

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Susumu Yoshida, et al. Attorney Docket No.:18768-0217IP7
U.S. Patent No.: 10,199,072
Issue Date: February 5, 2019
Appl. Serial No.: 15/808,175
Filing Date: November 9, 2017
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 and 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. 10,199,072 (“the ’072 Patent”) and prior art references relating to its subject matter. I have reviewed the ’072 Patent, and relevant excerpts of the prosecution history of the ’072 Patent. I have also reviewed the following references:

- LG-1001 U.S. Patent No. 10,199,072 (“the ’072 Patent”)
- LG-1002 Excerpts from the Prosecution History of the ’072 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”)

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- 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”)

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- 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-1029 U.S. Patent No. 6,091,778 to Sporer et al. (“Sporer”)
- LG-1030 U.S. Patent No. 5,838,317 to Bolnick et al. (“Bolnick”)
- LG-1031 U.S. Patent Application Publication No. 2003/0235396 to Boston et al. (“Boston”)
- LG-1032 U.S. Patent No. 6,487,069 to Onodera (“Onodera”)
- LG-1033 U.S. Patent No. 6,654,050 to Karube et al. (“Karube”)

- LG-1034 MPEG-7 Requirements, INTERNATIONAL ORGANISATION FOR STANDARDISATION ORGANISATION INTERNATIONALE DE NORMALISATION ISO/IEC JTC1/SC29/WG11 CODING OF MOVING PICTURES AND AUDIO, October 1998, *available at* <https://sound.media.mit.edu/resources/mpeg4/audio/public/mpeg7/w2461.html>
- LG-1035 “Change BMP Icon to Thumbnail View,” *available at* <https://www.tiplord.com/customizing/bmpicons.html>, with Wayback capture
- LG-1037 Excerpts from the Prosecution History of U.S. Patent No. 9,818,449 (“the ’449 Prosecution History”)

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 ’072 Patent at the time of the earliest possible priority date of the ’072 Patent, and I have done so during my review of these materials. The ’072 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 ’072 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 '072 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 '072 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 1-19 are obvious over Bryant (Ground 1)

- Claims 1, 6, 11, and 16-19 are obvious over Kaplan (Ground 2A)
- Claims 2-5, 7-10, and 12-15 are obvious over Kaplan in view of Sporer (Ground 2B)
- Claims 1-19 are obvious over Bryant in view of Kaplan (Ground 3)
- Claims 1-19 are obvious over Kaplan in view of Bryant (Ground 4A)
- Claims 2-5, 7-10, and 12-15 are obvious over Kaplan in view of Sporer and Bryant (Ground 4B)
- Claims 1, 6, 11, and 16-19 are obvious over Horn (Ground 5A)
- Claims 2-5, 7-10, and 12-15 are obvious over Horn in view of Sporer (Ground 5B)

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 ’072 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 '072 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 related patents

29. During prosecution and *inter partes* review of patents related to the '072 Patent, various arguments and statements were made concerning terms that implicate the '072 Patent's claims.

30. First, I note that during prosecution of U.S. Patent No. 9,818,449 (“the ’449 Patent”), a patent to which the ’072 Patent claims priority, 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-1037, 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 and shares a specification with the ’072 Patent and 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 “reproducer” are deemed to invoke § 112, ¶6, I have identified below the specific portions of the ’072 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.

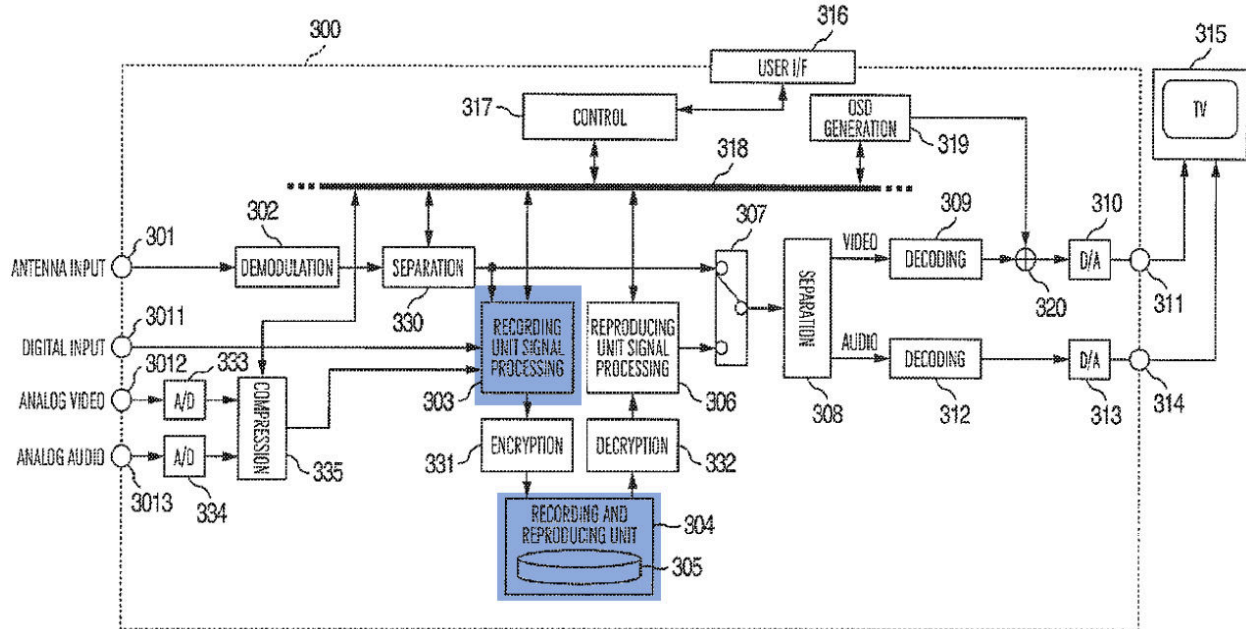
32. Second, I note that, during the IPR2018-01432, the Board made several claim construction determinations that affect the terms recited in the ’072

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 claim 11 performs the function of "record[ing] ... a plurality of video data on a recording medium." LG-1001, 10:37-38. The corresponding structure in the '072 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

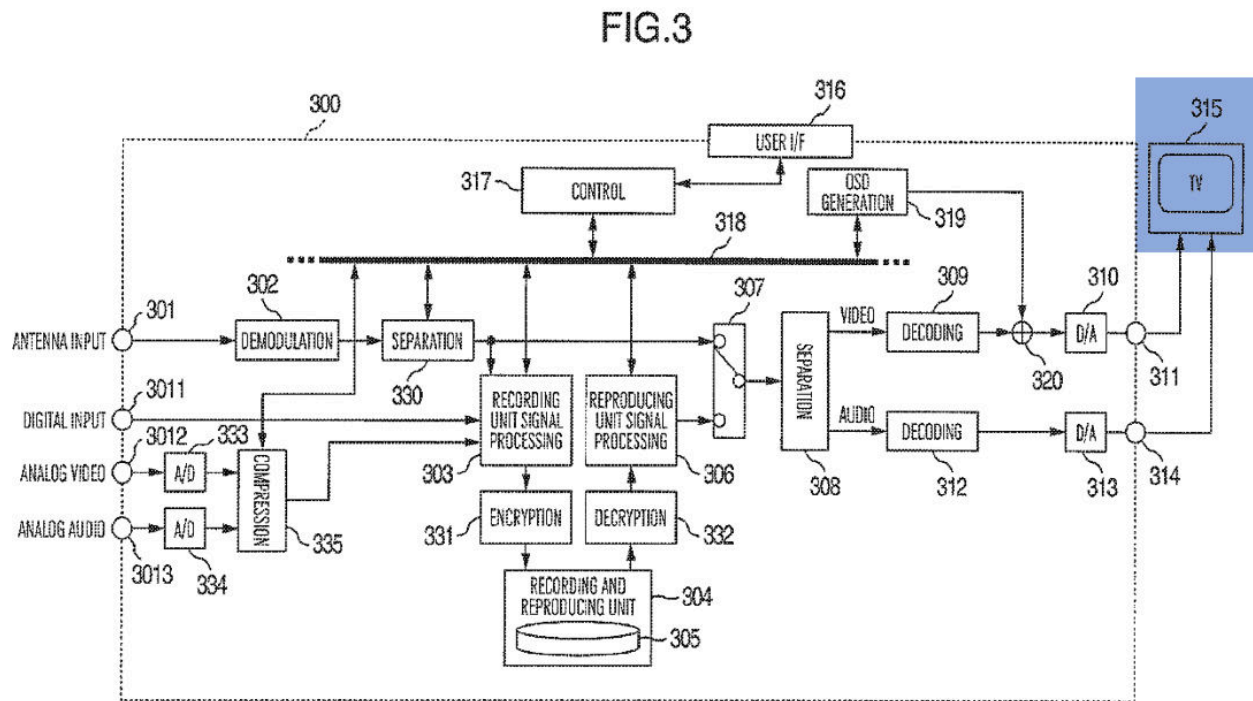


LG-1001, FIG. 3 (annotated)

ii. “output unit”

34. The “output unit” recited in claims 1, 3, and 4 performs the function of “output[ting] a menu display for a user.” LG-1001, 8:50-53. It further performs the function of “display[ing] a [first/second] character corresponding to the [first/second] group of video data 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, 9:19-26, 9:29-35. The corresponding structure in the ’072 Patent is “TV set

315” and equivalents. LG-1001, 5:2, 5:34-38, 5:49-54, FIG. 3; *see also* LG-1001, FIGS. 4-7, 12 and related text.

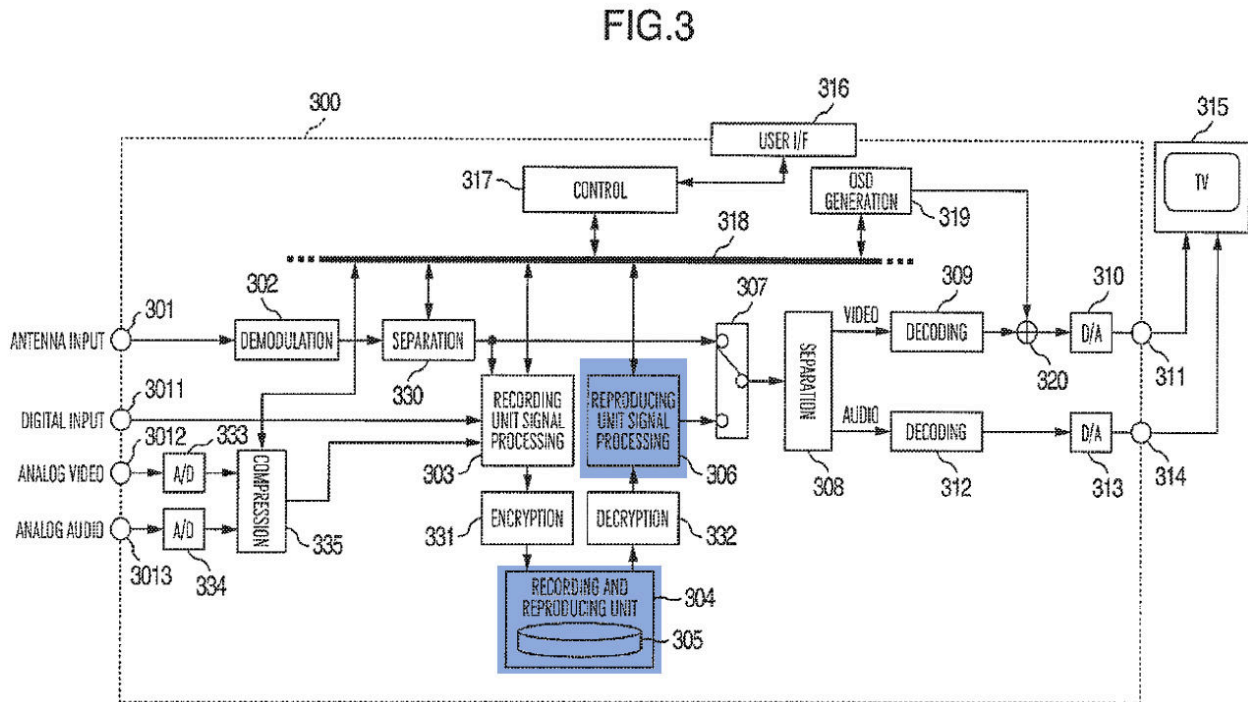


LG-1001, FIG. 3 (annotated)

iii. “reproducer”

35. The “reproducer” recited in claims 1, 6, and 16 performs the function of “reproduc[ing] selected video data read out from the recording medium.” LG-1001, 8:54-55; *see also id.*, 9:45-46, 11:35-36. The corresponding structure in the ’072 Patent includes “reproducing unit signal processing circuit” 306 and/or “recording and reproducing unit” 304 and equivalents. LG-1001, 4:46-5:4, 5:26-44 (“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.



LG-1001, FIG. 3 (annotated)

iv. “one video data”

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 groups 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 as it relates to the term “one video data,” which

is similarly presented and recited in the claims of the '072 Patent.¹¹ The limitation uses the article “one” to refer to “one video data,” and subsequent references recite “*the* one video data.” The plain usage of these words implies that the same “one video data” is initially included in each group. *Id.*, 11. If different copies of video data existed in the first and second groups, then the “one video data” deleted from the first group could not “continue[] to be included in the second group” because there would be different video data in the second group. *Id.*, 11-12. The specification of the '072 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 data” (e.g., the underlying AV data for program #1). *Id.*, 12-13; LG-1001, 2:59-67, 3:44-58, 6:17-38, FIG. 1.

v. “one video data ... is deleted from the first group of video data”

¹¹ I note that the specification of the '072 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.”

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 ’072 Patent as it relates to “video data” (in claims 1, 5-6, 10-11, 15-16, and 19), 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

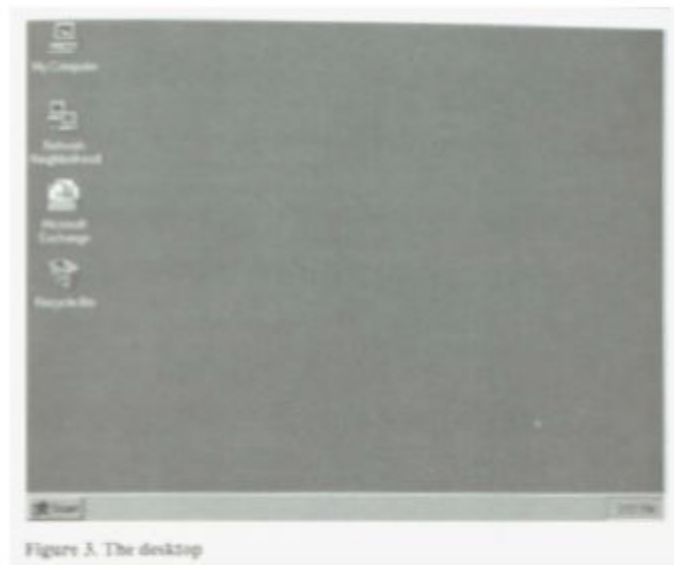
39. The data management techniques of the ’072 Patent, including its use of menus, thumbnails, and pointers, were well known in the field by 2004. By this time, computers had long had the ability to display digital media (e.g., graphics,

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.

