation

- Over one hundred and ninety publications in international journals and conferences.
- Elected to the CHI Academy (2015), which is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction.
- Recipient of the 2009 Chris Wallace award for the outstanding research contribution to Computer Science (2005-2007) in Australasia.
- Deputy Chair of the national panel for assessing Computer Science and Mathematics research quality (MIST PBRF panel, 2016-2019).
- Technical programme committee chair for ACM CHI 2020; Papers co-chair for ACM CHI 2014 and 2015.
- Editorial Board Member for: ACM Transactions on Computer-Human Interaction (2012-2021); Human-Computer Interaction Journal (2015-); Foundations and Trends in HCI (2015-2023); International Journal of Human-Computer Studies (2004-2013); Interacting with Computers (2003-2013).
- Best paper awards at CHI 2018, 2013, 2012, 2011 (awarded to the top 1% of submissions) and 13 Honourable Mention awards (top 5%) at ACM CHI.
- H-index impact factor of 56 (Google Scholar).

Excellent educator and public speaker

- Long track record of outstanding student evaluations.
- Nominated for the New Zealand National Tertiary Teaching Award, 2010. Recipient of a University of Canterbury Teaching Award (2004) and many nominations for student-elected 'lecturer of the year' award.

Experienced expert witness and consultant

- Testifying expert witness on behalf of industry leaders in various jurisdictions, including the Federal Court of Australia, US Federal Court, US Patent Trial and Appeal Board, and the US International Trade Commission.

Education

Degree	PhD (June 1993)
Discipline	Computer Science — Computer Supported Cooperative Work
Location	University of Stirling, Scotland
Thesis Title	Groupware Design: Principles, Prototypes, and Systems

Degree	BSc(Hons) (July 1988)
Discipline	Computer Science
Location	University of York, England

Employment History

Position	Professor (promoted through lecturer, senior lecturer, associate professor)
Location	University of Canterbury Christchurch New Zealand
Period	June 1993 — current

Research Student Supervision

PhD candidates

Stewart Dowding	2021–	Interaction Pace and User Preferences
Pang Suwanaposee	2020–	Cognitive Biases and the Subjective Experience of Interaction
Sarmad Soomro	2017–2021	Interaction with In-Vehicle Touchscreens
Joshua Leung	2013–2017	Understanding the Noticeability and Distraction of Interactive Highlighting Techniques
Philip Quinn	2012–2016	Economic Behaviour & Psychological Biases in Human-Computer Interaction
Tham Piumsomboon	2011–2015	Adaptive and Multimodal Interfaces for Collaborative Augmented Reality
Joey Scarr	2011–2014	Improving Interaction with Spatial User Interfaces
Stephen Fitchett	2010–2013	Understanding and Improving Personal File Retrieval
Susanne Tak	2008–2011	Improving Interfaces for Window/Task Switching
Jason Alexander	2006–2009	Improving Interfaces for Document Navigation
Joerg Hauber	2004–2008	Understanding Remote Collaboration in Video Collaborative Virtual Environments
Julian Looser	2003–2007	AR Magic Lenses: Addressing the Challenge of Focus and Context in Augmented Reality
Volkert Buchmann (A. sup.)	2004–2008	Haptic Feedback in Augmented Reality
Carl Cook (A. sup.)	2002–2006	Collaborative Software Engineering
Tim Wright	2000–2004	Collaborative and Multiple-Notation Programming Environments for Children
Michael JasonSmith	2000–2006	User Interfaces for Temporal Awareness

M.Sc. candidates

Ben McDonald	2010–2011	Multiuser interaction with large public displays
Dominic Winkler	2009–2011	Interaction Techniques for Cross Context Activities
Taher Amer	2005–2006	Evaluating SwiftPoint
Trond Nilsen	2004–2006	Hybrid Interfaces in Augmented Reality
Joshua Savage	2003–2004	The Calibration and Evaluation of Speed-Dependent Automatic Zooming Interfaces
Ben Schmidt	2001–2002	A Study of Bimanual Interaction
Elizabeth Ng (A. sup.)	1997–1998	Pen-based music input
Aaron Tay	1994–5	End-User Tailorability in Workflow Design

Honours candidates and Honours-level interns

Joel Harrison	2012	Improving Command Selection
Joshua Leung	2012	Improving File Access
Jerome Delamarche	2010	Multiple Trajectory Pointing Methods
Joey Scarr	2010	Improving Expertise Development in User Interfaces
Stephen Fitchett	2009	Improved Mobile Scrolling Interfaces
Philip Quinn	2007	Improving Command Interfaces
Keith Humm	2007	Improving Interfaces for Task Switching
Jason Alexander	2005	Improving Document Navigation with Space-Filling Thumbnails
Philip Brock	2005	An Investigation of Target Acquisition with Visually Expanding Targets in Constant Motor-Space
David Mitchell	2003	Evaluating Focus+Context Screens
Andrew Wallace	2003	Calibrating Speed-Dependent Automatic Zooming
Andrew Barrett	2002	Implementing RSVP as an Image Browser
Julian Looser	2002	3D Games as Motivation in Fitts' Law Experiments
Joshua Savage	2002	Implementing and Evaluating Speed-Coupled Scrolling
Amal Siresena	2002	Mobile Text Entry
Michael Moyle	2001	An Evaluation of Simple Gesture Based Controls
Lee Butts	2001	Mobile Phone Text Entry
Eddie Edwards	2001	Towards Scalable Interfaces Using Spatial Cues
Gene Thomas	1997	Smart Desktop
Olof Eilert	1997	User Interfaces for Object Oriented Literate Programming
Philip Weir	1996	Distortion Oriented Workspace Awareness
Carey Evans	1996	Assisting World Wide Web Navigation
Justin Macfarlane	1995	Mawd: A Collaborative Analysis Tool
Carl Cerecke	1995	TRAIL: An Email Based CSCW Toolkit
Andrew Bryant	1995	Leogo: An Equal Opportunity Programming Environment
Ian Bosely	1994	SPI: A Social Presence Indicator

Postgraduate Thesis Examinations

Katherine Fennedy	PhD	External Examiner	Singapore University of Tech. & Design	2021
Praveenkumar Kanithi	PhD	Chair	University of Canterbury	2020
Ori Gagoni	PhD	Chair	University of Canterbury	2019
Alaeddin Nassani	PhD	Chair	University of Canterbury	2019
Veera Mandalika	PhD	Chair	University of Canterbury	2018
Jessalyn Alvina	PhD	Examiner	Université Paris Sud	2017
Hyungon Kim	PhD	Chair	University of Canterbury	2017
Thomas Young	PhD	Chair	University of Canterbury	2017
Craig Sutherland	PhD	Examiner	University of Auckland	2016
David Thompson	PhD	Chair	University of Canterbury	2016
Philip Quinn	PhD	Supervisor	University of Canterbury	2016
Daniel Bradley	PhD	Examiner	University of Queensland	2016
David Altimera	PhD	Chair	University of Canterbury	2015
Jakub Zlotowsky	PhD	Chair	University of Canterbury	2015
Thammathip Piumsomboon	PhD	Supervisor	University of Canterbury	2015
Robert Schattschnieder	PhD	Chair	University of Canterbury	2014
Hazel Bradshaw	PhD	Chair	University of Canterbury	2014
Amur Al Manji	PhD	Examiner	University of Auckland	2014
Amir Shareghi Najar	PhD	Chair	University of Canterbury	2014
Joey Scarr	PhD	Supervisor	University of Canterbury	2014
Stephen Fitchett	PhD	Supervisor	University of Canterbury	2014
Amali Weeseringhe	PhD	Chair	University of Canterbury	2012
Sayan Ray	PhD	Chair	University of Canterbury	2012
Christina Dicke	PhD	Chair	University of Canterbury	2012
Minkyung Lee	PhD	Chair	University of Canterbury	2010
Jason Alexander	PhD	Supervisor	University of Canterbury	2009
Leah Findlater	PhD	Examiner	University of British Colombia	2009
Judy Bowen	PhD	Examiner	University of Waikato	2008
Joerg Hauber	PhD	Supervisor	University of Canterbury	2008
Julian Looser	PhD	Supervisor	University of Canterbury	2008
Michael JasonSmith	PhD	Supervisor	University of Canterbury	2006
Tim Wright	PhD	Supervisor	University of Canterbury	2005
Beryl Plimmer	PhD	Examiner	University of Waikato	2003
Gorden Paynter	PhD	Examiner	University of Waikato	2000
Gitesh K Raikundalia	PhD	Examiner	Bond University	1997
Ramon Craig Standing	PhD	Examiner	University of Western Australia	1997
Ying Leung	PhD	Examiner	Massey University	1995
Qi Min Ser	Masters	Examiner	University of Canterbury	2016
Taher Amer	Masters	Supervisor	University of Canterbury	2006
Trond Nilsen	Masters	Supervisor	University of Canterbury	2006
Akhil Mehra	Masters	Examiner	University of Auckland	2005
Aparna Krishnan	Masters	Examiner	University of Waikato	2003
Shaun Kaasten	Masters	Examiner	University of Calgary	2001
Boyd Ludlow	Masters	Examiner	University of Waikato	1999
Donald Cox	Masters	Examiner	University of Calgary	1998
Wallace Chigona	Masters	Examiner	Waikato University	1997
Simon Gianoutsos	Masters	Examiner	Waikato University	1997
Jing Deng	Masters	Examiner	Waikato University	1996 and 1997
Aaron Tay	Masters	Examiner	University of Canterbury	1996

Student glory

Pang Suwanaposee	PhD	2022	Google PhD Fellowship Award AUD$15,000.
Pang Suwanaposee	PhD	2021	CHI Honourable Mention award.
Joey Scarr	PhD	2016	John Makepeace Bennett Award for the Distinguished Computer Science PhD thesis in Australasia.
Philip Quinn	PhD	2015	US Patent Awarded (Google Assignee).
Philip Quinn	PhD	2014	US Patent Awarded (Google Assignee).
Stephen Fitchett	PhD	2014	CHI Honourable Mention award.
Philip Quinn	PhD	2013	Google Mountain View Internship.
Stephen Fitchett	PhD	2013	CHI Best Paper award.
Joey Scarr	PhD	2013	CHI Honourable Mention award.
Joey Scarr	PhD	2013	CHI ReplicCHI award.
Joey Scarr	PhD	2012	CHI Best Paper award.
Stephen Fitchett	PhD	2012	CHI Honourable Mention award.
Philip Quinn	PhD	2012	Google Mountainview Internship.
Joey Scarr	PhD	2012	Google Sydney Internship.
Stephen Fitchett	PhD	2011	Outstanding reference from Darren Edge, Microsoft Research Asia.
Joey Scarr	PhD	2012	$3K for 2nd place in University ‘PhD in 3’ competition.
Joey Scarr	PhD	2012	$1K for 1st place in College ‘PhD in 3’ competition.
Stephen Fitchett	PhD	2012	$1K for 3rd place in College ‘PhD in 3’ competition.
Philip Quinn	PhD	2011	Honourable Mention award ACM CHI’11.
Joey Scarr	PhD	2011	Google Sydney Internship.
Susanne Tak	PhD	2010	$5K Google Anita Borg Scholarship
Susanne Tak	PhD	2010	$3K from ACM for participation at CHI’s Doctoral Consortium
Jason Alexander	PhD	2010	PhD Thesis placed on “Dean’s list for excellence” (top 10%)
Susanne Tak	PhD	2009	$2K award for 1st place in College Research Poster competition
Jason Alexander	PhD	2008	$1K award for 2nd place in College Research Poster competition
Jason Alexander	PhD	2008	Michael Sweeney award for best student paper, Graphics Interface ’08.
Mark Hancock	PhD	2007	Best paper nomination at ACM CHI’07.
Josh Savage and Andrew Wallace	M.Sc. Hons	2005	Best paper nomination at ACM CHI’05.
Mike Moyle	Hons	2005	NZ Hi-Tech Young Achiever of the Year Award

Publications

Edited Volumes

EV1 J McGrenere and A Cockburn (Eds.) Proceedings of ACM CHI 2020 Conference on Human Factors in Computing Systems.

EV2 J McGrenere and A Cockburn (Eds.) Extended Abstracts of ACM CHI 2020 Conference on Human Factors in Computing Systems.

EV3 M Billinghurst and A Cockburn (Eds.) Proceedings of the Sixth Australasian User Interface Conference (AUIC2005). Volume 40 of the Conferences in Research and Practice in Information Technology, Australian Computer Society.

EV4 A Cockburn (Ed.) Proceedings of the Fifth Australasian User Interface Conference (AUIC2004). Volume 28 of the Conferences in Research and Practice in Information Technology, Australian Computer Society.

Papers in Refereed Journals and Collections

J1 A Cockburn, D Hills, Z Che, and C Gutwin. User Interface Evaluation Through Implicit-Association Tests. *Proceedings of the ACM on Human-Computer Interaction.* EICS, Article v8eics262. 2024.

J2 A Cockburn, A Goguey, C Gutwin, Z Chen, P Suwanaposee, and S Dowding. Automatically Adapting System Pace Towards User Pace – Empirical Studies. *International Journal of Human-Computer Studies.* 185:103228. May. 2024.

J3 S Dowding, C Gutwin, and A Cockburn. User Speech Rates and Preferences for System Speech Rates. *International Journal of Human-Computer Studies.* 184:103222. April. 2024.

J4 P Suwanaposee, C Gutwin, and A Cockburn. The Influence of Audio Effects and Attention on the Perceived Duration of Interaction. *International Journal of Human-Computer Studies.* 159:102756. March. 2022.

J5 J Leung and A Cockburn. Design Framework for Interactive Highlighting Techniques. *Foundations and Trends in Human-Computer Interaction.* 14(2-3):96-271. 2021.

J6 AF Mairena, C Gutwin, and A Cockburn. Which Emphasis Technique to Use? Perception of Emphasis Techniques with Varying Distractors, Backgrounds, and Visualization Types. *Information Visualization.* 21(2):95-129. 2022.

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C93 J Looser, M Billinghurst and A Cockburn. Through the Looking Glass: The Use of Lenses as an Interface Tool for Augmented Reality *Proceedings of Graphite'04: International Conference on Computer Graphics and Interactive Techniques* Singapore, 15–18 June *2004*, 204–211.

C94 V Buchmann, S Violich, M Billinghurst and A Cockburn. FingARtips — Gesture Based Direct Manipulation in Augmented Reality *Proceedings of Graphite'04: International Conference on Computer Graphics and Interactive Techniques* Singapore, 15–18 June *2004*, pp 212–221.

C95 A Cockburn. Revisiting 2D vs 3D Implications on Spatial Memory *Proceedings of the Fifth Australasian User Interface Conference (AUIC2004)* Dunedin, New Zealand, 18–22 January *2004*, pp 25–32. Australian Computer Society.