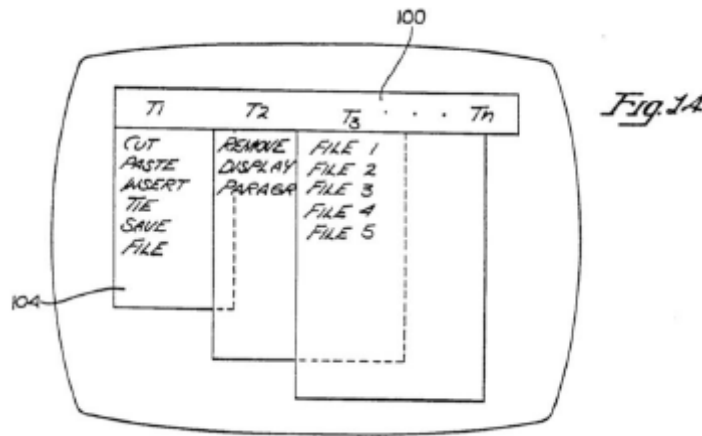
Windows 95 was one example of such a GUI:



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”:



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”:

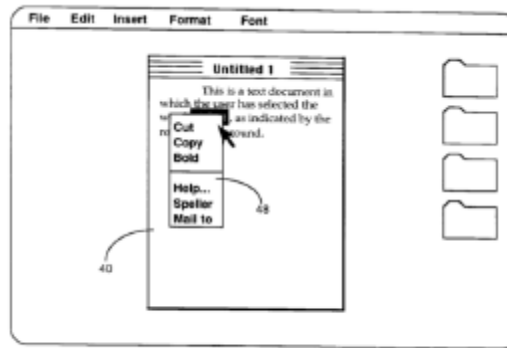


FIG. 5

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.:

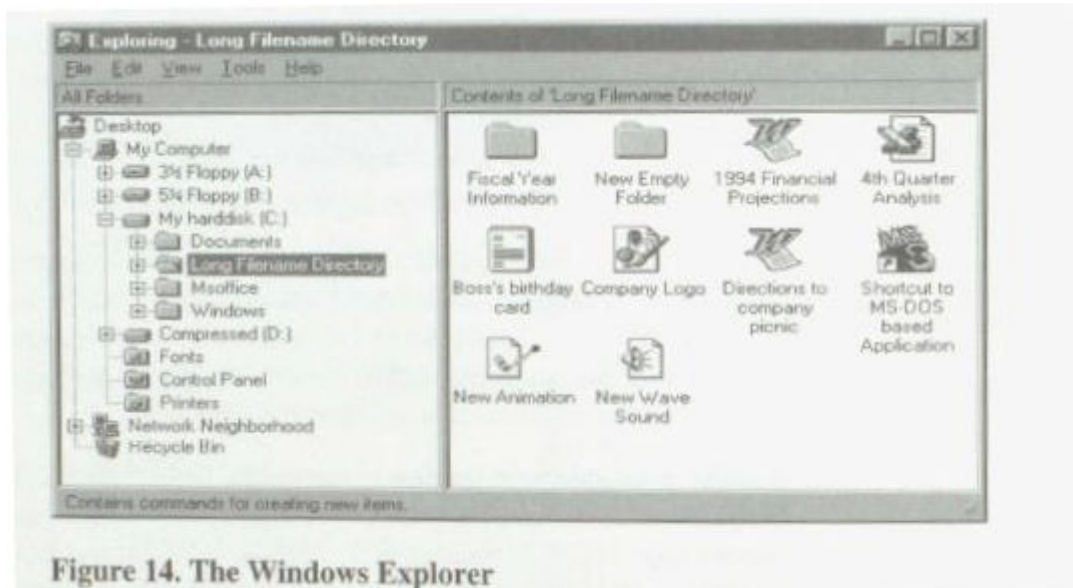


Figure 14. The Windows Explorer

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.

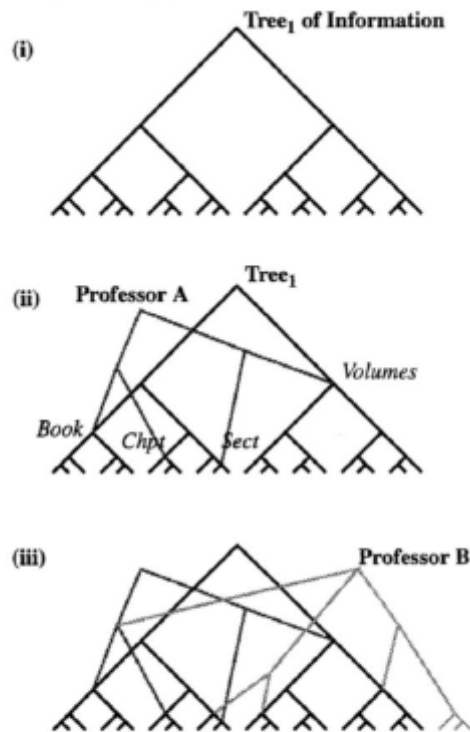
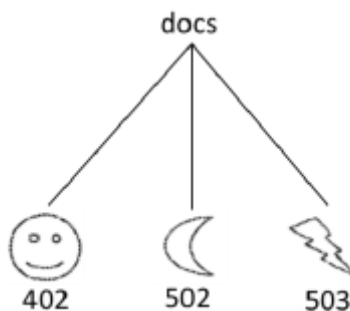
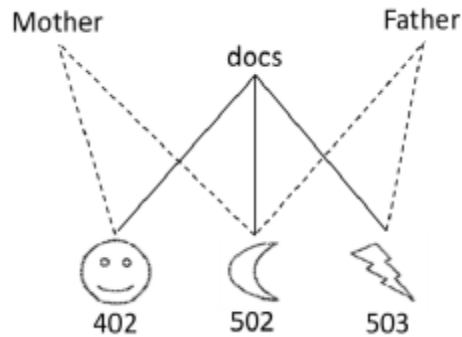


Figure 1 . Constructing a multitree - an example. Beginning with an initial tree of information, Professor A builds her course syllabus. In (a) she chooses a disjoint set of complete subtrees and adds new tree structure above them. Similarly, Professor B makes another, chooses fragments, including some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

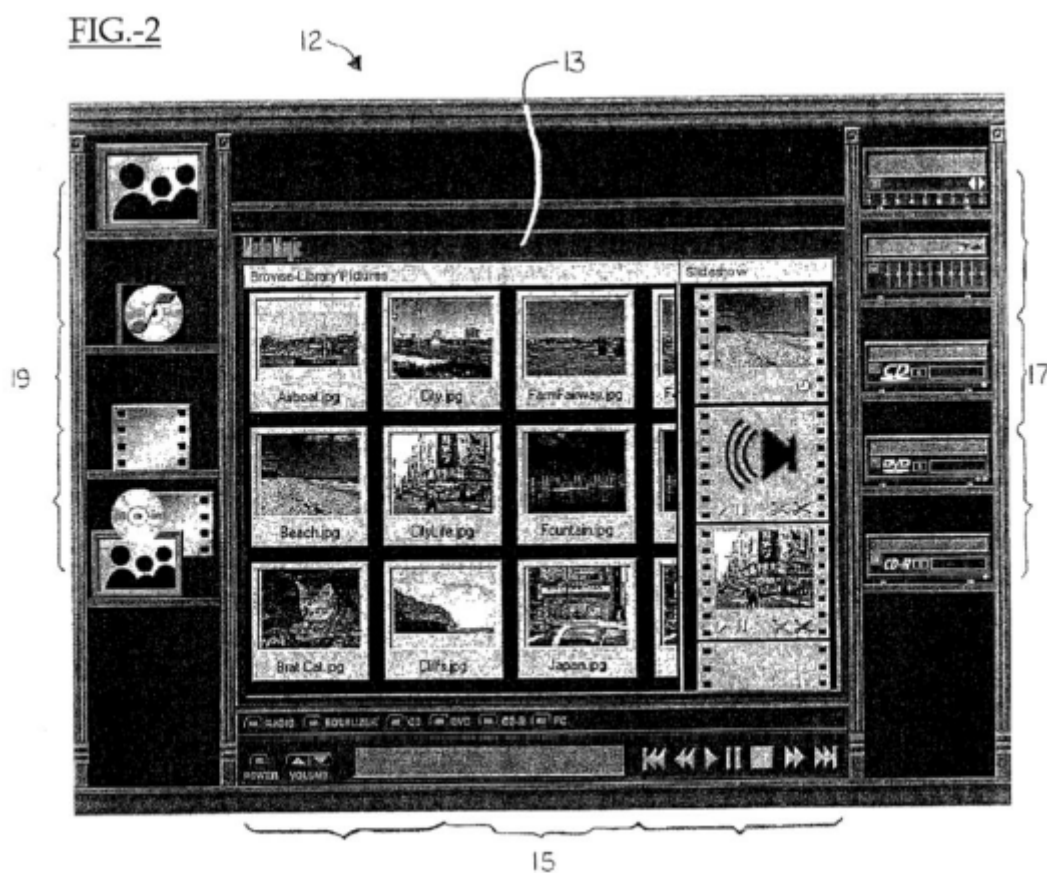


Figure 1: Screen snapshot of PhotoMesa with over 500 images in 17 groups.

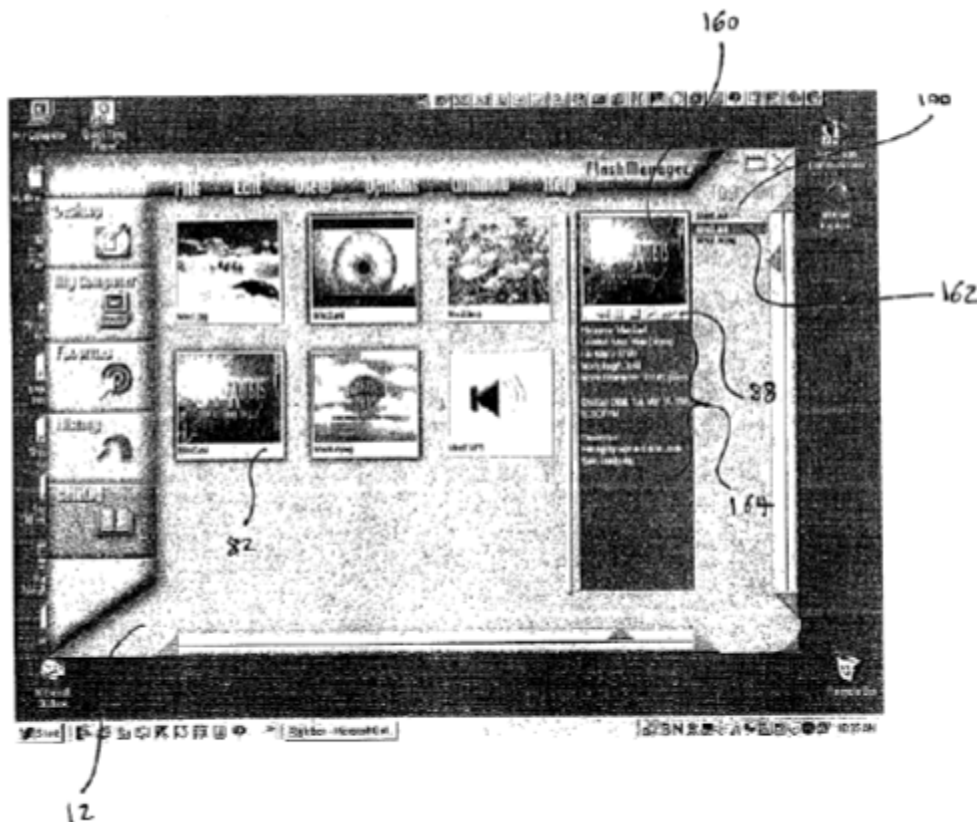
LG-1012, 71 (FIG. 1)

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.”).



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 '072 PATENT

A. Admitted Prior Art

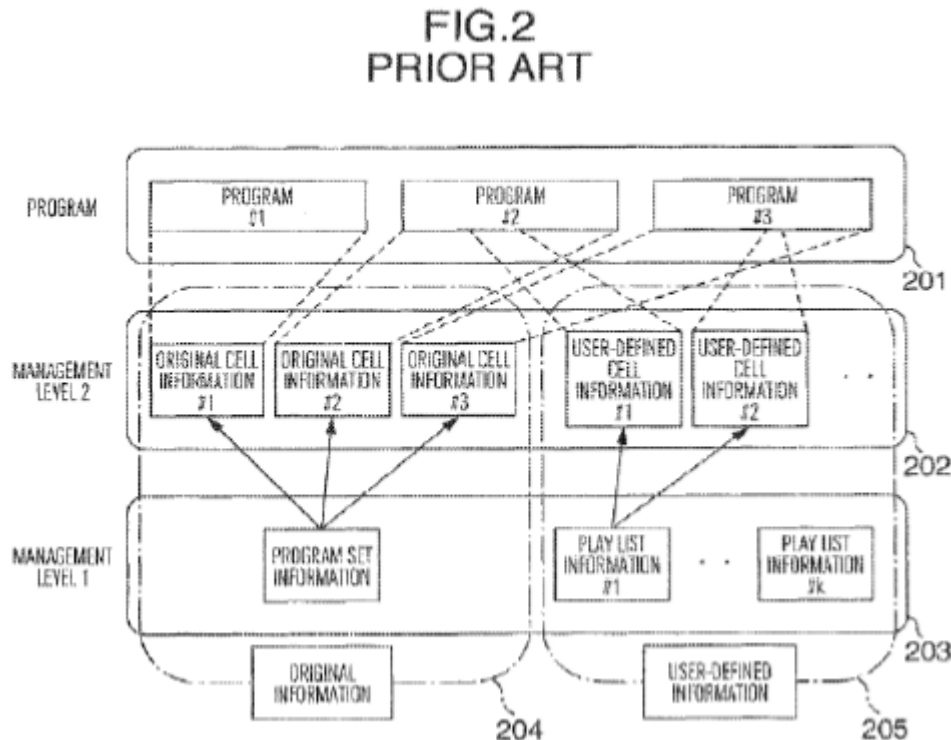
59. The '072 Patent admits that “conventional techniques” for managing “AV data on a recording medium” were known, and describes a known two-level management scheme for such management:

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, 1:58-2:23; *see also id.*, 3:13-14 (“FIG. 2 shows a management state of AV data in a conventional technique example.”), 1:30-55 (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.



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”).

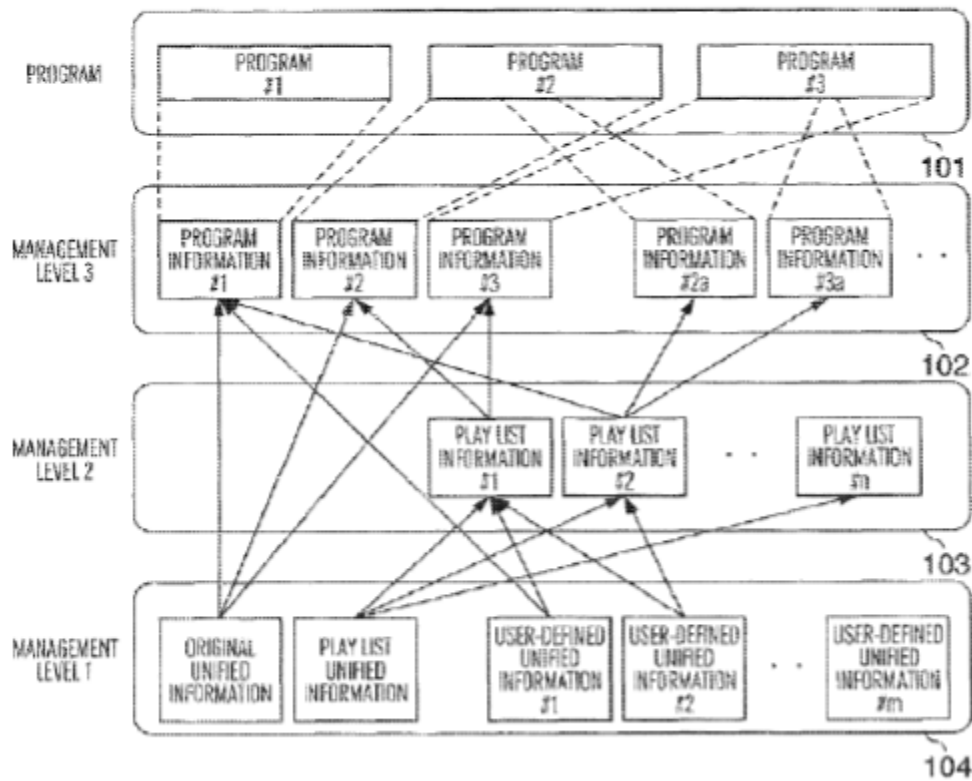
61. I refer to the above descriptions of “conventional technique[s]” and devices as the “Admitted Prior Art.”

B. The '072 Patent

62. U.S. Patent No. 9,818,072 to Yoshida et al. is titled “Editing Method and Recording and Reproducing Device,” and was filed on November 9, 2017. The '072 Patent states that it is a continuation of Appl. Nos. 15/176,435, filed June 8, 2016, 14/141,417, filed December 26, 2013, 12/567,898, filed September 28, 2009, and 11/203,457, filed August 11, 2005. The '072 Patent also claims priority to a number of Japanese applications, the earliest of which was filed December 2, 2004.

63. The '072 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; 1:35-50. For instance, the '072 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

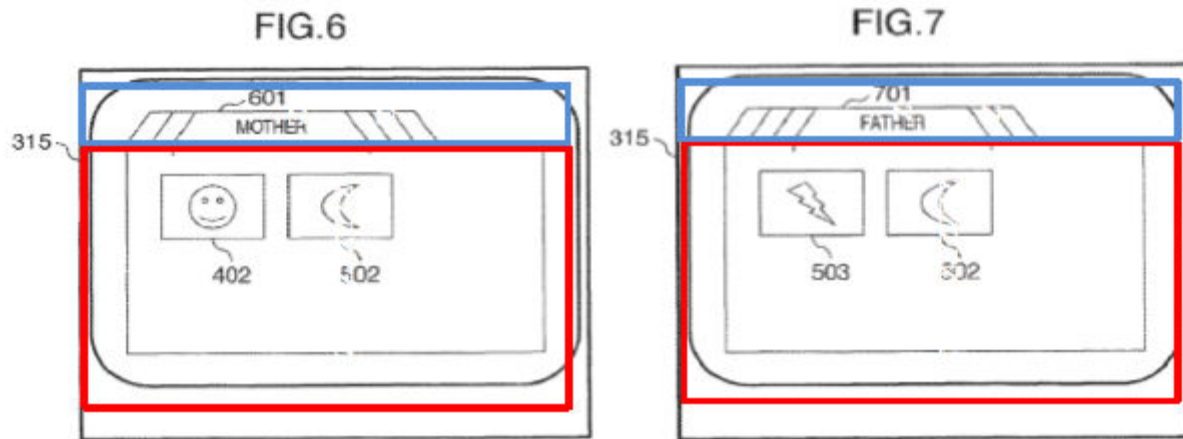


LG-1001, FIG. 1.