C96 A Wallace, J Savage and A Cockburn. Rapid Visual Flow: How Fast is Too Fast? *Proceedings of the Fifth Australasian User Interface Conference (AUIC2004)* Dunedin, New Zealand, 18–22 January *2004*, pp 117–122. Australian Computer Society.

C97 A Cockburn, J Looser and J Savage. Around the World in Seconds with Speed-Dependent Automatic Zooming *Paper and Video in the Conference Supplement of the ACM Conference on User Interface Software and Technology* Vancouver, Canada, November *2003*, pp 35–36.

C98 A Cockburn and J Savage. Comparing Speed-Dependent Automatic Zooming with Traditional Scroll, Pan and Zoom Methods *People and Computers XVII: British Computer Society Conference on Human Computer Interaction* Bath, England, September *2003*, pages 87–102. Springer-Verlag.

C99 A Cockburn and A Firth. Improving the Acquisition of Small Targets *People and Computers XVII: British Computer Society Conference on Human Computer Interaction* Bath, England, September *2003*, pages 181–196. Springer-Verlag.

C100 A Cockburn and A Siresena. Evaluating Mobile Text Entry with the Fastap Keypad Acceptance rate: 33%, 8 from 24. *People and Computers XVII (Volume 2): British Computer Society Conference on Human Computer Interaction* Bath, England, September *2003*, pages 77–80. Springer-Verlag.

C101 T Wright and A Cockburn. A Language and Task-based Taxonomy of Programming Environments *Proceedings of IEEE Symposium on Visual Languages and Formal Methods.* Auckland, October 28–31 *2003*, pages 192–194. Acceptance rate: 33%, 8 from 24.

C102 T Wright and A Cockburn. An Evaluation of the Effects of Different Forms of Computer Supported Collaboration on Problem Solving Strategies *Proceedings of CHINZ'03. Annual conference of the New Zealand Chapter of the ACM Special Interest Group on Human-Computer Interaction.* Otago, July *2003*, pages 99-104. Acceptance rate: 59%, 19 from 32.

C103 T Wright and A Cockburn. A Framework for Evaluating Multiple Language Programming Environments *Proceedings of CHINZ'03. Annual conference of the New Zealand Chapter of the ACM Special Interest Group on Human-Computer Interaction.* Otago, July *2003*, pages 21–26. Acceptance rate: 59%, 19 from 32.

C104 M Apperley, P Carter, C Churcher, A Cockburn, M Jones, B Lobb, K Novins, C Phillips and W Wong. State of the Art: HCI in New Zealand (HCI Societies Worldwide Review) *Proceedings of INTERACT'03: Ninth IFIP TC13 International Conference on Human-Computer Interaction* Zurich, Switzerland, Sept 1–5 *2003*

C105 M Moyle and A Cockburn. The Design and Evaluation of a Flick Gesture for 'Back' and 'Forward' in Web Browsers *Proceedings of the Fourth Australasian User Interface Conference (AUIC2003)* Adelaide, Australia, 4–7 February *2003*, pages 39–46.

C106 M JasonSmith and A Cockburn. Get a Way Back: An Evaluation of Temporal Lists *Proceedings of the Fourth Australasian User Interface Conference (AUIC2003)* Adelaide, Australia, 4–7 February *2003*, pages 33–38.

C107 T Wright and A Cockburn. Mulspren: A MUltiple Language Simulation PRogramming ENvironment *Proceedings of the 2002 IEEE Symposia on Human Centric Computing Languages and Environments* Arlington, VA, Sept 3–6 *2002*, pages 101–103.

C108 T Wright and A Cockburn. Evaluating Computer-Supported Collaboration for Learning a Problem Solving Task, *Proceedings of the International Conference on Computers in Education,* Auckland, NZ *2002*, pages 266-267.

C109 M Moyle and A Cockburn. Analysing Mouse and Pen Flick Gestures *Proceedings of the SIGCHI-NZ Symposium On Computer-Human Interaction* Hamilton, New Zealand, 11–12 July. *2002*, pages 19–24.

C110 A Cockburn and B McKenzie. Evaluating the Effectiveness of Spatial Memory in 2D and 3D Physical and Virtual Environments *Proceedings of ACM CHI'2002 Conference on Human Factors in Computing Systems* Minneapolis, Minnesota, 20–25 April. *2002*, pages 203–210. Addison-Wesley. Acceptance rate: 15%, 61 from 409.

C111 A Cockburn, B McKenzie, and M JasonSmith. Evaluating a Temporal Behaviour for Web Browsers' Back and Forward Buttons *CD and on-line Proceedings of WWW2002, the 11th International World Wide Web Conference* Honolulu, May 7–11. *2002*. `www2002.org`

C112 M Moyle and A Cockburn. Gesture Navigation: An Alternative Back for the Future *Extended Abstracts of ACM CHI'2002 Conference on Human Factors in Computing Systems* Minneapolis, Minnesota, 20–25 April. *2002*, pages 822–823. ACM Press. Acceptance rate: 17%, 62 from 374.

C113 L Butts and A Cockburn. An Evaluation of Mobile Phone Text Input Methods *Proceedings of Australian User Interface Conference. 2002*, pages 55–59. Australian Computer Society Inc.

C114 T Wright and A Cockburn. Solo, Together, Apart: Evaluating Modes of CSCL for Learning a Problem Solving Task *Proceedings of ACM Computer Supported Collaborative Learning (CSCL) Conference 2002*. `newmedia.colorado.edu/cscl/06.pdf`

C115 T Bell, A Cockburn, B McKenzie and J Vargo. Flexible Delivery Damaging to Learning? Lessons from the Canterbury Digital Lectures Project *Proceedings of ED-MEDIA'2001: World Conference on Educational Multimedia, Hypermedia and Telecommunications* Tampere, Finland, June 25–30. *2001*, pages 117–122. Association for the Advancement of Computing in Education.

C116 A Cockburn and B McKenzie. 3D or Not 3D? Evaluating the Effect of the Third Dimension in a Document Management System *Proceedings of ACM CHI'2001 Conference on Human Factors in Computing Systems* Seattle, Washington, March 31–April 6. *2001*, pages 434–441. Addison-Wesley. Acceptance rate: 19%, 69 from 353.

C117 B McKenzie and A Cockburn. An Empirical Analysis of Web Page Revisitation *34th Hawaiian International Conference on System Sciences, HICSS34 2001.* IEEE Computer Society Press.

C118 T Wright and A Cockburn. Writing, Reading, Watching: A Task-Based Analysis and Review of Learners' Programming Environments *International Workshop on Advanced Learning Technologies, IWALT 2000*, pages 167–170. IEEE Computer Society Press.

C119 A Cockburn and B McKenzie. An Evaluation of Cone Trees *People and Computers XIV: British Computer Society Conference on Human Computer Interaction 2000*, pages 425–436. Springer-Verlag. Acceptance rate: 27 from 57.

C120 A Cockburn and S Greenberg. Issues of Page Representation and Organisation in Web Browser's Revisitation Tools *OzCHI'99: Australian Conference on Computer-Human Interaction,* Wagga Wagga, November 28–30, 1999, pages 7–14. Acceptance rate: 50%.

C121 A Cockburn, S Greenberg, B McKenzie, M JasonSmith and S Kaasten. WebView: A Graphical Aid for Revisiting Web Pages *OzCHI'99: Australian Conference on Computer-Human Interaction,* Wagga Wagga, November 28–30, 1999, pages 15–22. Acceptance rate: 50%.