64. The '072 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, 2:24-3:6. 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 '072 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 ’072 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.*, 6:5-8.



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 ’072 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.*, 6:23-38. 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 ’072 Patent. *See, generally*, LG-1002. The application that later issued as the ’072 Patent was filed with 19 claims. LG-1002, 1-31. The Office then allowed all claims, within a year of the application filing, without raising any prior art rejections. *Id.*, 78-84. In allowing the claims, the Examiner offered “reasons for allowance”: “[t]he prior arts do not disclose include[sic] deleted information of the first group in the second group when the deleted information recorded on the recording medium was included in both the first group and the second group.” *Id.*, 83.

VIII. PRIOR ART ANALYSIS

A. The Prior Art

i. Bryant³

³ General descriptions provided for this and other references and combinations thereof are incorporated into each subsection and mapping of the claims that

68. U.S. Publ. No. 2004/0201691 to 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 ’072 Patent under at least 35 U.S.C. §§ 102(a) and (e).

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

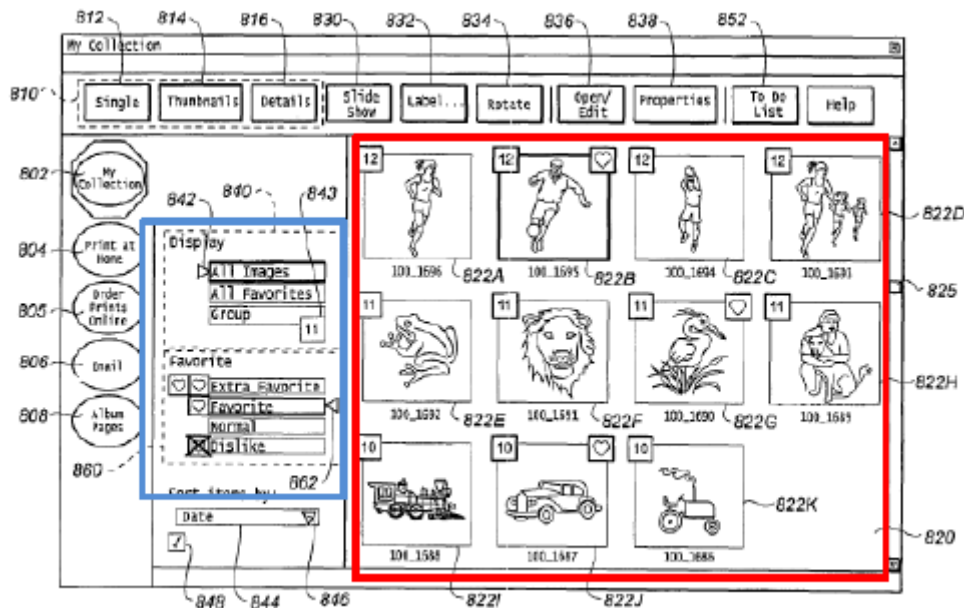
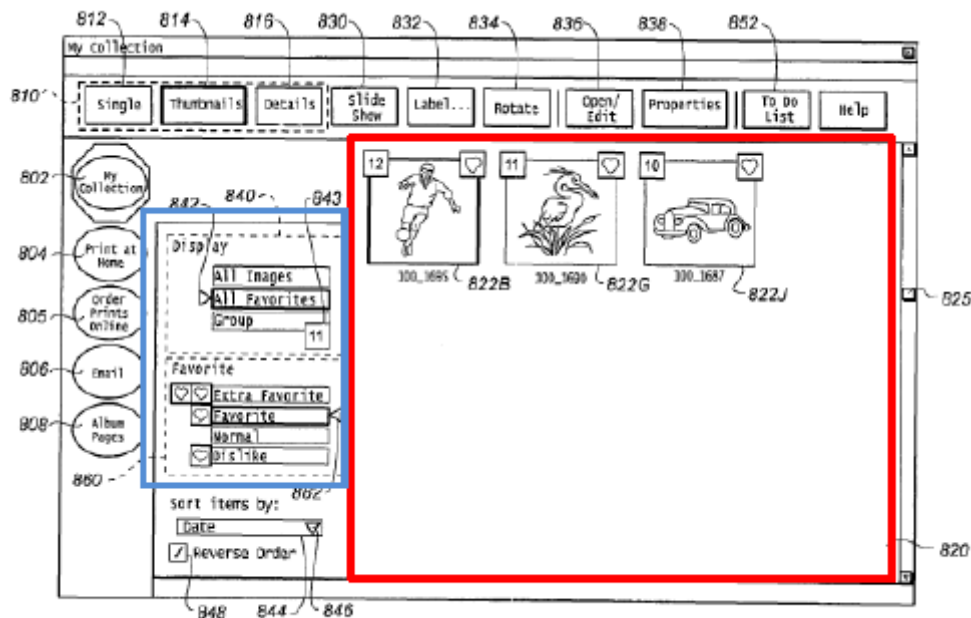
LG-1005, [0029]. For example, the digital images and video can be “organized into categories according to the people, places, subjects or events depicted.” [0004].

includes citations to these references.

70. 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.*

71. 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.

72. 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.



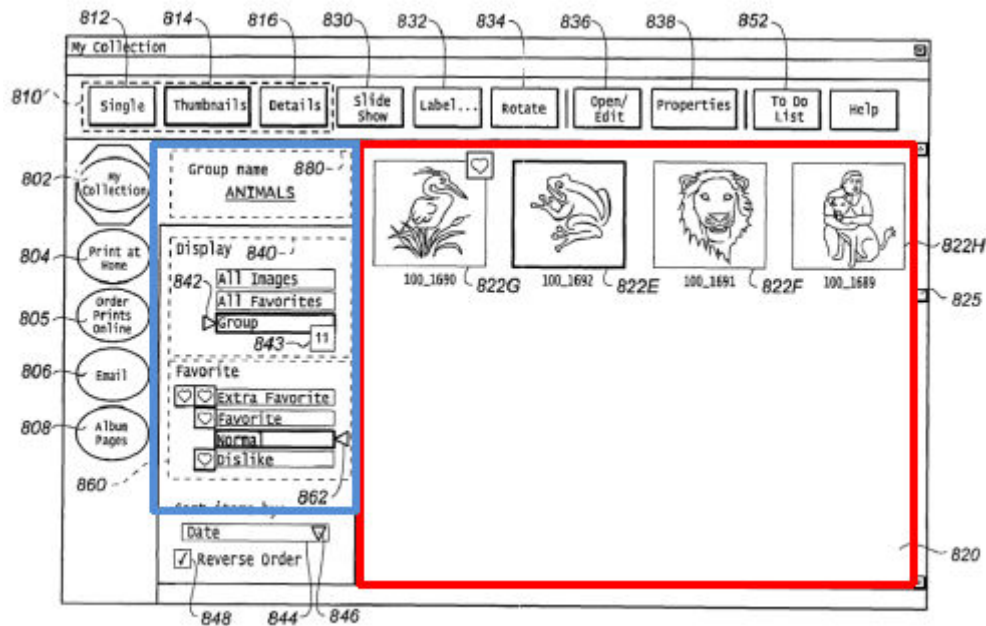


FIG. 9C

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 “thmnl” 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].

73. 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.

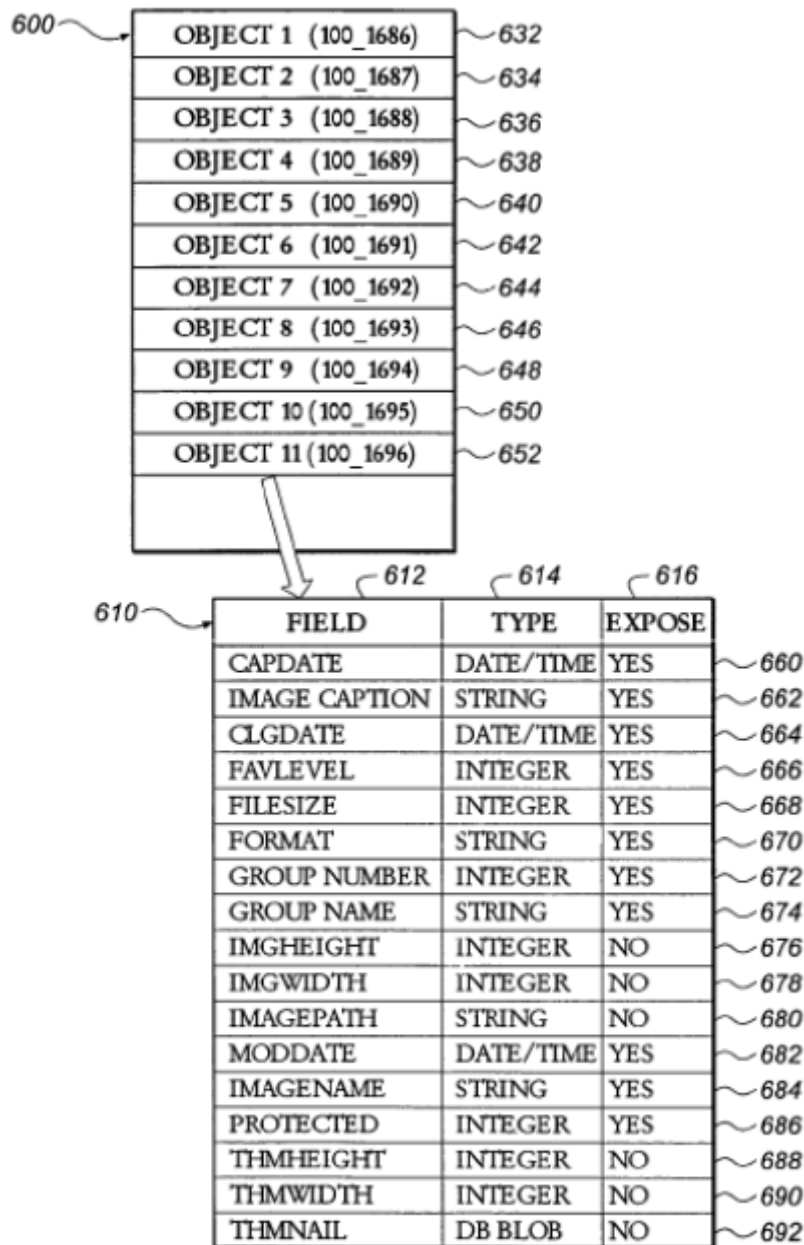


FIG. 8

LG-1005, FIG. 8

74. 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]dja-cent 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.

75. 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.*

76. 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

77. 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 ’072 Patent under at least 35 U.S.C. § 102(b).

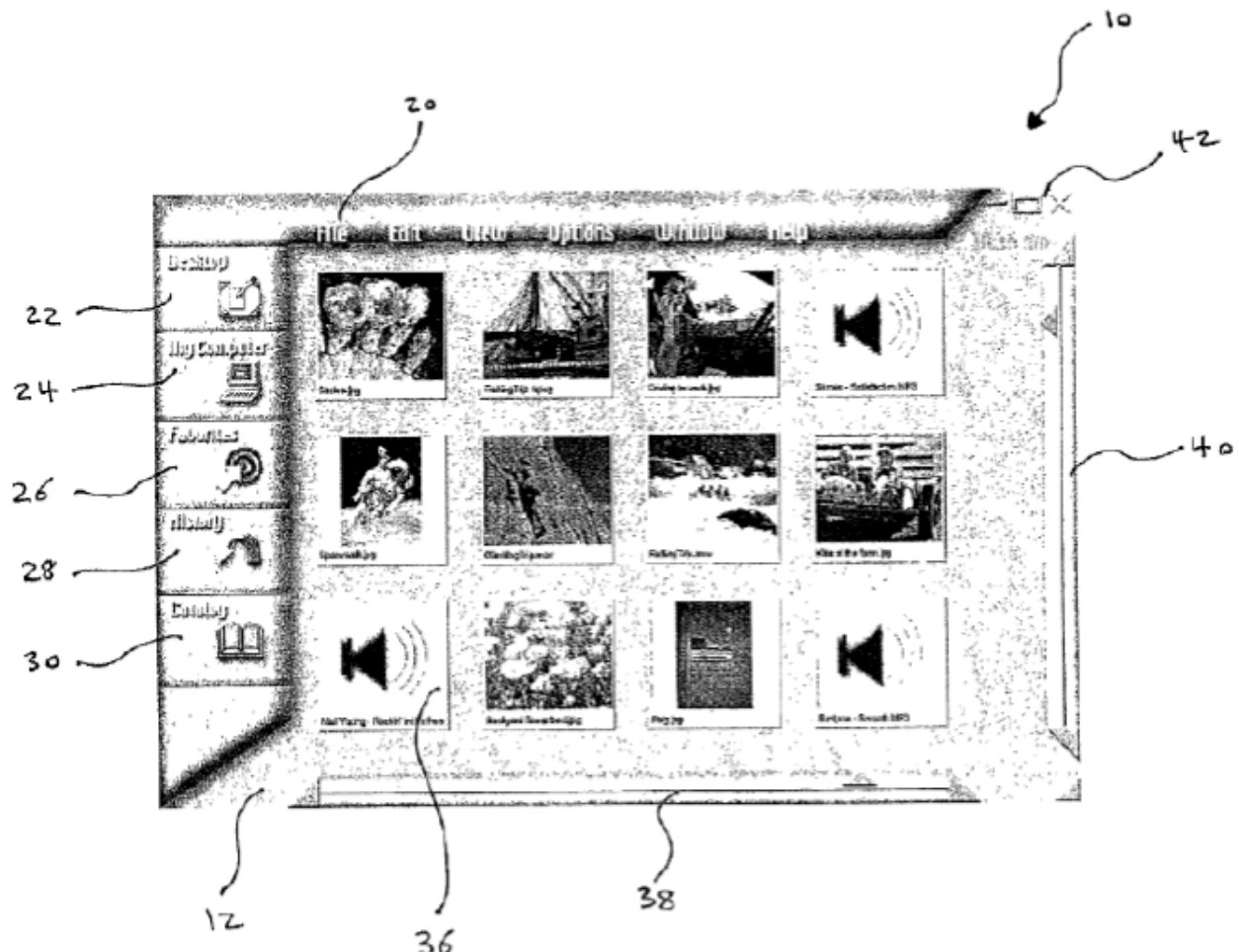
78. Kaplan recognizes that with the increasing amount of multimedia content on computers due to “the ability to stream or download multimedia content, such as movies and music,” there is a need for improved ways in which users can “keep track of and organize their computer files containing multimedia 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].

79. 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].

80. 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.

81. 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.

82. In other words, Kaplan discloses “independently editable” groups of video information.

iii. Horn

83. 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

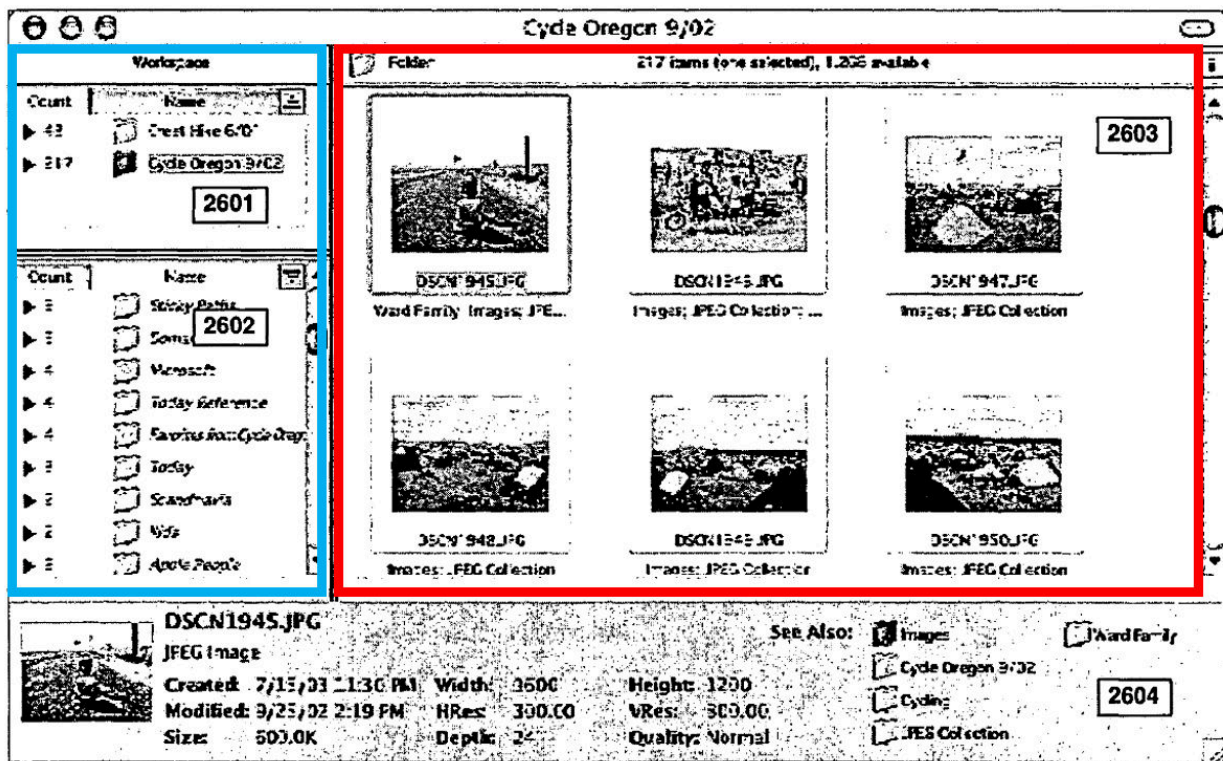
I am informed that it is prior art to the '072 Patent under at least 35 U.S.C. §§ 102(a) and 102(e).

84. 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].

85. 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.

86. 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)

87. 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].

iv. Sporer

88. U.S. Patent No. 6,091,778 to Sporer (“Sporer”) (LG-1029) was filed on December 14, 1998, claiming benefit to an earlier application filed on August 2, 1996, and is titled “Motion Video Processing Circuit For Capture, Playback and Manipulation of Digital Motion Video Information on a Computer.” Sporer issued and was published July 18, 2000, and I am informed that it is prior art to the ’072 Patent under at least 35 U.S.C. §§ 102(a), 102(b), and 102(e).

89. Sporer describes a “digital motion video processing circuit [that] can capture, playback and manipulate digital motion video information using the system memory of a computer as a data buffer for holding compressed video data from the circuit.” LG-1029, Abstract. Sporer explains that “computer systems are presently available for capturing motion video information as a computer data file including data representative of a sequence of several digital still images,” where “[s]uch digitized data is often compressed, using common compression standards such as MPEG (Motion Picture Experts Group) and motion-JPEG (Joint Photographers Expert Group) compression.” LG-1029, 1:17-23. However, there are various challenges in these systems, including addressing situations where “there are several formats in which motion video information may be needed,”

such as when “motion video information [is] stored in a different form of computer data file, requiring conversion, for example, from Motion-JPEG to MPEG.” LG-1029, 1:24-44. Additionally, if one wishes to edit a video, “[m]otion video information may also need to be processed,” which “may require the steps of decompression of the video information, addition of the effect and compression of the resulting video information.” LG-1029, 1:45-52.

90. To address these concerns, Sporer discloses a video processing circuit with other components in Figure 1 (below). LG-1029, FIG. 1. The digital motion video processing circuit that can be implemented in a computer system, such as the example computer system shown in Figure 2 (below). LG-1029, 4:12-65.

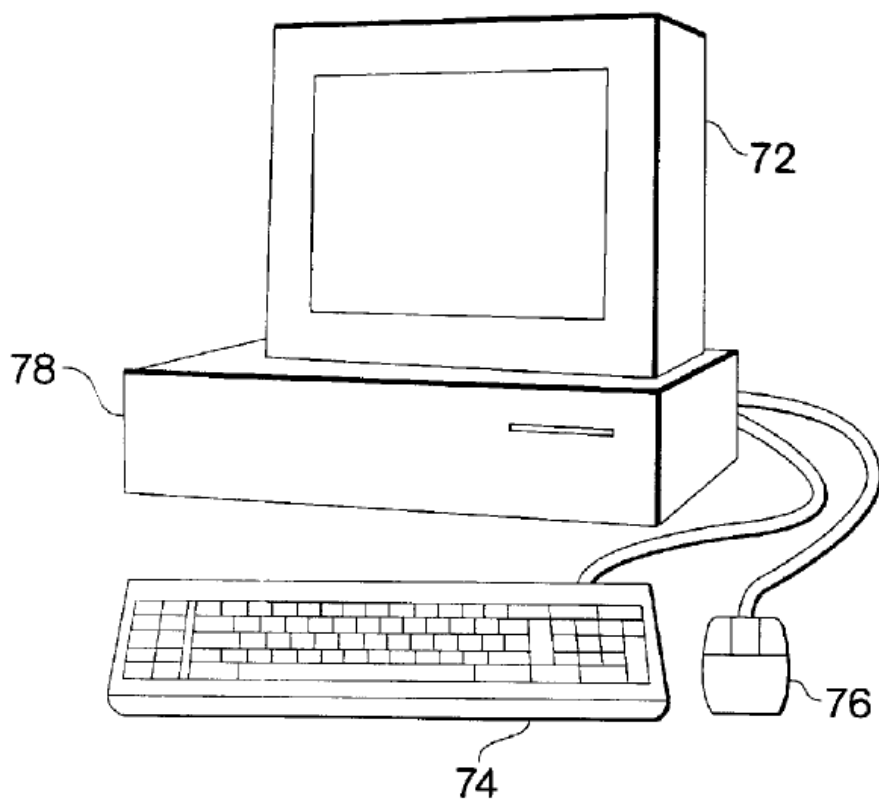


Fig. 2

LG-1029, FIG. 2

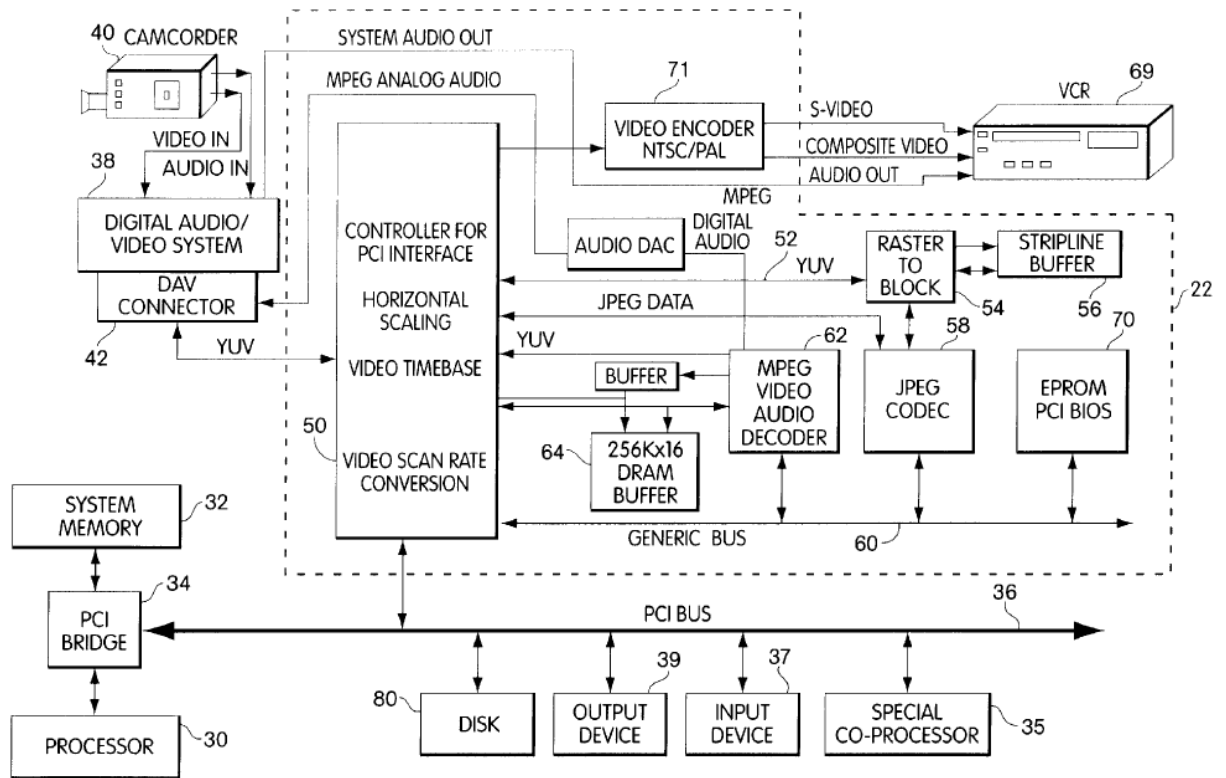


Fig. 1

LG-1029, FIG. 1

91. With reference to Figure 1, Sporer explains that its video processing circuit 22 can be used with a computer system, which includes “an audio/video input/output system 38” that “can be connected to receive audio and video information input, for example, from a camcorder 40.” LG-1029, 3:56-4:11. The “video processing circuit 22 includes a controller 50 which handles operations for interfacing to the PCI bus” and controlling other components such as “JPEG compression/decompression circuit including a raster to block converter 54, which uses buffer 56, and a JPEG codec 58” and “a video and audio encoder/decoder

(codec) 62 for encoding and decoding MPEG format video and audio.” LG-1029, 5:49-6:17. Sporer offers implementation details about how the various components of the video processing circuit, including various codecs, work together to process video data, including compression and decompression, from external devices, such as camcorder 40. *See, generally*, LG-1029.

B. Ground 1: Claims 1-19 are obvious over Bryant

92. 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:

93. 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.

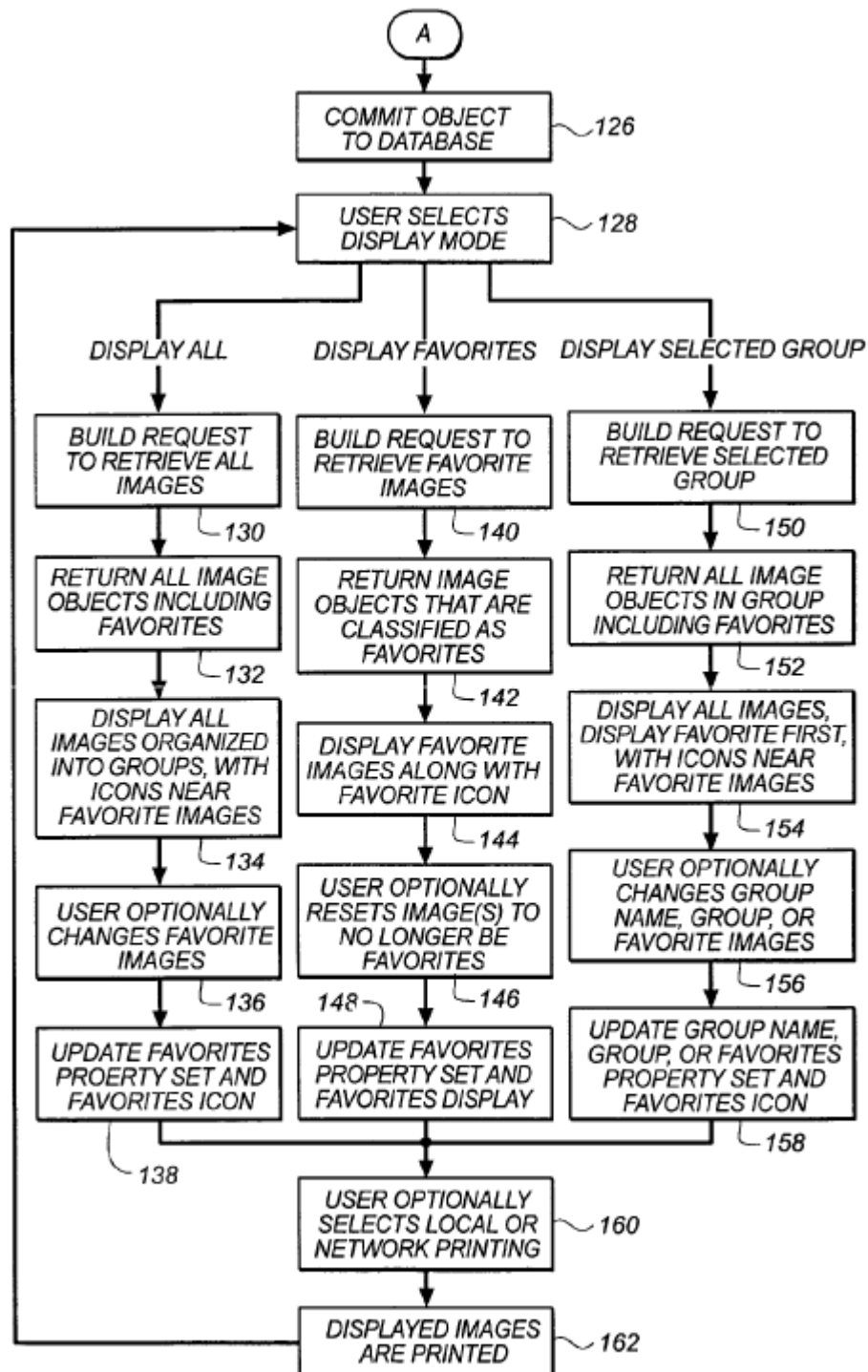


FIG. 3B

LG-1005, FIG. 3B

[1.a] a recording medium to store a plurality of video data;

94. Bryant discloses or renders obvious a recording medium to store a plurality of video data. 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 data. 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].

95. A POSITA would have understood that the “hard drive 20” of Bryant necessarily includes a circuitry (claim 11’s “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.

96. 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.

97. 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 data among a plurality of groups of video data by specifying a position of a character corresponding to the one group of video data;

98. 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 data (e.g., “All Images,” “All Favorites,” “Group”) among a plurality of groups of video data (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 data. LG-1005, [0037]-[0038], [0087], [0089], [0149], [0154], FIGS. 9A-9C; *see also* discussion of Elements [1.e]-[1.f].

99. In particular, Bryant teaches “user interface screens” that facilitate user selection of desired video data 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].

100. 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 data (e.g., “All Images,” “All Favorites,” “Group”) from among a plurality of groups of video data (circled in blue in FIGS. 9A-9C below, e.g.,

“All Images,” “All Favorites,” “Group”). A user selects a group of video data
“[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 data.