C122 S Greenberg and A Cockburn. Getting Back to Back: Alternate Behaviors for a Web Browser's Back Button *5th Conference on Human Factors and the Web, Gaithersburg, Maryland. June 3, 1999.* Acceptance rate: 11 from 27.

C123 P Weir and A Cockburn. Distortion-Oriented Workspace Awareness in DOME *British Computer Society Conference on Human-Computer Interaction. Imperial College, London. 1–4 September, 1998.*, pages 239–252. Springer-Verlag. Acceptance rate: 21 from 89.

C124 E Ng, T Bell and A Cockburn. Improvements to a Pen-Based Musical Input System *OzCHI'98: The Australasian Conference on Computer-Human Interaction. Adelaide, Australia. 29th November to 4th December, 1998. 1998.*, pages 239–252. IEEE Computer Society Press.

C125 A Cockburn and T Bell. Extending HCI in the Computer Science Curriculum *ACM Australasian Computer Science Education Conference ACSE'98. Brisbane, Australia, 8–10 July, 1998,* pages 113–120. ACM Press. Acceptance rate: 28 from 59.

C126 A Cockburn and A Bryant. Cleogo: Collaborative and Multi-Paradigm Programming for Kids *APCHI'98: Asia Pacific Conference on Computer Human Interaction.* Japan. July 15–17, 1998, pages 187–192. IEEE Computer Society Press.

C127 N Churcher, A Cockburn, B McMaster, J Horlor. CUTE—The Design and Evolution of a First Year Programming Environment Software Engineering: Education and Practice '98. Dunedin. January, 1998, pages 142–148. IEEE Computer Society Press.

C128 A Cockburn and T Dale. CEVA: A Tool for Collaborative Video Analysis *ACM Group'97: International Conference on Supporting Group Work* Phoenix, Arizona, November 16–19, 1997, pages 47–55. ACM Press. Acceptance rate: 44 from 104.

C129 A Cockburn and N Churcher. Towards Literate Tools for Novice Programmers *ACM Australasian Computer Science Education Conference ACSE'97.* Melbourne, Australia, 2-4 July 1997, pages 163–169. ACM Press. Acceptance rate: 31 from 46.

C130 N Churcher and A Cockburn. An Immersion Model for Software Engineering Projects *ACM Australasian Computer Science Education Conference ACSE'97.* Melbourne, Australia, 2-4 July 1997, pages 107–116. ACM Press. Acceptance rate: 31 from 46.

C131 A Cockburn and S Jones. Design Issues for World Wide Web Navigation Visualisation Tools *RIAO'97: The Fifth Conference on Computer-Assisted Research of Information.* McGill University, Montreal, Quebec, Canada, 25th-27th June 1997. pages 55–74. Acceptance rate: 35 from 90.

C132 J Anstice, T Bell, A Cockburn and M Setchell. The Design of a Pen-Based Musical Input System. *OzCHI'96: The Sixth Australian Conference on Computer-Human Interaction,* Hamilton, New Zealand, November 24–27, 1996, pages 260–267. IEEE Press. Acceptance rate: 38 from 79.

C133 A Cockburn and A Bryant. Do It This Way: Equal Opportunity Programming for Kids *OzCHI'96: The Sixth Australian Conference on Computer-Human Interaction,* Hamilton, New Zealand, November 24–27, 1996, pages 246–251. IEEE Press. Acceptance rate: 38 from 79.

C134 A Tay and A Cockburn User Interfaces for Workflow Systems: Designing for End-User Tailorability Short paper in *OzCHI'96: The Sixth Australian Conference on Computer-Human Interaction,* Hamilton, New Zealand, November 24–27, 1996, pages 301–302. IEEE Press.

C135 A Cockburn. Collaborative Usability Analysis Using Video Protocols *APCHI'96: The First Asia Pacific Conference Human Computer Interaction,* Information Technology Institute Singapore, 25–28 June, 1996, pages 67–80. Acceptance rate: lower than 50%.

C136 S Greenberg, C Gutwin, and A Cockburn. Using Distortion-Oriented Displays to Support Workspace Awareness. *British Computer Society Conference on Human-Computer Interaction. Imperial College, London. 20–23 August, 1996.* Cambridge University Press. Acceptance rate: 23 from 63.

C137 A Cockburn and S Greenberg. Children's Collaboration Styles in a Newtonian Microworld. In *Companion Proceedings of CHI'96. ACM Conference on Human Factors in Computing Systems* Vancouver, April 13–18 1996, pages 181–182. ACM Press. Acceptance rate: 78 from 335.

C138 S Greenberg, C Gutwin, and A Cockburn. Awareness Through Fisheye Views in Relaxed-WYSIWIS Groupware *Proceedings of Graphics Interface, May 21–24, 1996. Toronto*, pages 28–38. Morgan-Kauffman. Acceptance rate: 29 from 73.

C139 SRA Jones and AJG Cockburn. A Study of Navigational Support Provided by Two World Wide Web Browsing Applications. In *Hypertext '96. Seventh ACM Conference on Hypertext. Washington DC March 16–20, 1996*, pages 161–169. ACM Press. Acceptance rate: 24 from 85.

C140 AJG Cockburn and SRA Jones. Trails, Trials, and Tribulations: Unravelling Navigational Problems in the World Wide Web. In *Proceedings of the 5th Workshop on Information Technologies and Systems (WITS '95). Nijenrode University, The Netherlands. 9–10 December.*, pages 46–55, 1995. Acceptance rate: 24 from 70.

C141 A Cockburn and S Greenberg. TurboTurtle: A Collaborative Microworld for Exploring Newtonian Physics. In *ACM Conference on Computer Supported Cooperative Learning (CSCL '95). Bloomington, Indiana. October 17–20, 1995*, pages 62–66. Lawrence Erlbaum Associates, Inc, October 1995.

C142 AJG Cockburn. TurboTurtle: Educating Children in an Alternative Reality Universe. In *Proceedings of the 1994 Computer Human Interaction Specialist Interest Group of the Ergonomics Society of Australia (OZCHI'94).* November 28 to December 1. *Melbourne.*, pages 99–105, 1994.

C143 A Cockburn and S Jones. Four Principles for Groupware Design. In *Proceedings of the 1994 Computer Human Interaction Specialist Interest Group of the Ergonomics Society of Australia (OZCHI'94).* November 28 to December 1. *Melbourne.*, pages 21–26, 1994.

C144 AJG Cockburn and S Greenberg. Making Contact: Getting the Group Communicating with Groupware. In *COOCS '93. The ACM Conference on Organisational Computing Systems. November 1st to 4th. Milpitas, California.*, pages 31–41, 1993.

C145 AJG Cockburn. Supporting Social Awareness in Distributed Work. In P *et al* Collings, editor, *Proceedings of OZCHI 1993. CHISIG Annual Conference.* Canberra. November., pages 224–241, 1993.

C146 AJG Cockburn and HW Thimbleby. Reducing User Effort in Collaboration Support. In WD Gray, WE Hefley, and D Murray, editors, *Proceedings of the 1993 International Workshop on Intelligent User Interfaces, Orlando, Florida. January 4–7.*, pages 215–218. New York: ACM Press, January 1993.