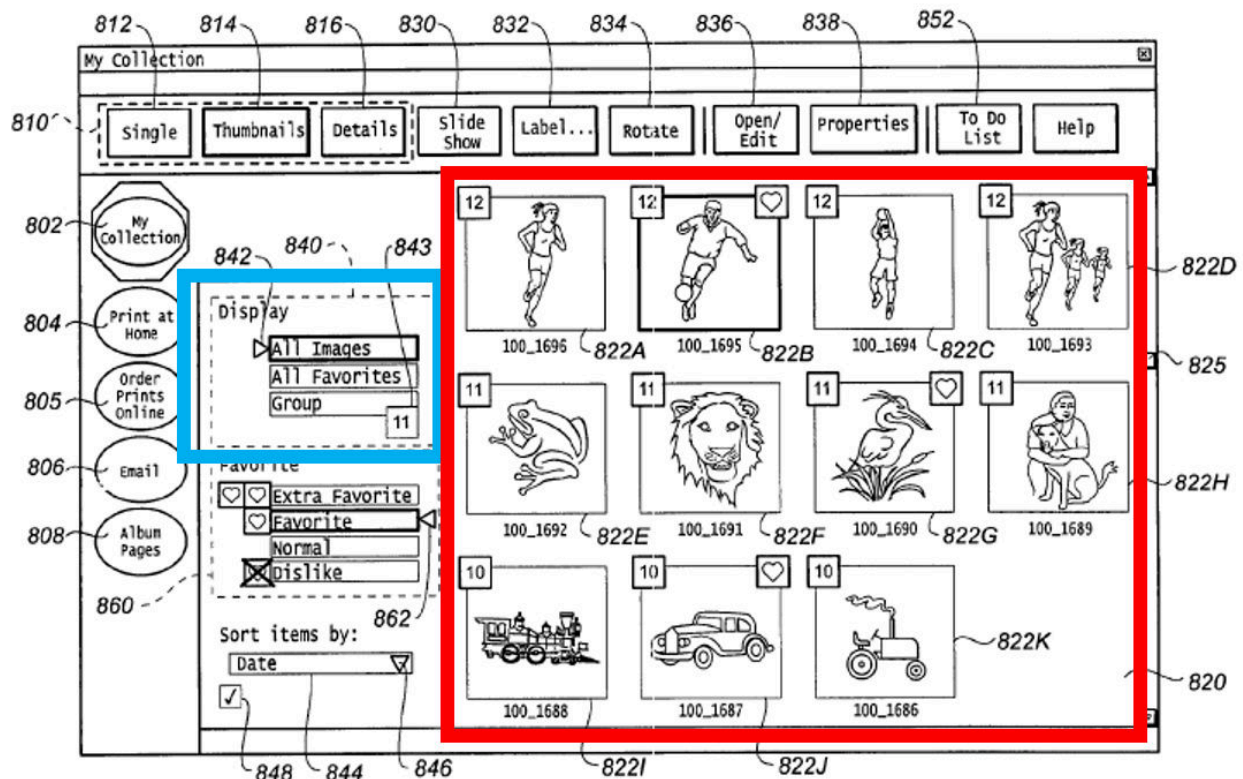


FIG. 9A

LG-1005, FIG. 9A (annotated)

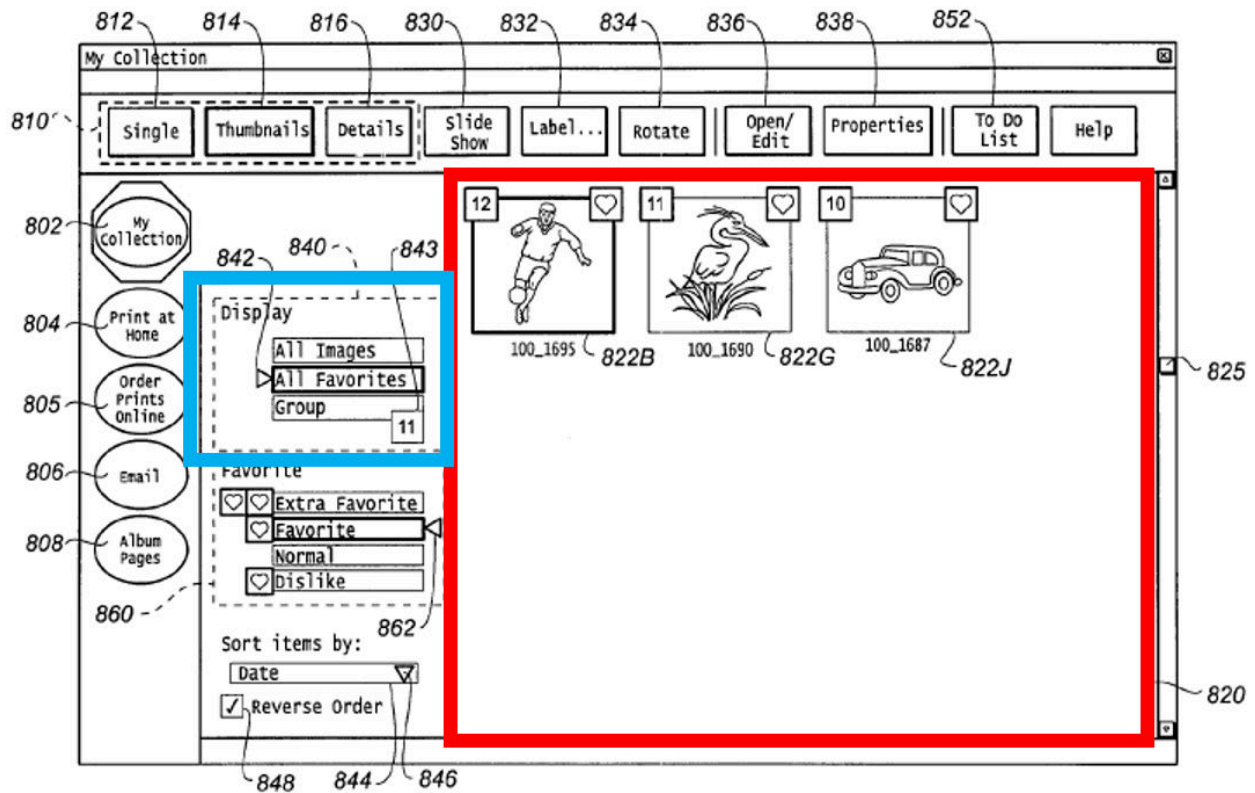


FIG. 9B

LG-1005, FIG. 9B (annotated)

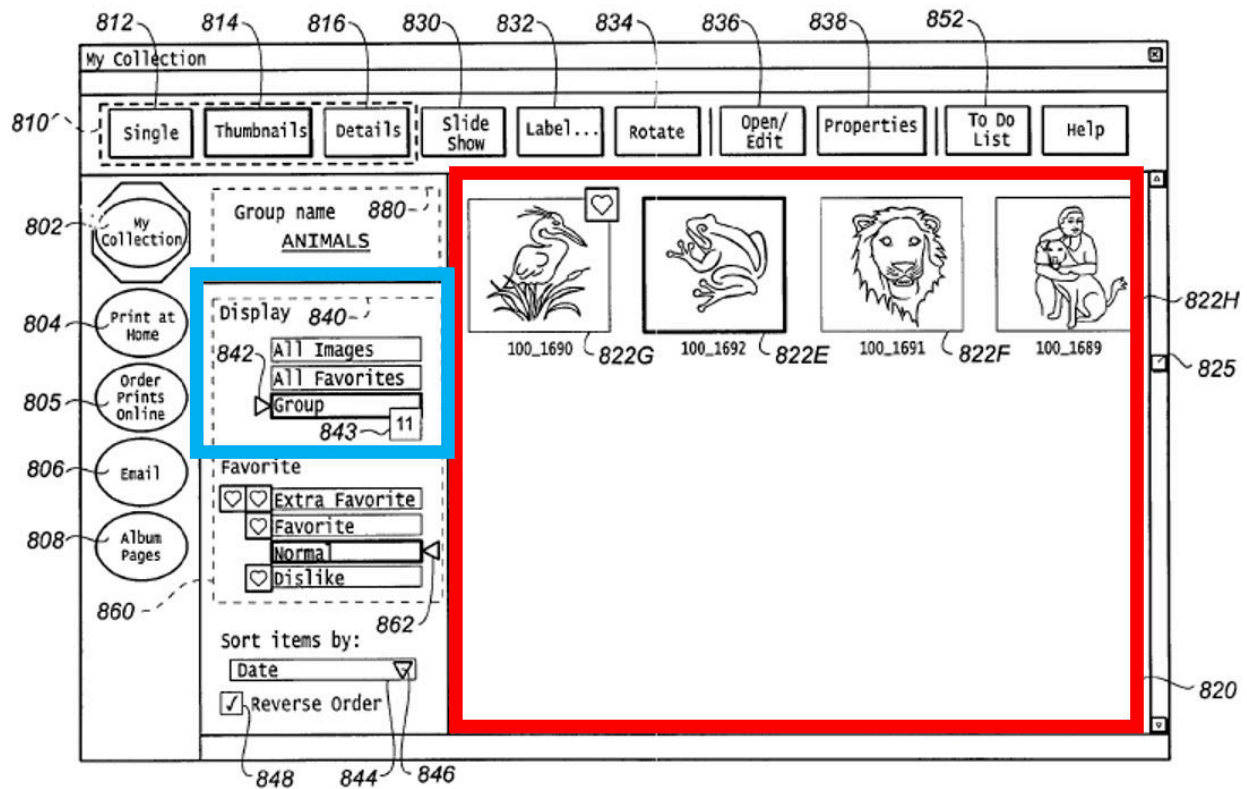


FIG. 9C

LG-1005, FIG. 9C (annotated)

101. 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 data 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 reproducer configured to reproduce selected video data read out from the recording medium; and

102. Bryant discloses or renders obvious a reproducing unit configured to reproduce selected video data 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.

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

104. A POSITA would have understood that Bryant at least renders obvious reproducing selected video data 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.

105. 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 data ("motion video images") from a plurality of video data 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.

106. 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.

107. 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.*

108. 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.

109. 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.

110. 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.

111. 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,

112. 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.i] wherein, 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 data, the controller controls so that a first group of thumbnails corresponding to the first group of video data is displayed,

113. 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 data, the controller controls so that a first group of thumbnails corresponding to the first group of video data is displayed.

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.

114. 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 data (*see* discussion of Element [1.b] with respect to “video data”), 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.

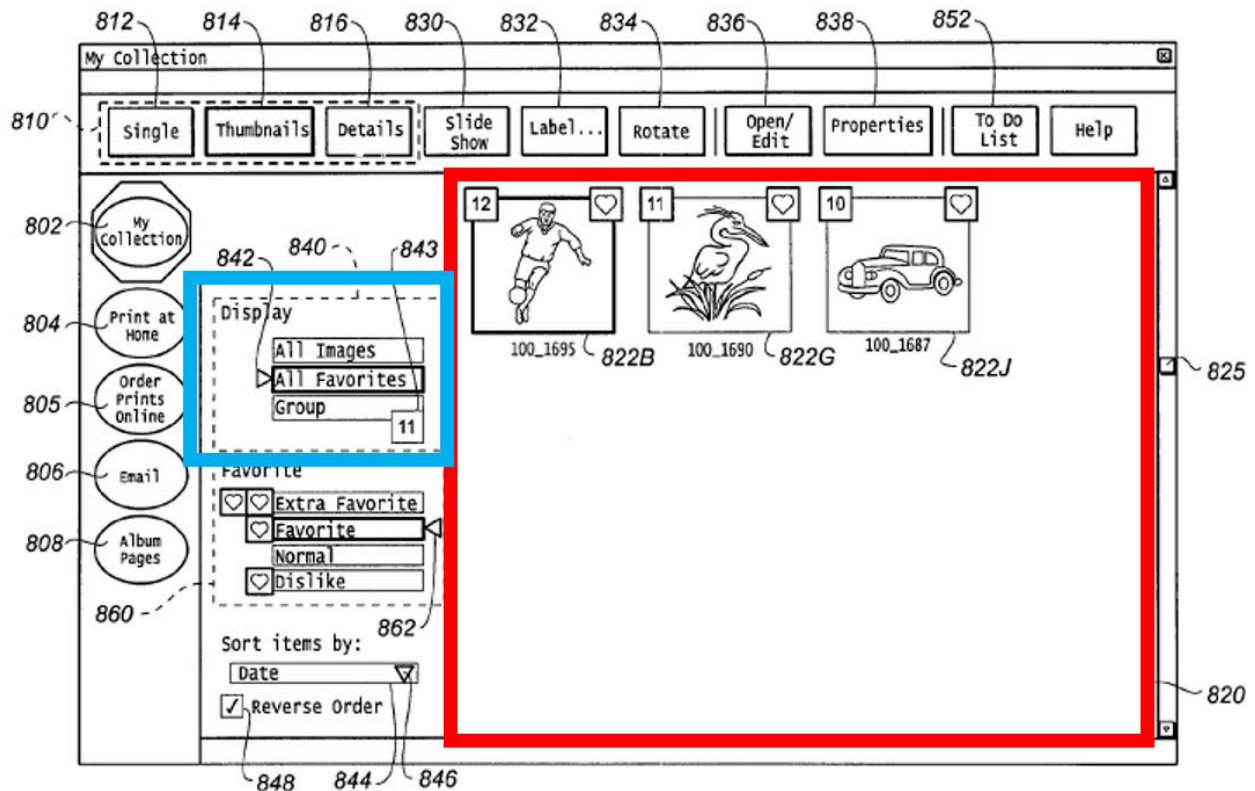


FIG. 9B

LG-1005, FIG. 9B (annotated)

115. 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 data associated with the selected group of video data. *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 data (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 data (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].

116. 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 '072 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 data (e.g., video data).

[1.e.ii] in a state that an order of the first group of thumbnails is editable,

117. Bryant discloses or renders obvious that the first group of thumbnails is displayed a state in which an order of the first group of thumbnails is editable. LG-1005, [0094].

118. At a high level, Bryant generally describes that the user interface can be controlled by the user. LG-1005, [0088] (“user selects a display mode”), [0089] (“display mode”), [0090] (“‘Thumbnails’ display mode has been selected”). Specifically, as shown in Figure 9B (below), Bryant explains that the user interface (GUI screen 800A) “includes sort options that are selected using a sort items text box 844 and a pull-down arrow icon 846 to select a desired sort option from a list, including sort by date, caption, or keyword.” LG-1005, [0094], FIG. 9B. Bryant further explains that “[a] reverse order checkbox 848 is used to reverse the display

of the thumbnail images.” *Id.* That is, a user can change the order in which thumbnails are displayed in Bryant by clicking the “reverse order checkbox” and cause the order of the thumbnail images to be reversed. *Id.* Thus, the thumbnails are displayed in a state that the order of the thumbnails is editable (e.g., sortable).

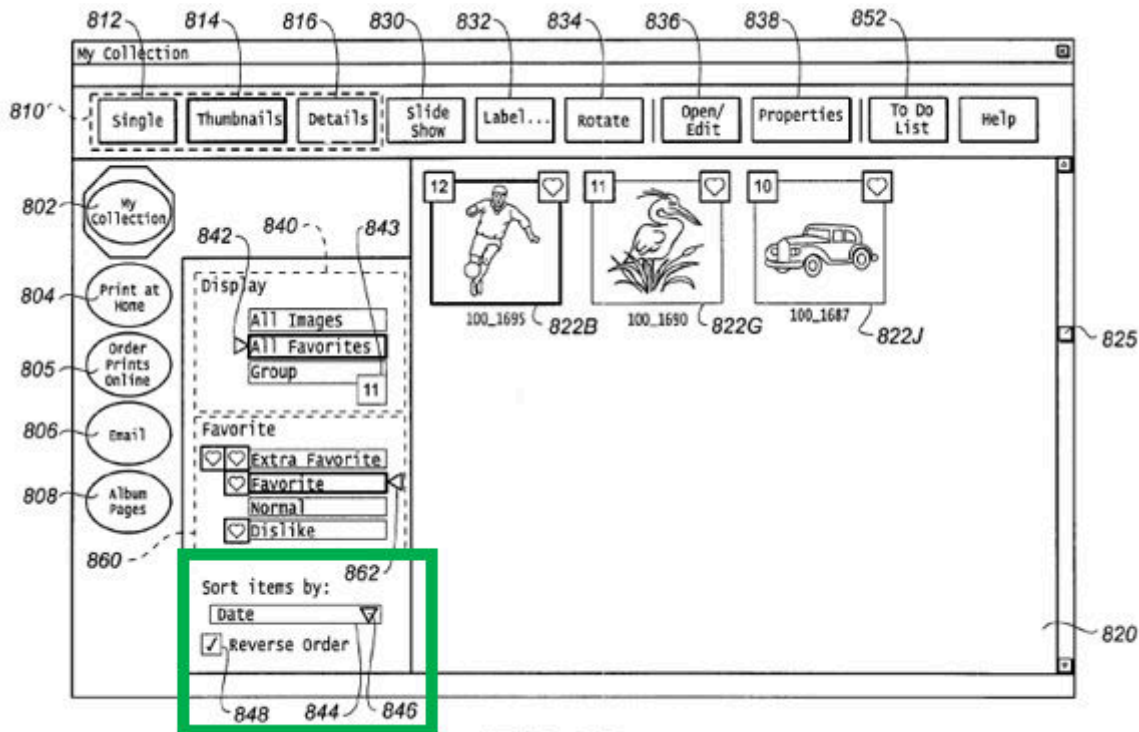


FIG. 9B

LG-1005, FIG. 9B (annotated)

[1.f.i] wherein, 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 data, the controller controls so that a second group of thumbnails corresponding to the second group of video data is displayed

119. Bryant 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 data, the controller controls so that a

second group of thumbnails corresponding to the second group of video data is displayed. LG-1005, [0089]-[0103], FIGS. 9A-9C.

120. For example, with reference to Figure 9A, Bryant explains that, when a second group of video data (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 data (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.