C147 AJG Cockburn and HW Thimbleby. Automatic Conversational Context: Avoiding Dependency on User Effort in Groupware. In MJ Rees and R Iannella, editors, *Interface Technology: Advancing Human-Computer Communication. Proceedings of OZCHI 1992. CHISIG Annual Conference.* Bond University Australia, Queensland. November 26–27, pages 142–149, 1992.

C148 AJG Cockburn. Reflexive CSCW and Managing Commitments. In *IEE Colloquium on CSCW: Some Fundamental Issues.* London, March 15, number 065 in 1991, pages 9/1–9/5. IEE, 1991.

Patents and Patent Applications

P1 Andy Cockburn, Mark Billinghurst, Dinesh Mandalapu. User Interface Device. US Patent Application Number: PCT/IN2011/000897.

Other: Refereed Videos, Media Reports and Non-Refereed Publications

O1 L Besanon, Y Jansen, A Cockburn, and P Dragicevic. Definitely Maybe: Hedges And Boosters in the HCI Literature. OSF Preprints. https://osf.io/mjg7h/, 2021.

O2 National Science Challenges report. 'Meet the researchers: Andy Cockburn, Turbulent touch'. 22/03/2019.

O3 Marsden update. 'Young researchers experience international science.' (PhD student Stephen Fitchett). February 2012.

O4 Magazine article. New Zealand Listener. "Charge of the tech brigade". Mar 31, 2012.

O5 Newspaper article. The Press. "Conference acceptance a coup". Dec 22, 2011.

O6 Newspaper article. The Press. "Intuitive Innovations". Feb 22, 2011.

O7 UC Communications. 'UC/Microsoft internship opens up world for computer science student.' Mar 22, 2011.

O8 Marsden update. 'Highlights of the 2010 funding round.' November 2010.

O9 Magazine article. 'Profiling Excellence'. Royal Society of New Zealand. 'Thirty years of research in a single hit', March 2010.

O10 Newspaper article. Sydney Morning Herald. 'Computer mouse still rules, says expert', Jan 19, 2010. (Widely syndicated through AAP.)

`http://news.smh.com.au/breaking-news-national/computer-mouse-still-rules-says-expert-20100119-mhnp.html`

O11 Newspaper article. Dominion Post. 'Next-step mouse on its way', Feb 1, 2010.

O12 Radio Interview (Live). ABC Perth. 'Drive Time' program. January 19th, 2010.

O13 Newspaper article. The Press. 'Boost for Computer Activation Project', Nov. 5, 2009.

O14 Radio interview (Sweden). 'Highlights of the INTERACT Conference', Sept 3 2009. `http://www.sr.se/cgi-bin/p1/program/artikel.asp?ProgramID=406&nyheter=1&artikel=3075930`

O15 Newspaper article. Dominion Post. 'Kiwi mouse comes out of hiding', March 10, 2008. `http://www.stuff.co.nz/4433363a28.html`

O16 Newspaper article. Christchurch Press. 'Fast Kiwi mouse attracts interest from big players', March 5, 2008. `http://www.stuff.co.nz/4425499a28.html`

O17 Newspaper article. The Age (Australia). 'Kiwi mouse attracts interest', March 5, 2008. `http://http://www.theage.com.au/news/biztech/kiwi-mouse-attracts-interest/2008/03/10/1204998342852.html`

O18 Magazine article. Marsden Update. 'Document Navigation', December 2008.

O19 Interview. IEEE Spectrum. 'A New Spin on the Computer Mouse', October 2006. `http://www.spectrum.ieee.org/oct06/4668`

O20 Video. Faster Document Navigation with Space-Filling Thumbnails *Video in the Video Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI2006)* Montreal, Canada, April *2006*. http://www.cosc.canterbury.ac.nz/~andy/sft.mov

O21 Video. Tuning and Testing Scrolling Interfaces that Automatically Zoom *Video in the Refereed Video Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI2005)* Portland, Oregon, April *2005*. http://www.cosc.canterbury.ac.nz/~andy/tuning-n-testing.wmv

O22 Video. Around the World in Seconds with Speed-Dependent Automatic Zooming *Video and Demonstration at the ACM Conference on User Interface Software and Technology* Vancouver, Canada, November *2003*. http://www.cosc.canterbury.ac.nz/~andy/uist-sdaz.avi

O23 Radio Interview. BBC World Service. 'Go Digital' program. January 14th, 2003 http://news.bbc.co.uk/2/hi/technology/2677337.stm

O24 Nature Journal's Science Update. 'Browsers go back to the future' www.nature.com/nsu/021230/021230-3.html

O25 'The Register' in the UK. 'Kiwis redesign the Back button'. http://www.theregister.co.uk/content/6/28729.html

O26 Canadian Broadcast Corporation. Programmers try out alternative to browser's back button. http://cbc.ca/storyview/CBC/2002/12/30/back_button021230

O27 Slashdot. 'Redesigning The "Back" Button' slashdot.org/article.pl?sid=02/12/30/1727206&mode=thread&tid=95

O28 NZOOM's Technology Page. technology.nzoom.com/technology_subcategory/0,1610,113-116,00.html

O29 Newspaper Interview. Christchurch Press. 'Better Going Back', Feb 11, 2003.

O30 University Chronicle. "Taking the frusturation out of the web", Feb 20, 2003.

O31 S Greenberg, C Gutwin, and A Cockburn. Applying Distortion-Oriented Displays to Groupware. Video Programme of the ACM Conference on Computer Supported Cooperative Work. 1996.

O32 S Greenberg, C Gutwin, and A Cockburn. Sharing fisheye views in relaxed-WYSIWIS groupware applications. Technical Report 95/577/29, Department of Computer Science, University of Calgary, Calgary, CANADA., 1996.

O33 S Greenberg, C Gutwin, and A Cockburn. Using distortion-oriented displays to support workspace awareness. Technical Report 96/581/01, Department of Computer Science, University of Calgary, Calgary, CANADA., 1996.

O34 S Greenberg, C Gutwin, M Roseman, and A Cockburn. From awareness to teamrooms, groupweb and turboturtle: Eight snapshots of recent work in the grouplab project. Technical Report 95/580/32, Department of Computing Science, University of Calgary, Canada, December 1995.

O35 A Cockburn and S Greenberg. The design and evolution of turboturtle: A collaborative microworld for exploring newtonian physics. Technical Report tr-cosc.03.95, University of Canterbury, Christchurch. New Zealand, 1995.

O36 AJG Cockburn. Social awareness without mega-bits. In *Proceedings of Uniforum. Rotoroa, New Zealand.*, 1994.

O37 AJG Cockburn. *Groupware design: principles, prototypes, and systems*. PhD thesis, Department of Computing Science and Mathematics, University of Stirling, Scotland. FK9 4LA, 1993. Available from British Libraries, or as Technical Report 107 from the University of Stirling.

O38 SRA Jones and AJG Cockburn. Reducing requirements in computer supported writing tasks, 1993. Paper presented at: 6th UK conference on computers and writing. University of Wales. April 13-15.

O39 AJG Cockburn and S Greenberg. Making contact: getting the group communicating. Technical Report 93/498/03, Department of Computer Science, University of Calgary, Alberta T2N 1N4 Canada, 1993.

O40 AJG Cockburn and HW Thimbleby. Reducing user effort in collaboration support. Technical Report 93, University of Stirling, Stirling, Scotland, FK9 4LA, 1992.

O41 AJG Cockburn and HW Thimbleby. A reflexive perspective of CSCW. *ACM SIGCHI Bulletin*, 23(3):63–68, July 1991.