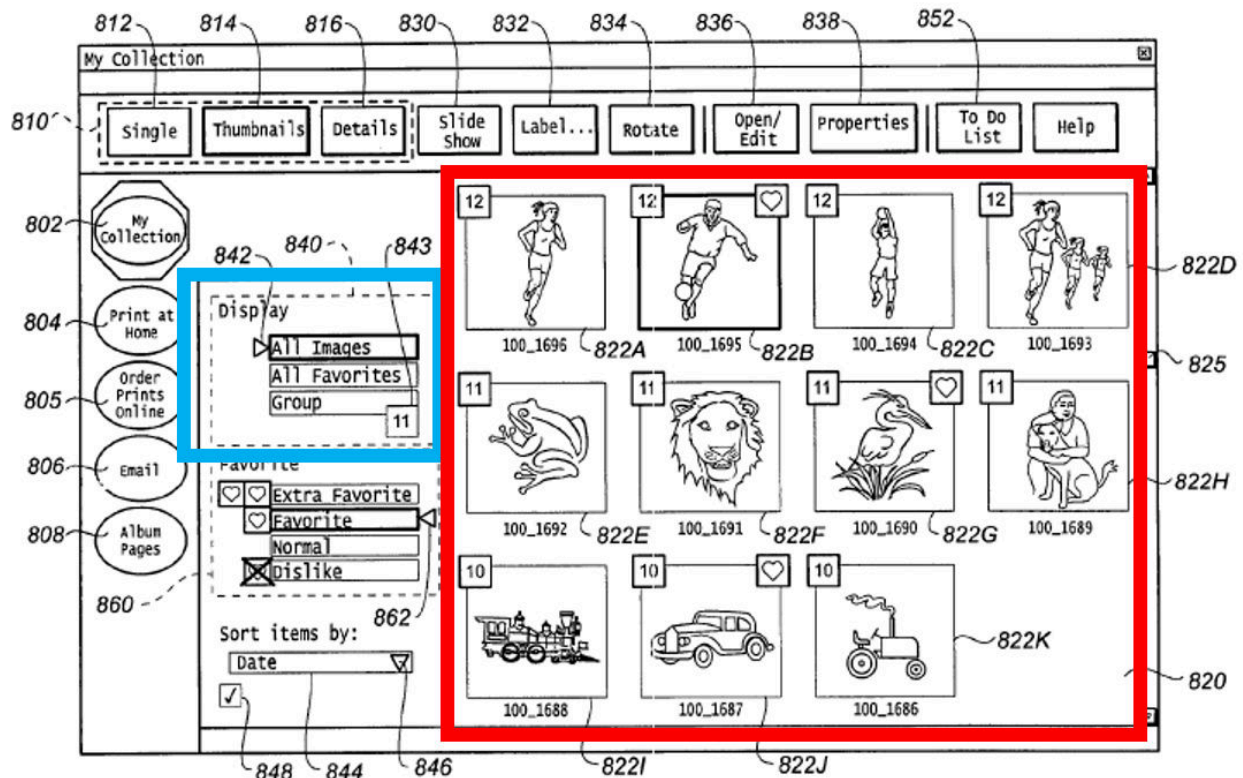


FIG. 9A

LG-1005, FIG. 9A (annotated)

[1.f.ii] in a state that an order of the second group of thumbnails is editable,

121. See discussion of Element [1.e.ii].

[1.g] wherein, even if one video data stored on the recording medium included in both the first group of video data and the second group of video data is deleted from the first group of video data, the controller controls so that the one video data continues to be included in the second group of video data and a thumbnail corresponding to the one video data is displayed as one of the second group of thumbnails when the second group of thumbnails is displayed.

122. Bryant discloses or renders obvious wherein, even if one video data stored on the recording medium included in both the first group of video data and the second group of video data is deleted from the first group of video data, the

controller controls so that the one video data continues to be included in the second group of video data and a thumbnail corresponding to the one video data is displayed as one of the second group of thumbnails when the second group of thumbnails is displayed. 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.

123. 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.

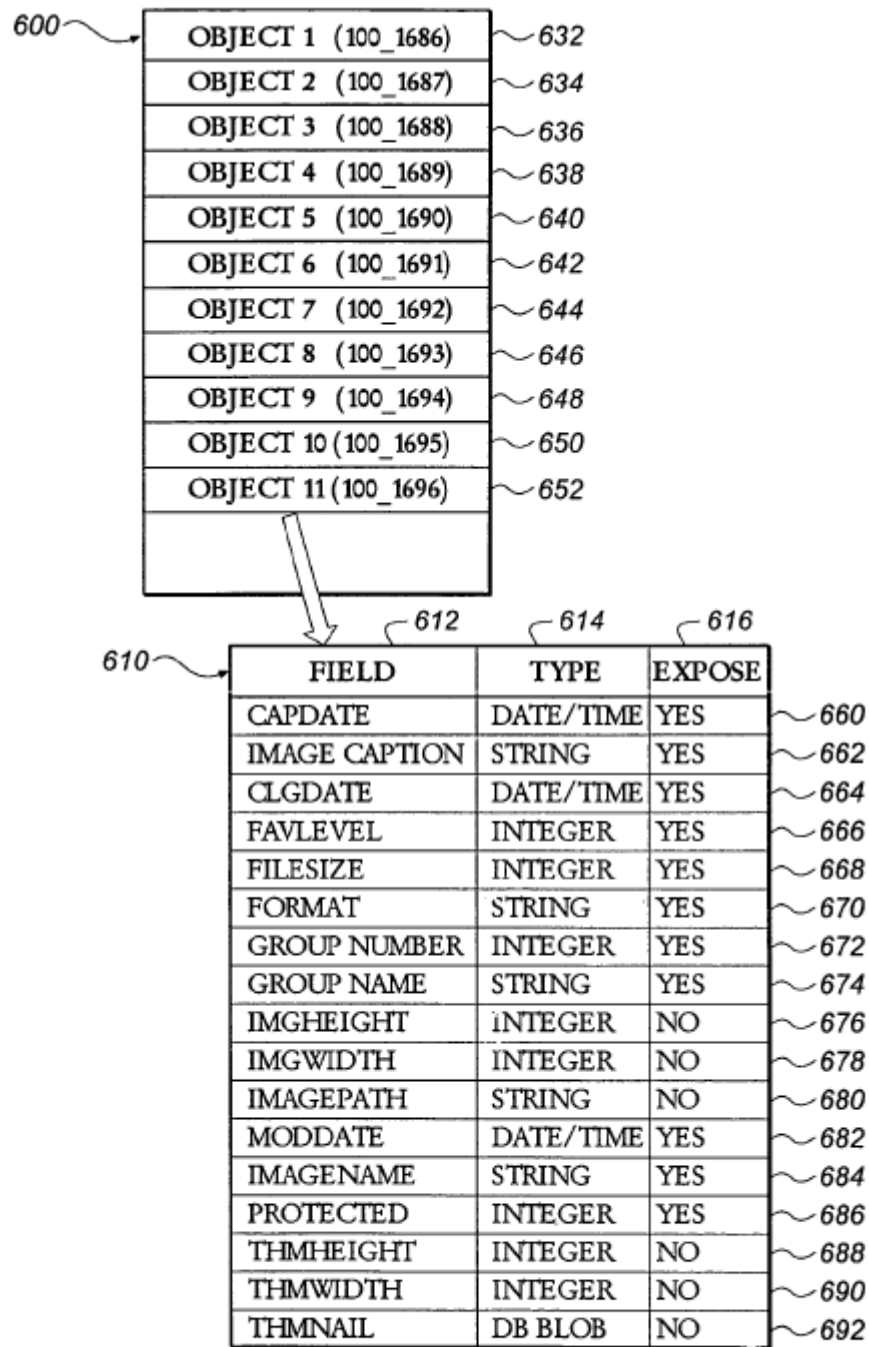


FIG. 8

LG-1005, FIG. 8

124. 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.

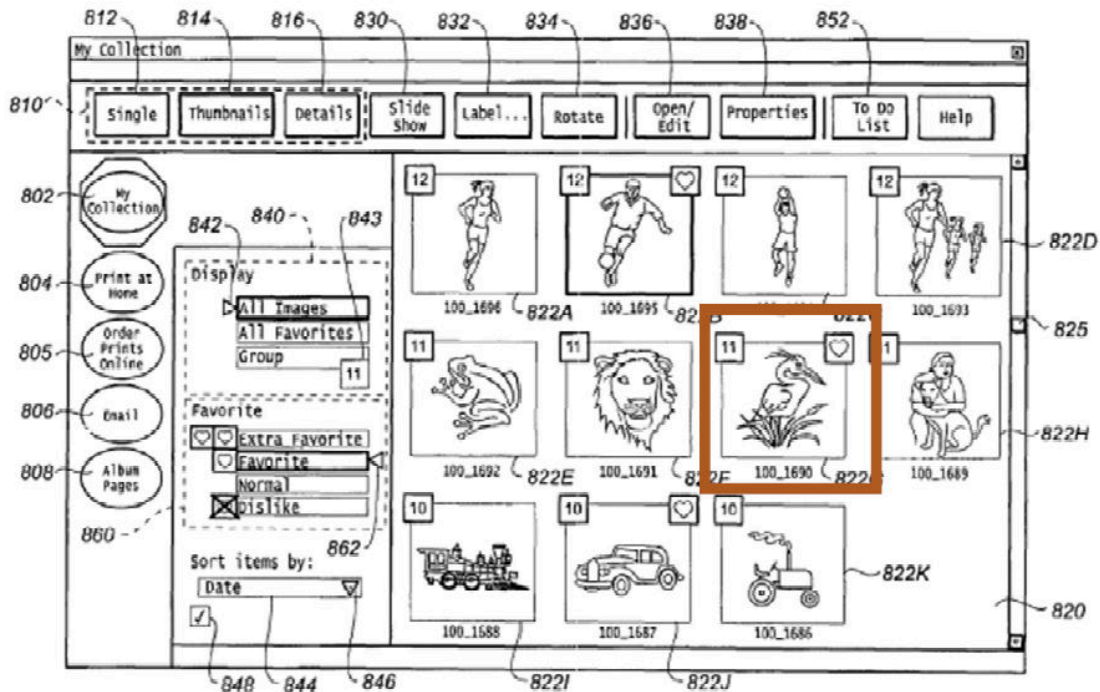


FIG. 9A

LG-1005, FIG. 9A (annotated)

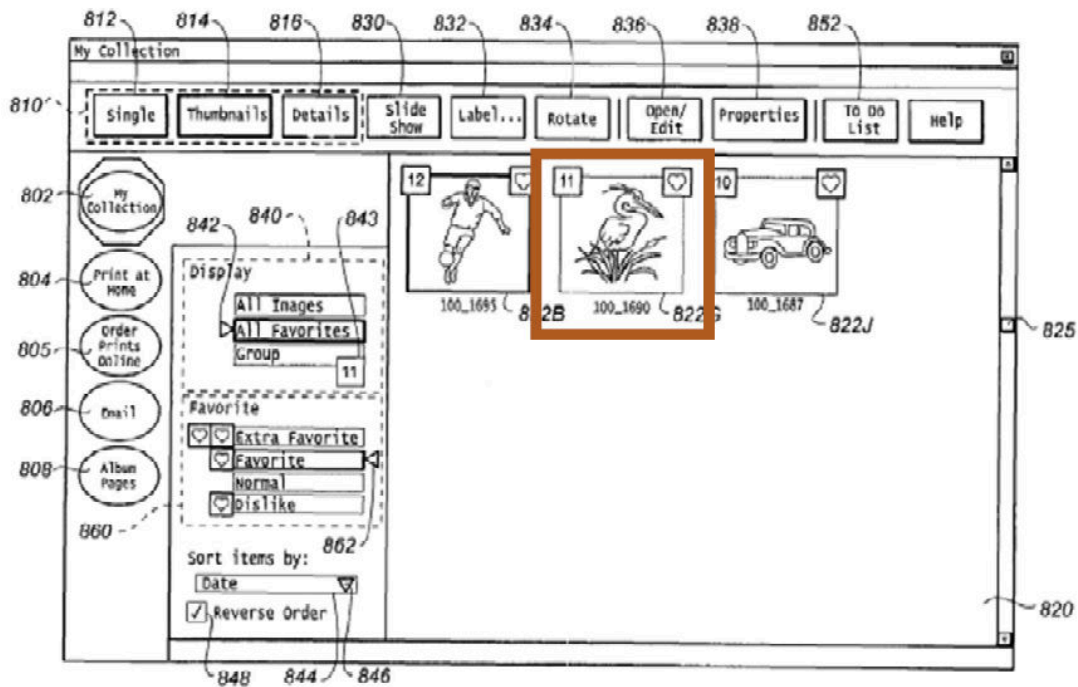


FIG. 9B

LG-1005, FIG. 9B (annotated)

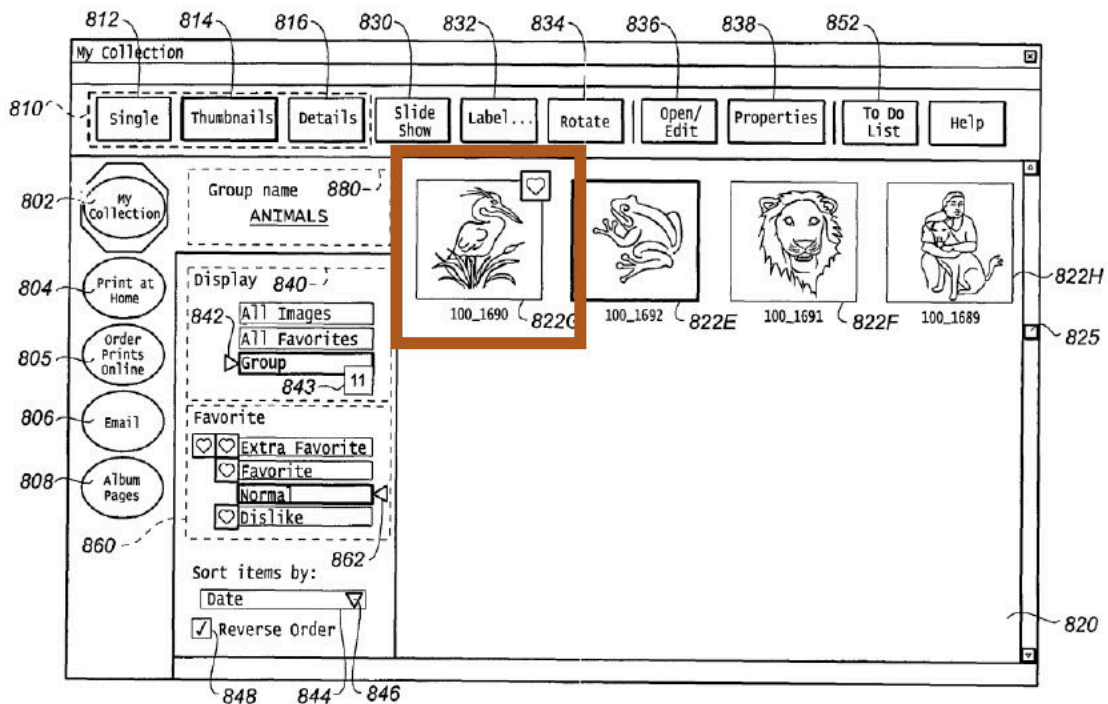


FIG. 9C

LG-1005, FIG. 9C (annotated)

125. 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 data, and the thumbnail for the crane media object would continue to be displayed with those groups of video data (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 data recorded on the recording medium included in both the first group of video data and the second group of video data is deleted from the first group of video data, the controller controls so that the one video data continues to be included in the second group of video data and a thumbnail corresponding to the one video data is displayed as one of the

second group of thumbnails when the second group of thumbnails is displayed.

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].

126. 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.

127. 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].

128. 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]

129. 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 data, with its thumbnail continuing to be displayed as one of the thumbnails in the All images”

and “Group/11” groups of video data. 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] The information processing apparatus according to claim 1, further comprising an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder.

130. Bryant discloses or renders obvious an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder. LG-1005, [0049]. In particular, Bryant explains that its system includes a “processor 320 [that] performs color interpolation followed

by color and tone correction, in order to produce rendered sRGB image data.” LG-1005, [0049]. Bryant further explains that the “processor 320 can also provide various image sizes selected by the user, for example, 3.1 megapixel (MP) ‘best quality’ images, 2.2 MP ‘better quality’ images, 0.8 MP ‘e-mail quality’ images, and 0.4 MP ‘web quality’ images.” *Id.* “The rendered sRGB image data is then JPEG compressed and stored as a JPEG image file on the removable memory card 330.” *Id.*

131. Bryant teaches that the data files transferred from the digital camera to the computer include “still and motion video images.” LG-1005, [0036]. Thus, it would have been obvious to a POSITA that Bryant’s processor 320 is (or includes) an encoder that performs the processing and compression described above, and that such processing and compression includes encoding both still and motion video images. LG-1005, [0005] (referencing the “MPEG-7 Requirements Document”), [0036]. For instance, Bryant explains that “[v]arious types of metadata related to images,” which have been standardized, referencing the “MPEG-Requirements Document” developed by “the International Organization for Standardization (ISO) group ISO/IEC JTC1/SC29/WG11, ‘Coding of Moving Pictures and Audio.’” *Id.*, [0005]. Version 7 of the “MPEG-7 Requirements Document” references use of encoders/decoders for encoding video and other image data. LG-1034, 5, FIG. 3. Moreover, the use of video encoding and decoding standards, i.e.,

codecs, such as JPEG, was well known by the Critical Date. *See* LG-1029, 5:49-6:17; §VIII.A.iv.