O42 AJG Cockburn. A user's guide to TELEFREEK: a communication and social awareness environment. Technical Report 105, Department of Computing Science and Mathematics, University of Stirling, Stirling, Scotland, FK9 4LA, 1993.

O43 AJG Cockburn. A user's guide to *mona*: an enhanced email system. Technical Report 97, Department of Computing Science and Mathematics, University of Stirling, Stirling, Scotland, FK9 4LA, 1992.

Grants and industry research/consulting

Project	Source	Date	Amount
Understanding the human experience of intelligent user interfaces	Marsden. (19-UOC-021)	2020-2023	$530,000
Travel expenses	Airbus & U. Paul Sabatier	2018	≈ $7,000
In-Vehicle Touchscreens	NZ Science for Innovation	2017	$200,000
Travel expenses	ACM CHI Steering Committee	2017	≈ $4,000
Travel expenses	Australian National University	2016	≈ $3,000
Travel expenses	Airbus & U. Paul Sabatier	2016	≈ $5,000
Travel expenses	ACM CHI Academy Award (Seoul)	2015	≈ $5,000
Benjamin Meaker Visiting Professorship	University of Bristol	2013	£7,000
Understanding and improving the novice to expert transition with user interfaces	Marsden. (10-UOC-020)	2011-2014	$496,000
Dynamic Multimodal Affordances	HP Innovations Award	2011-2012	US$40,000
Travel expenses	ACM UIST conference	June 2009	≈ $4,000
Postdoctoral Fellow	BuildIT	2011-2012	$116,000
Dynamic Multimodal Affordances	HP Innovations Award	2010-2011	US$40,000
Travel expenses	ACM UIST conference	June 2009	≈ $4,000
Scrolling device studies	Logitech Inc	2010	$10,000
Canadian GRAND project	Canadian Centres of Excellence	2010-2014	C$25,000,000
BuildIT Emerging Researcher Mentoring Fund	BuildIT	2010	$8,000
Pythodogogical	UC Teaching and Learning	2009-2010	$15,000
Dynamic Multimodal Affordances	HP Innovations Award	2009-2010	US$40,000
Travel expenses	ACM UIST conference	June 2009	≈ $4,000
Travel expenses	ACM CHI conference	Nov. 2008	≈ $4,000
Improving document navigation interfaces	Marsden. (07-UOC-013)	2007–2010	$400,000
Accessible AR on Everyday Devices	FRST (UOCX0704)	2007–2011	$1,875,000
Usability training	Jade Software	2007	≈ $2,000
Usability training	AMI	2007	≈ $2,000
Expenses	Logitech Inc., California	April 2007	≈ $5,000
Expenses	Logitech Inc., California	July 2006	≈ $2,000
Grant in aid	University of Toronto	July 2006	≈ $8,000
Grant in aid	University of Saskatoon	June 2006	≈ $6,000
Grant in aid	University of Calgary	May 2006	≈ $3,000
Grant in aid	IBM Almaden Research, California	April 2006	≈ $3,000
NOKIA Pocket (Assoc. with HIT Lab).	Nokia Research Center	2006.	≈$100,000.
Speed-Dependent Automatic Zooming	Computer Science	2003	$3,000
Evaluation of Speed-Coupled Scrolling	Computer Science	2002	$3,000
Multimedia Learning of Graphics (Assoc.)	UoC Teaching and Learning Ctte.	2002	$5,000
Fastap Evaluation	Digit Wireless LLC, MA, USA.	2002	$3,000
Supermedia—The MagicBook Project (Assoc.)	NZ NERF (UOCX0204)	2002	$333,000
Practical Flexible Delivery of Virtual Learning	UoC (U6360)	1999–2002	$40,000
Collaborative Programming for Children	Marsden, Royal Soc. (UOC805)	2000–2002	$135,000
Evaluation of Back/Forward in Web-browsers	Computer Science	2001	$3,000
Interfaces for WWW navigation.	Microsoft Research, USA.	1999	≈ $8,000
HCI and multi-media research lab	Computer Science	1999	$7,400
Video analysis and multi-media lab	UoC (2313728)	1996	$30,000
Collaborative video analysis	Computer Science	1996	$3,000
Collaborative microworlds	Computer Science	1995	$4,000
Asynchronous groupware toolkits	Computer Science	1994	$2,000

Academic Service

EiC Cttee.	2024	Search committee for ACM ToCHI Editor in Chief.
Grant reviewer	2024	French National Research Agency (ANR).
Grant reviewer	2024	Israel Science Foundation (ISF).
External assessor	2019	Promotion to Full Professor: University of Toronto.
External assessor	2018	Promotion to Full Professor: University of Cambridge.
Rapportuer	2018	Habilitation, Dr Eric Lecolinet, Université Paris Sud, France.
Rapportuer	2018	Habilitation, Dr Marcos Serrano, University Toulouse III Paul Sabbatier, France.
External assessor	2017	Promotion application: University of Waterloo.
Chair	2018-2021	Technical program chair for ACM CHI 2020 Conference
Committee member	2016-2020	Steering Committee for the ACM CHI Conference
Rapportuer	2017	Habilitation, Dr Caroline Appert, University Paris-Sud, France.
Chair	2016-2018	CORE Chris Wallace Research Award Panel
Deputy Chair	2016-2018	PBRF Mathematical and Information Sciences Panel
Editorial	2015–	Editorial Board of Foundations and Trends in Human-Computer Interaction.
Editorial	2015–	Editorial Board of Human-Computer Interaction. Taylor and Francis.
Chair	2012–2015	Papers co-chair for ACM CHI 2014 and 2015 (over 2000 submissions).
Service Award.	2014.	ACM SIGCHI Recognition of Service Award.
Editorial	2012–	Editorial Board of ACM Transactions on Computer-Human Interaction. ACM.
Panel member	2011-2012	Member of the Mathematics, Information Sciences and Technology PBRF panel.
Panel member	2008–2009	BuildIT Postdoctoral Award.
Governance board	2008–2010	Elected member of the governance board of BuildIT.
Panel member	2009, 2011	Member of the Mathematics and Information Sciences Marsden panel.
Panel member	2008–2009	BuildIT Postdoctoral Award.
Panel member	2008–2010	BuildIT Emerging Reseacher Travel Fund.
Mentor	2009–2010	BuildIT mentor for early career researchers.
External assessor	2010	Docent application advisor, University of Tampere, Finland.
External assessor	2010	Promotion application for University of Auckland.
External assessor	2007, 2009	Promotion applications for INRIA, University Paris-Sud.
External assessor	2007	Postdoctoral applicants for Ryerson Univerity, Canada.
Editorial	2002–2013	Associate Editor for International Journal of Human-Computer Studies.
Editorial	2002–2013	Member Editorial Board for Interacting with Computers Journal.
Chair	2010–2011	Subcommittee Chair ACM CHI'11.
Senior Reviewing	2004–	Associate Chair (Papers) for ACM CHI'04, CHI'08, CHI'09.
Senior Reviewing	2009	Associate Chair (Papers) for ACM UIST 2009.
Senior Reviewing	2007	Short papers chair for INTERACT 2007
Chair	2004–2005	Papers chair for Australasian User Interface Conferences
Competition judge	2009	Student Research Competition at CHI 2009.
Journal Reviewing	1993–	Communications of the ACM, Human-Computer Interaction Journal, IEEE Transactions on Visualization and Computer Graphics, ACM Transactions on Computer-Human Interaction, Ergonomics, Information and Software Technology, Information Technology and Society, Interacting with Computers, Virtual Reality, Personal and Ubiquitous Computing, Journal of Computer-Mediated Communication, and International Journal of Human-Computer Studies.
Misc.	2003	Organised the 'Masterclass and Symposium on Interacting with and Through Next Generation Computer Systems', held at the University of Canterbury.
Organising committees	1996, 1998	OzCHI
Doctoral consortium	2008	CHI 2008
Other reviewing	Ongoing	Graphics Interface 2009, 2010, 2011; UIST Demos 2009; ACM CHI 2007, 2006, 2005, 2004, 2003, 2002. AICCS-07; ACM UIST 2007, 2006, 2005, 2003; InfoVis 2006; BEyond time and errors: novel evaLuation methods for Information Visualization (BELIV'06); ACM Advanced Visual Interfaces (AVI) 2006; IEEE Tencon'05; CHINZ'05; Interact'05; MobileHCI'05; ACM CSCW 2004; ACM UIST 2003; INTERACT 2003; Australasian User Interface Conference, 2000–2003; The Active Web, '99; ACM Conference on Data Communications 1994; ACM Conference on Human Factors in Computing Systems 1996; OZCHI'94-97; APCHI'96 & '98; ACM Hypertext '97; Graphics Interface '97; InterAct '97; ACM Group '97.

Invited seminar presentations outside the University of Canterbury

Keynote address, ACM Interactive Surfaces and Spaces Conference, Wellington, NZ.	November, 2022.
Keynote address, INTERACT Conference, Mumbai.	September, 2017.
Dean's Colloquium, ANU, Australia.	August, 2016.
Engineering & Computer Science, ANU, Australia.	August, 2016.
Institute of Advanced Studies, University of Bristol, UK.	August, 2013.
Department of Computer Science, University of Glasgow, UK.	August, 2013.
Colloquium Polaris, INRIA, Lille, France.	July, 2013.
Department of Computer Science, University of Manitoba, Canada.	August, 2010.
Department of Computer Science, University of Manitoba, Canada.	August, 2010.
Department of Computer Science, University of British Colombia, Canada.	August, 2010.
Keynote address, Australasian Computer Science Week.	January, 2010.
Department of Computer Science, University of British Colombia, Canada.	July, 2009.
Department of Computer Science, University of Calgary, Canada.	July, 2008.
Department of Computer Science, Swansea University, UK.	September, 2008.
INRIA, Universite Paris-Sud, France.	September, 2006.
Department of Computer Science, Swansea University, UK.	August, 2006.
Logitech Inc., California.	July, 2006.
Department of Computer Science, Dalhousie University, Nova Scotia.	July, 2006.
Digital Graphics Project Lab, University of Toronto.	June, 2006.
Department of Computer Science, University of Saskatoon.	June, 2006.
Department of Computer Science, University of Calgary.	April, 2006.
IBM Almaden Research Centre.	March, 2006.
Digital Fusion Inc..	February, 2006.
Usability Professionals Association (UPA), Canterbury Innovation Incubator.	November, 2005.
Usability Professionals Association (UPA), Canterbury Innovation Incubator.	November, 2004.
Department of Computer Science, University of Calgary, Canada.	November, 2003.
Human-Computer Interaction Lab, Univ. of Maryland, College Park, USA.	October 2003.
Department of Computer Science, University of Glasgow.	September, 2003.
Department of Psychology, University of York.	September, 2003.
Interaction Centre, University College London.	September, 2003.
Department of Computer Science, University of Southampton.	September, 2003
New Zealand Computer Society, Christchurch.	June, 2003.
Department of Computer Science, University of Waikato.	December, 2002.
Allied Telesyn Research.	November, 2002.
Department of Computer Science, University of Calgary, Canada.	October, 2001.
Institute for Info. Tech., National Research Center, Ottawa, Canada.	October, 2001.
Grouplab, University of Calgary, Canada.	October, 2001.
Department of Computer Science, University of Saskatchewan, Canada.	October, 2001.
Department of Computer Science, University of Cape Town, South Africa.	September, 2001.
Department of Computer Science, Victoria University of Wellington.	July, 2000.
Inaugural ACM SIGCHI_NZ meeting. Massey University.	June 2000.
Department of Computer Science, University of Waikato.	May, 2000.
Department of Computer Science, University of Calgary.	March, 1999.
Center for LifeLong Learning and Design, University of Colorado, Boulder.	November, 1998.
Norsk Regencentral (Norwegian Research Centre), Oslo, Norway.	August, 1998.
Department of Computer Science, University of Calgary.	January, 1996.
Department of Computer Science, Massey University.	January, 1993.
Department of Computer Science, University of Waikato.	January, 1993.

Visiting academics

I have attracted many world leaders in Human-Computer Interaction to the department. Most of them have presented several seminars while at Canterbury, including numerous 'Science Prestige Lectures' and Ben Sheiderman's Royal Society Evening Lecture.

Prof. Joanna McGrenere	University of British Columbia, Vancouver, Canada.	One month, 2023.
Prof. Carl Gutwin	University of Saskatchewan, Saskatoon, Canada.	Two months, 2023.
Dr. Philip Quinn	Google Research, Mountain View, California.	One year, 2020-2021.
Prof. Carl Gutwin	University of Saskatchewan, Saskatoon, Canada.	Four weeks, 2020.
Prof. Carl Gutwin	University of Saskatchewan, Saskatoon, Canada.	Seven weeks, 2015-2016.
Prof. Wolfgang Stuerzlinger	University of Waterloo, Canada	Three months, 2011-2012
Prof. Kari-Jouko Raiha	University of Tampere, Finland	Nine months, 2009-2010
Dr. Saila Ovaska	University of Tampere, Finland	Nine months, 2009-2010
Dr. David Ahlstroem	Klagenfurt University, Austria.	Eighteen months, 2008-2010.
Prof. Carl Gutwin	University of Saskatchewan, Saskatoon, Canada.	Three months, 2008.
Prof. Karon MacLean	University of British Colombia, Canada.	Six months, 2007-2008.
Prof. Bob Kraut	Carnegie Mellon University.	Erskine Visitor. Three months, 2008.
Prof. Andrew Monk	University of York, UK.	Three months, 2008.
Dr. Gonzalo Ramos	University of Toronto, Canada.	One month, 2007.
Prof. Carl Gutwin	University of Saskatchewan, Saskatoon, Canada.	Erskine Fellow. Four months, 2007.
Prof. Alistair Sutcliffe	University of Manchester, UK.	One month, 2007.
Prof. Carl Gutwin	University of Saskatchewan, Saskatoon, Canada.	One week, 2005.
Prof. Ben Bederson	University of Maryland, Maryland, USA.	One week, 2004.
Prof. Ben Shneiderman	University of Maryland, Maryland, USA.	Erskine Fellow. One month, 2003.
Prof. Jenny Preece	University of Maryland, Baltimore County, Maryland.	Erskine Fellow. One month, 2003.
Prof. Stephen Brewster	University of Glasgow, UK.	Erskine Fellow. Six months, 2003.
Prof. Gerhard Fischer	University of Colorado, Boulder.	One year, 2002–2003.
Prof. Bob Spence	Imperial College London.	Erskine Fellow. One month, 2002.
Prof. Gerhard Fischer	University of Colorado, Boulder.	Erskine Fellow. One month, 2000.
Prof. Harold Thimbleby	Middlesex University, UK.	Erskine Fellow. One month, 1997.
Dr Allen Cypher	Apple Research, Cuppertino, California.	One week, 1996.
Dr Akihiko Machizawa	Communications Research Laboratory, Japan.	Three years, 1996–1998.
Professor Brian Wyvill	University of Calgary, Canada.	Erskine Fellow. Two months, 1996.
Professor Saul Greenberg	University of Calgary, Canada.	Erskine Fellow. Six months, 1995.
Carl Gutwin	University of Calgary, Canada.	Two months, 1995.
Dr Steve Jones	University of Abertay, Dundee.	Six months, 1995.