132. Additionally, Bryant explains that its processor 320 is part of the digital camera 300, which is connected to the computer 10. LG-1005, [0047], FIG. 2. From this description, a POSITA would have understood Bryant's camera connected to the computer disclosing a collective apparatus. For example, the components of Bryant's Figure 1, which includes both the home computer 10 and the docked digital camera 300, is described as the collective apparatus of a singular "digital photography system." LG-1005, [0012]. To the extent that it is argued that the camera-computer combination is not a "apparatus" per claims 1 and 2, it would have been obvious to a POSITA to include such a processor 320 in a computer, especially in well-known scenarios where the computer included an integrated camera, as was well known by the Critical Date. *See, e.g.*, LG-1032, 1:6-10 ("personal computer having a camera mounted thereon"), 1:13-46 (describing various prior art "portable personal computers on which a camera is mounted"), FIGS. 1-2; LG-1033, 1:44-64 ("a conventional video camera connected to the personal computer in which the video capture board is installed"), FIG. 2 (showing a prior art personal computer with a built-in video camera), FIGS. 9, 22.

iii. Claim 3

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

133. Bryant discloses the controller controlling the output unit to display a first character corresponding to the first group of video data 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.

134. For example, as shown in FIG. 9B below, Bryant discloses a first area (circled blue) that displays names of groups of video data (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 data (“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.

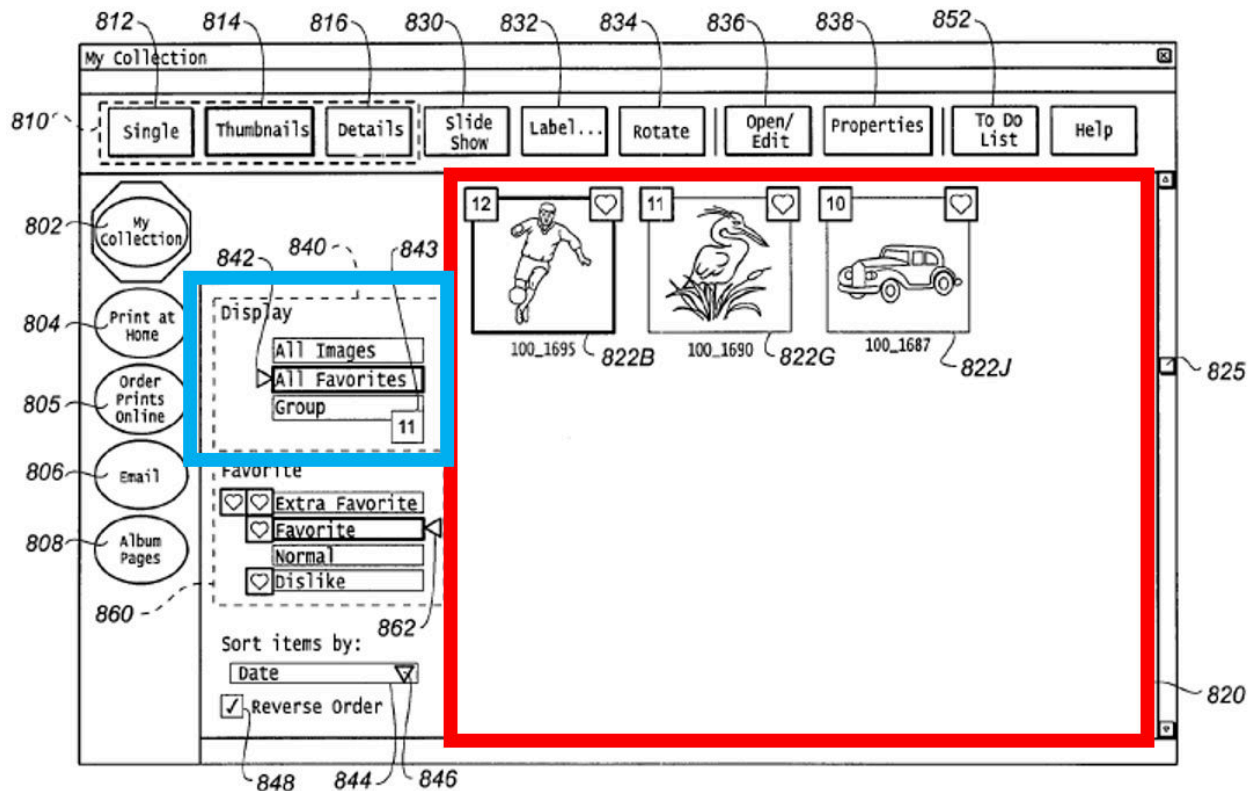


FIG. 9B

LG-1005, FIG. 9B (annotated)

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

135. Bryant discloses the controller controlling the output unit to display a second character corresponding to the second group of video data (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 [3.a].

136. For example, as shown in FIG. 9A below, Bryant discloses the first area (circled blue) that displays names of groups of video data (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 data (“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.

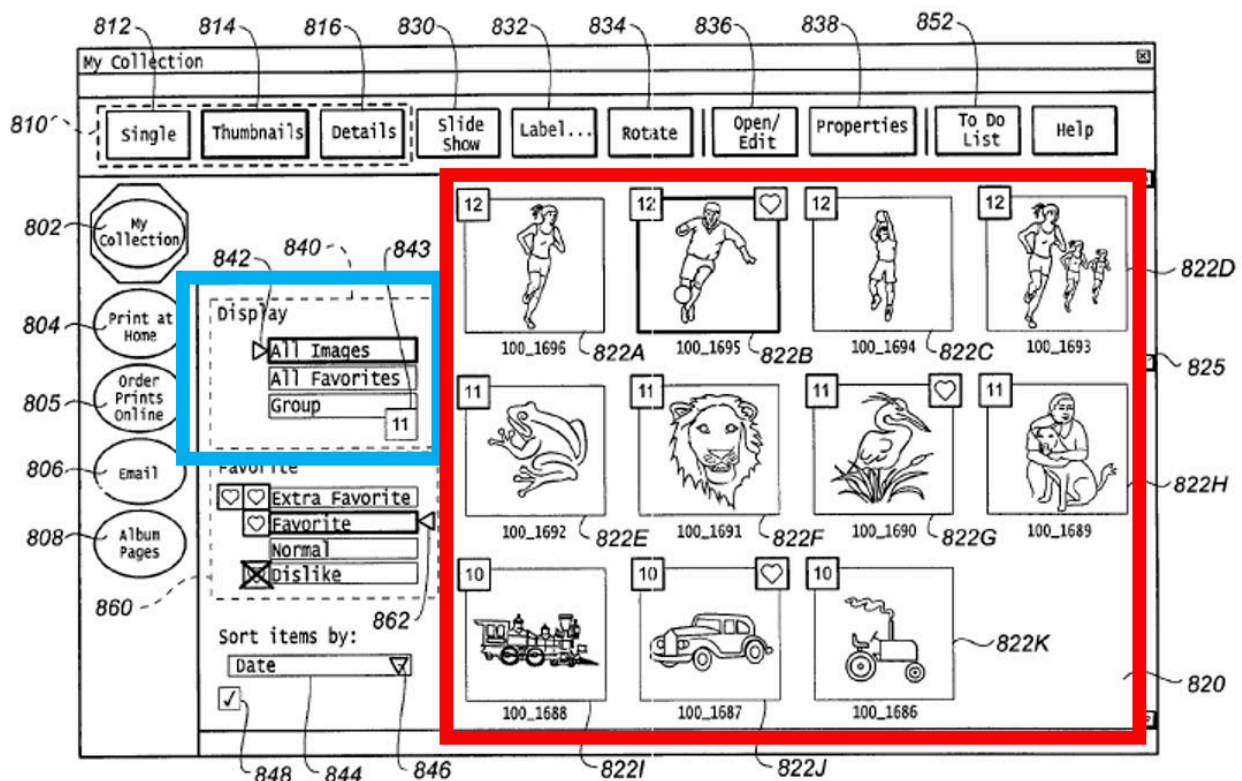


FIG. 9A

LG-1005, FIG. 9A (annotated)

iv. Claim 4

[4.a] The information processing apparatus according to claim 3, 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, and

137. 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 [3.a]-[3.b].

138. 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.

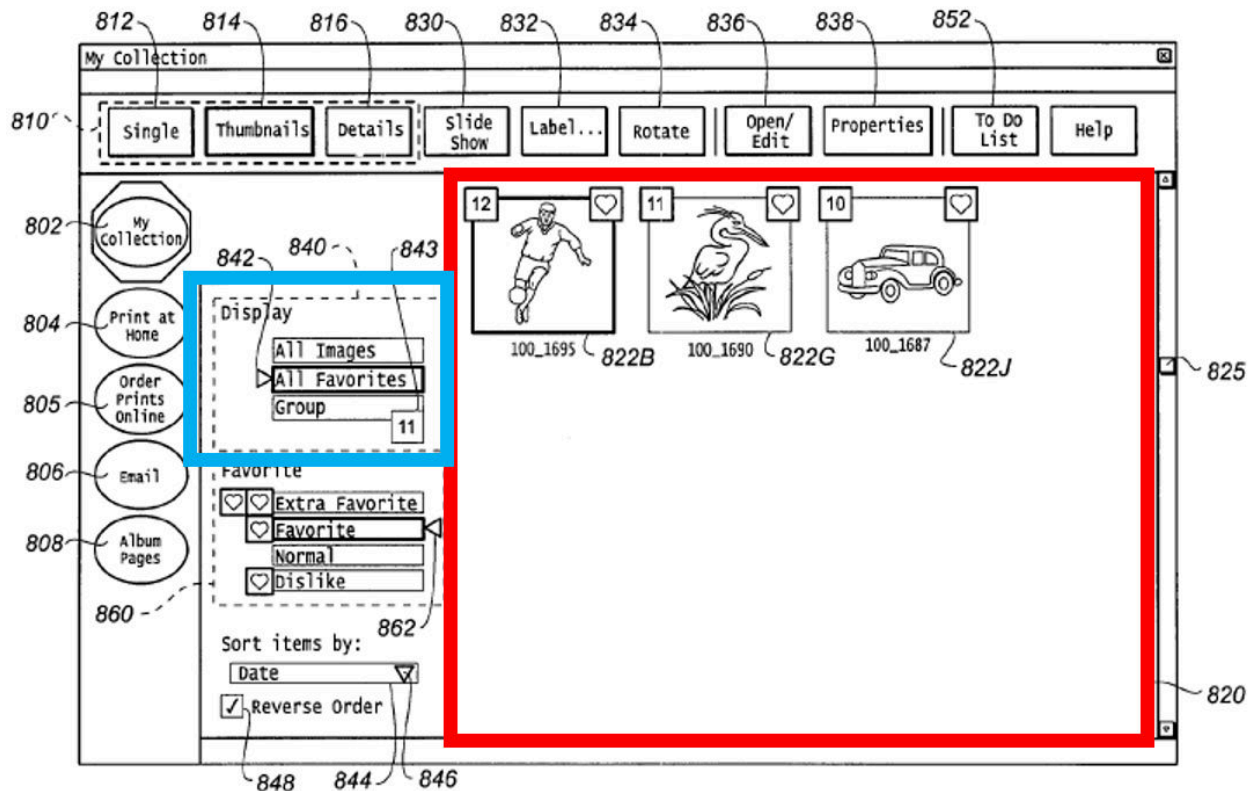


FIG. 9B

LG-1005, FIG. 9B (annotated)

[4.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.

139. 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 [4.a].

140. 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 ‘Thumbnaills’ 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.

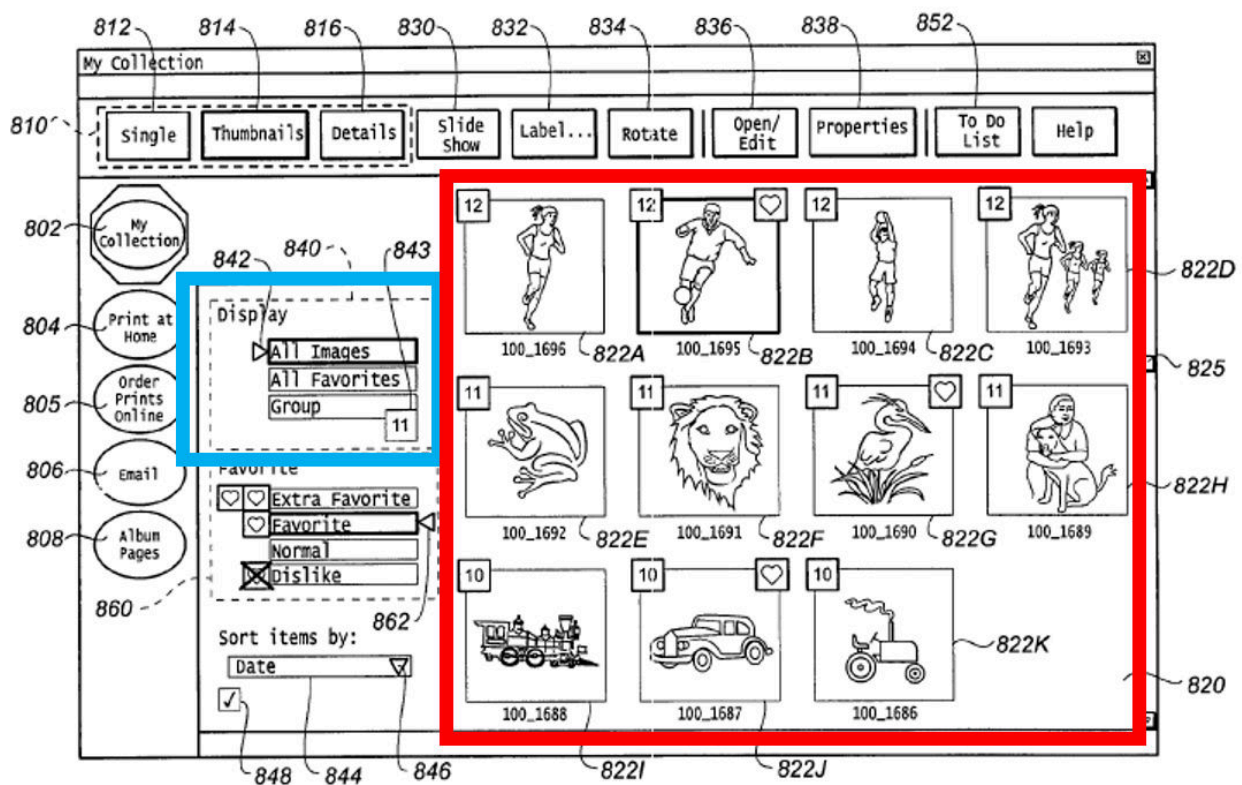


FIG. 9A

LG-1005, FIG. 9A (annotated)

v. Claim 5

[5] *The information processing apparatus according to claim 4, wherein, when the one video data is deleted from the first group of video data, the*

controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

141. Bryant discloses or renders obvious when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium. *See* discussion of Element [1.g].

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

vi. Claim 6

[6.pre] An information processing system comprising:

143. See discussion of Element [1.pre].

[6.a] a recording medium to record a plurality of video data;

144. See discussion of Element [1.a].

[6.b] a reproduce configured to reproduce selected video data read out from the recording medium; and

145. See discussion of Element [1.c].

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

146. See discussion of Element [1.b].

[6.d.i] wherein, 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 data, a first group of thumbnails corresponding to the first group of video data is displayed on the display unit

147. See discussion of Element [1.e.i].

[6.d.ii] in a state that the order of the first group of thumbnails is editable,

148. See discussion of Element [1.e.ii].

[6.e.i] wherein, 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 data, a second group of thumbnails corresponding to the second group of video data is displayed on the display

149. See discussion of Element [1.f.i].

[6.e.ii] in a state that the order of the second group of thumbnails is editable, and

150. See discussion of Element [1.f.ii].

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

151. See discussion of Element [1.g].

vii. Claim 7

[7] The information processing system according to claim 6, further comprising an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder.

152. See discussion of Claim [2].

viii. Claim 8

[8.a] The information processing system according to claim 7, wherein a first character corresponding to the first group of video data in a first area when the first group of thumbnails is displayed on the display, and

153. See discussion of Element [3.a].

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

154. See discussion of Element [3.b].

ix. Claim 9

[9.a] The information processing system according to claim 8, wherein the first group of thumbnails is displayed in a second area when the first group of

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

155. See discussion of Element [4.a].

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

156. See discussion of Element [4.b].

x. Claim 10

[10] The information processing system according to claim 9, further comprising: a controller, wherein, when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

157. See discussion of Claim [5].

xi. Claim 11

[11.pre] An information processing method comprising:

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

[11.a] recording, by a recording unit, a plurality of video data on a recording medium;

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

[11.b] outputting a menu display for a user to select one group of video data among a plurality of groups of video data by specifying a position of a character corresponding to the one group of video data;

160. See discussion of Element [1.b].

[11.c] reproducing selected video data read out from the recording medium;

161. See discussion of Element [1.c].

[11.d.i] controlling display, 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 data, a first group of thumbnails corresponding to the first group of video data

162. See discussion of Elements [1.d]-[1.e.i].

[11.d.ii] in a state that the order of the first group of thumbnails is editable,

163. See discussion of Element [1.e.ii].

[11.e.i] controlling to display, 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 data, a second group of thumbnails corresponding to the second group of video data,

164. See discussion of Elements [1.d], [1.f.i].

[11.e.ii] in a state that the order of the first group of thumbnails is editable,

165. See discussion of Elements [1.f.ii].

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

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

xii. Claim 12

[12] The information processing method according to claim 11, further comprising encoding inputted video data with an encoder, and storing the plurality of video data encoded by the encoder on the recording medium.