Expert Witness Consulting

Role	Expert witness for SBM Legal, counsel for New Zealand Te Whatu Ora Waitemata. (analysis, reports).
Case	Vinod Chand v Health New Zealand Te Whatu Ora Waitemata. *Employment relations authority (regarding text auto-correct functionality).*
Dates	May 2024 – June 2024.
Role	Expert witness for Fish & Richardson, counsel for Apple. (analysis, reports).
Case	Smith Interface Technologies v. Apple. *Patent Trial and Appeal Board.*
Dates	December 2023 –
Role	Expert witness for Finnegan, Henderson, Farabow, Garrett & Dunner, counsel for Samsung.
Role	Expert witness for Fish & Richardson, counsel for Apple. (analysis, reports, deposition).
Case	Masimo v. Apple. *Patent Trial and Appeal Board.* IPR2023-00664, IPR2024-00290
Dates	July 2023 –
Role	Expert witness for Finnegan, Henderson, Farabow, Garrett & Dunner, counsel for Samsung. (analysis).
Case	Smith Interface Technologies v. Samsung. *Eastern District of Texas.* 2:22-cv-00290-JRG
Dates	November 2022 – June 2023.
Role	Expert witness for Morrison Foerster, counsel for Apple. (analysis, reports, deposition).
Case	Firstface Co. Ltd. v. Apple Inc. *Northern District of California.* 3:18-cv-02245-JD.
Dates	June 2022 – March 2024.
Role	Expert witness for Finnegan, Henderson, Farabow, Garrett & Dunner, counsel for Samsung. (analysis).
Case	Village Green Technologies v. Samsung. *Eastern District of Texas.* 2:21-cv-00323-JRG-RSP
Dates	January 2022 – March 2022.
Role	Expert witness for Desmarais, counsel for IBM. (analysis, reports, deposition).
Case	Chewy, Inc. v. IBM. *Southern District of New York.* 1:21-cv-01319-JSR.
Dates	August 2021 – Jan 2023.
Role	Expert witness for Farella, Braun & Martel, counsel for Google. (analysis, reports, testimony at trial).
Case	Profectus Technology versus Google. *Western District of Texas.* 6:20-cv-101-ADA.
Dates	March 2021 – October 2021.
Role	Expert witness for Latham & Watkins and Allen & Overy, counsel for Facebook/Instagram/WhatsApp/Meta. (analysis, reports, deposition).
Case	Facebook/Meta Platforms *et al.* versus Wrinkl *Patent Trial and Appeal Board.* IPR2021-00882, -00883
Dates	February 2021 – November 2022.

Role	Expert witness for Morrison & Foerster, counsel for Renesas. (analysis).
Case	Neodron versus Renesas Electronics Corp. *Western District of Texas.* 6:20-CV-00529.
Dates	December 2020 – August 2021.
Role	Expert witness for DLA Piper, counsel for Samsung. (analysis, declaration).
Case	Neonode versus Samsung. *Western District of Texas.* 6:20-CV-00507.
Dates	September 2020 – July 2023.
Role	Expert witness for DLA Piper (counsel for Apple, Microsoft and ASUS), Morrison & Foerster (counsel for Amazon), Finnegan, Henderson, Farabow, Garrett & Dunner (counsel for LG), O'Melveny & Myers (counsel for Samsung), Vasquez Benisek & Lindgren (counsel for ASUS). (analysis).
Case	Neodron versus Apple, Microsoft, Amazon & others. *US International Trade Commission.* 337-TA-1193.
Dates	May 2020 – November 2020.
Role	Expert witness for Desmarais, counsel for IBM. (analysis, reports).
Case	IBM versus Zillow Group. *Central District of California.* 8:19-CV-01777.
Dates	October 2019 – May 2020.
Role	Expert witness for DLA Piper (counsel for Microsoft, HP, Lenovo), Morrison & Foerster (counsel for Amazon), Finnegan, Henderson, Farabow, Garrett & Dunner (counsel for Motorola and Lenovo), Alston & Bird (counsel for Dell), O'Melveny & Myers (counsel for Samsung). (analysis, reports, deposition).
Case	Neodron versus Microsoft, HP, Amazon, Samsung, Dell, Motorola, Lenovo. *US International Trade Commission.* 337-TA-1162.
Dates	August 2019 – December 2020.
Role	Expert witness for Jones Day, counsel for Google and Huawei. (analysis).
Case	American Patents versus Huawei.
Dates	April 2019 – July 2019
Role	Expert witness for Gilbert+Tobin, counsel for Aristocrat Technologies. (reports, testimony at trial).
Case	Aristocrat Technologies versus Commissioner of Patents. *Federal Court of Australia.* NSD 1343/2018.
Dates	September 2018 – June 2020
Role	Expert witness for Williams & Connolly and Alston & Bird, counsel for Google and ASUS Inc. (reports, deposition).
Case	Koninklijke Philips versus ASUS. *Northern District of California* 4:18-cv-01885-HSG.
Dates	March 2016 – March 2020
Role	Expert witness for Williams and Connolly, counsel for Google Inc. (reports, deposition).
Case	Google versus Philips. *Patent Trial and Appeal Board.* IPR2017-00386/387/388/389.
Dates	March 2016 – March 2020

Role	Expert witness for DLA Piper, counsel for Apple Inc. (reports, deposition, testimony at trial).
Case	Immersion versus Apple. *US International Trade Commission.* 337-TA-1004 and 337-TA-990 (consolidated).
Dates	June 2016 – May 2017

Role	Expert witness for DLA Piper, counsel for Apple Inc. (reports).
Case	Apple versus Immersion. *Patent Trial and Appeal Board.* IPR2016-01777.
Dates	June 2016 – May 2017

Role	Expert witness for Wilmer Cutler Pickering Hale and Dorr, counsel for Apple Inc. (analysis).
Case	Core Wireless Licensing S.a.r.l. v. Apple Inc. *Eastern District of Texas.* 6:14-cv-00751 and 6:14-cv-00752.
Dates	August 2015 – June 2016

Role	Expert witness for Weil, Gotshal & Manges, counsel for Apple Inc. (analysis).
Case	Motorola Mobility Inc. versus Apple Inc. *Southern District of Florida.* 10-CV-23580-RNS-TEB and 12-CV-20271-RNS-TEB.
Dates	October 2013 – March 2014

Role	Expert witness for Gibson, Dunn & Crutcher, counsel for Apple Inc. (reports, deposition, testimony at trial).
Case	Apple Inc. versus Samsung Electronics Co. Ltd. *Northern District of California.* 12-CV-0630-LHK.
Dates	June 2013 – June 2014

Role	Expert witness for Herbert Smith Freehills, counsel for Apple Inc. (reports, testimony at trial).
Case	Apple Inc. versus Samsung Electronics Co. Ltd. *Federal Court of Australia.* NSD 1243 of 2011.
Dates	September 2011 – May 2013

Other

- Member of the Association of Computing Machinery (ACM).
- Member of the ACM Special Interest Group of Computer-Human Interaction.