167. See discussion of Claim [2].

xiii. Claim 13

[13.a] The information processing method according to claim 12, further comprising: controlling, by the controller, to display a first character corresponding to the first group of video data in a first area when the first group of thumbnails is displayed; and

168. See discussion of Element [3.a].

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

169. See discussion of Element [3.b].

xiv. Claim 14

[14.a] The information processing method according to claim 13, further comprising: controlling, by the controller, 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

170. See discussion of Element [4.a].

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

171. See discussion of Element [4.b].

xv. Claim 15

[15] The information processing method according to claim 14, wherein, when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

172. See discussion of Claim [5].

xvi. Claim 16

[16.pre] An information processing system comprising:

173. See discussion of Element [1.pre].

[16.a] a recording medium configured to record a plurality of video data;

174. See discussion of Element [1.a].

[16.b] a reproducer configured to read video data from the recording medium;

175. See discussion of Element [1.c].

[16.c] a display; and

176. See discussion of Element [1.b].

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

177. See discussion of Element [1.d].

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

178. See discussion of Element [1.b].

[16.f.i] upon selection of a character corresponding to a first group of video data in the menu display by specifying a position of the character corresponding to the first group of video data, control the display to display a first group of thumbnails corresponding to the first group of video data

179. See discussion of Element [1.e.i].

[16.f.ii] in a state that the order of the first group of thumbnails is editable, and

180. See discussion of Element [1.e.ii].

[16.g.i] upon selection of a character corresponding to the second group of video data in the menu display by specifying a position of the character corresponding to the second group of video data, control the display to

display a second group of thumbnails corresponding to the second group of video data

181. See discussion of Element [1.f.i].

[16.g.ii] in a state that the order of the second group of thumbnails is editable,

182. See discussion of Element [1.f.ii].

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

183. See discussion of Element [1.g].

xvii. Claim 17

[17.a] The information processing system according to claim 16, wherein upon display of the first group of thumbnails on the display, the controller controls to display a first character corresponding to the first group of video data in a first area, and

184. See discussion of Element [3.a].

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

185. See discussion of Element [3.b].

xviii. Claim 18

[18.a] The information processing system according to claim 17, wherein upon display of the first group of thumbnails on the display, the controller

controls to display the first group of thumbnails in a second area, the second area being different from the first area, and

186. See discussion of Element [4.a].

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

187. See discussion of Element [4.b].

xix. Claim 19

[19] The information processing system according to claim 18, wherein, upon deletion of the one video data from the first group of video data, the controller removes the one video data from the first group of video data without instructing the deletion of the one video data recorded on the recording medium.

188. See discussion of Claim [5].

C. Ground 2A: Claims 1, 6, 11, and 16-19 are obvious over Kaplan

i. Claim 1

[1.pre] An information processing apparatus comprising:

189. 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].

190. 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 data. 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 medium to store a plurality of video data;

191. Kaplan discloses or renders obvious a recording medium to store a plurality of video data. 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].

192. A POSITA would have understood that, for example, the “hard disk” of Kaplan necessarily includes a circuitry (claim 11’s “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.

193. 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.

194. 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 data among a plurality of groups of video data by specifying a position of a character corresponding to the one group of video data;

195. Kaplan discloses or renders obvious an output unit configured to output a menu display for a user to select one group of video data among a plurality of groups of video data by specifying a position of a character corresponding to the one group of video data. 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 data (e.g., “Desktop”) among a plurality of groups of video data (e.g., “Desktop,” “My Computer,” “Favorites,” “History,” “Catalog”) by moving and clicking a mouse pointer over a desired group. *Id.*

196. 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].

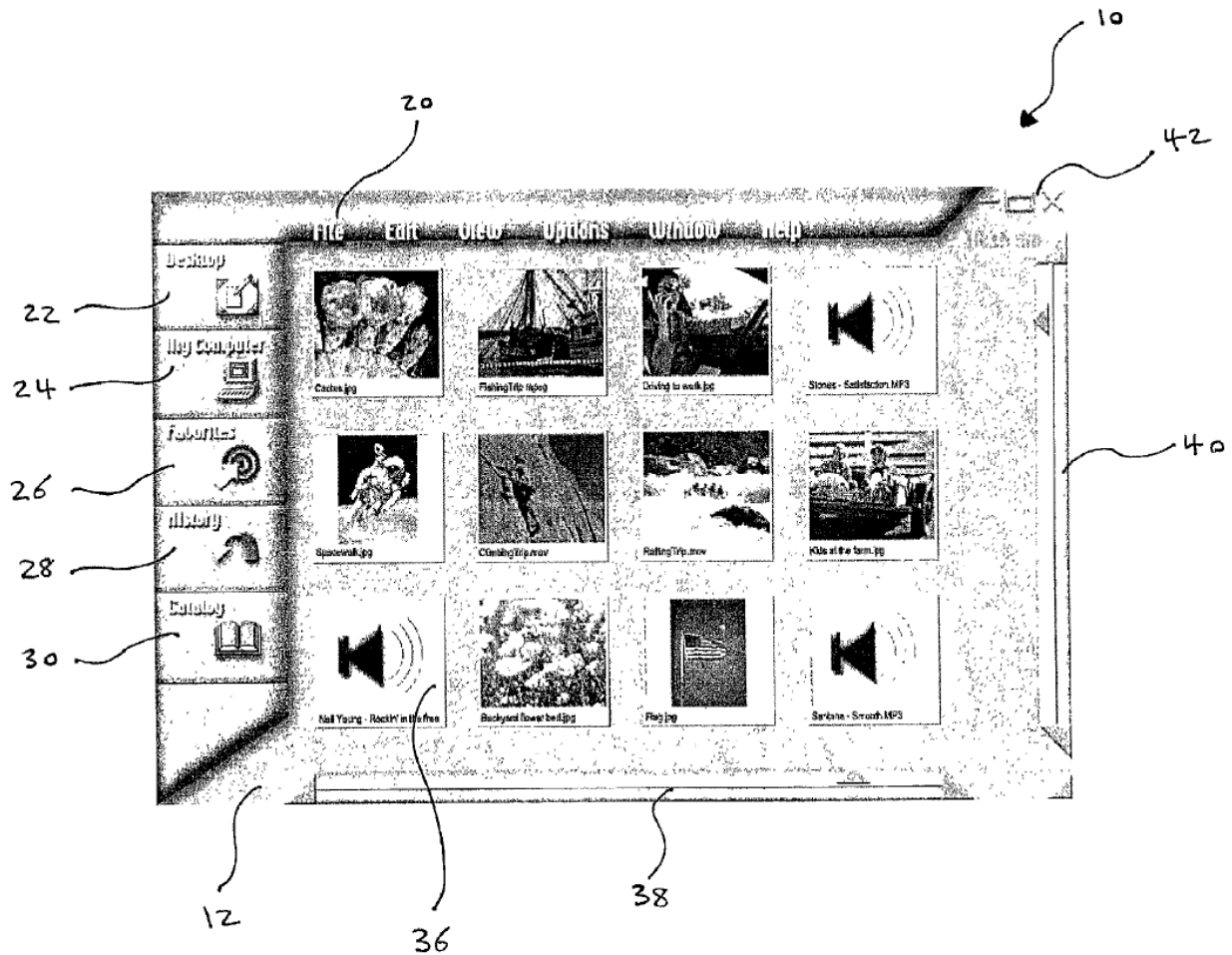
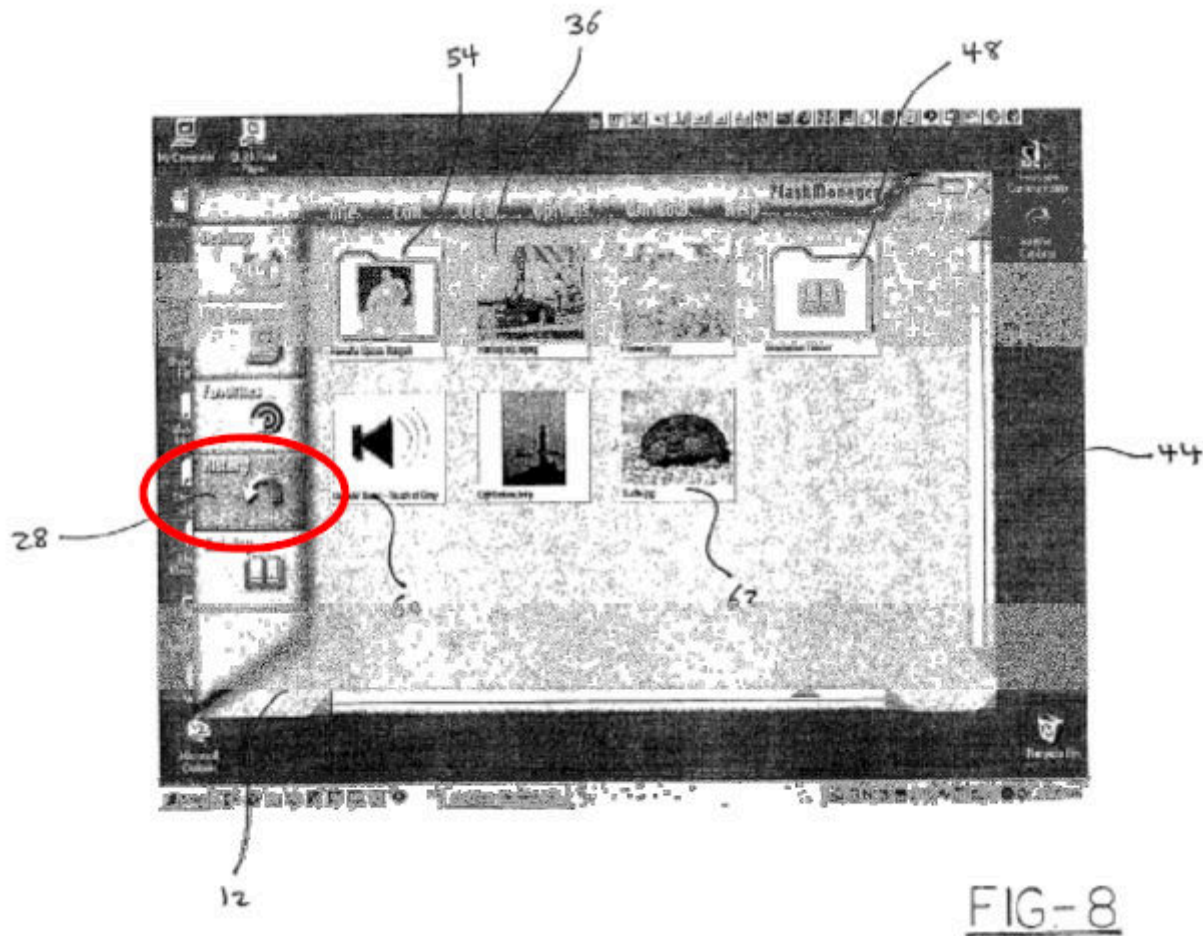


FIG.-4

LG-1004, FIG. 4

197. 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 data (e.g., the displayed categories, such as “Favorites” or “History”) among a plurality of groups of video data (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 data (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.*



LG-1004, FIG. 8 (annotated)

198. Note that although many of the examples shown in Figures 4-12 show image files, a POSITA would have understood that the files can be “movies.” *Id.*, [0042] (“default containers 48 are set up to hold types of multimedia content for movies 56, photos 50, and songs 52”), [0047] (“Within each container the user could store digital photographs, digital movie files, audio files and any other multimedia content...”), [0050] (“Additional thumbnails 36 display images, movies and music multimedia content. For example, thumbnails 80, 82, and 84

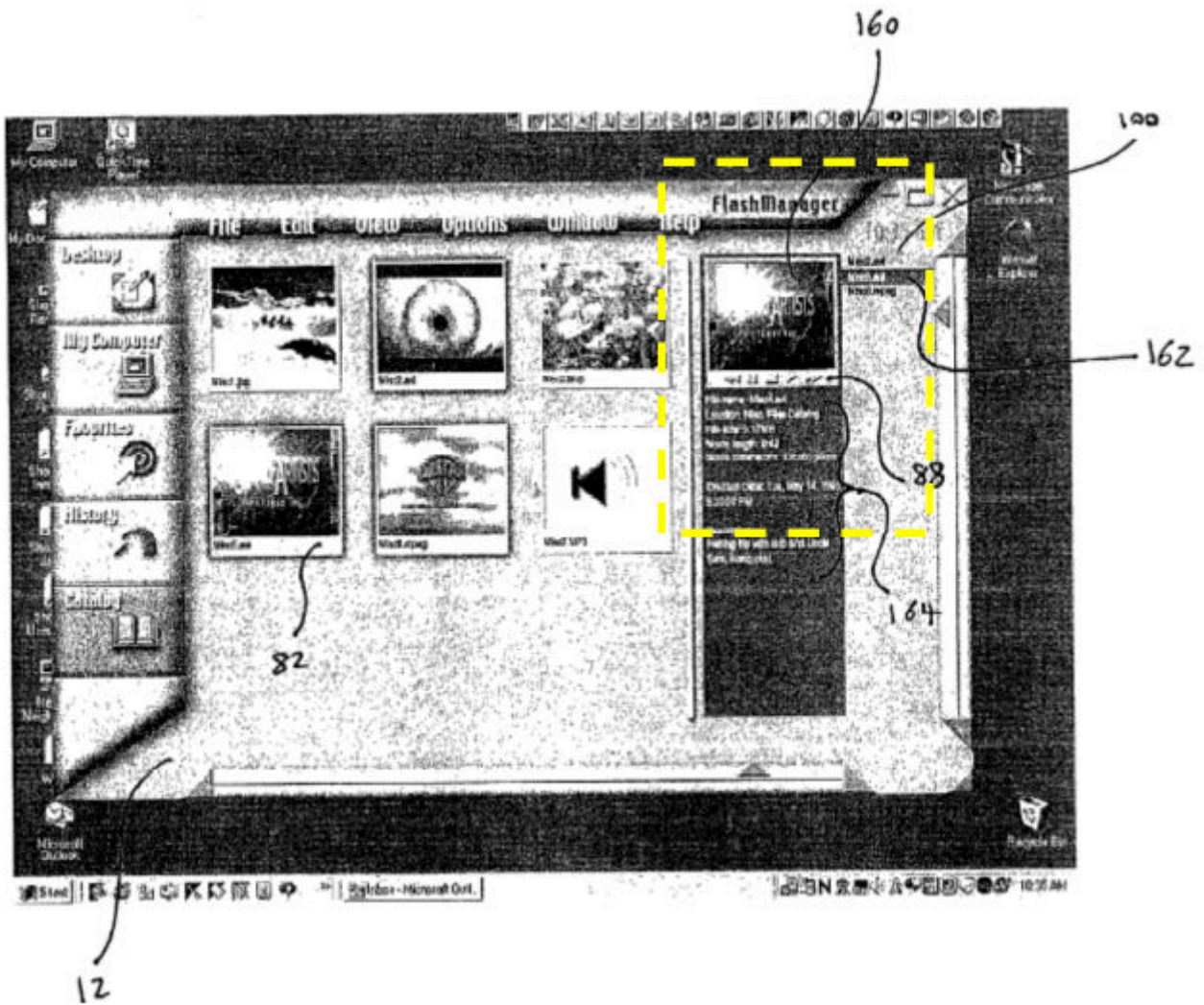
display images representing movies saved in the AVI and MPEG multimedia file formats.”).

[1.c] a reproducer configured to reproduce selected video data read out from the recording medium; and

199. Kaplan discloses or renders obvious a reproducing unit configured to reproduce selected video data 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 data. 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].

200. Additionally, Kaplan describes an interface 12 for reproducing for display user selected video data from among a plurality of video data 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 data 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)

201. 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 '072 Patent itself admits that reproduction of video from a recording medium, for instance with a playlist, was “conventional.” See §VII.A.

202. Moreover, a POSITA would have understood that the hard disk of Kaplan necessarily includes a circuitry (“reproducer”), 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[] multimedia content” and “play multimedia content.” LG-1004, [0004], [0051]. 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.

203. 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.

204. 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,

205. 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”).

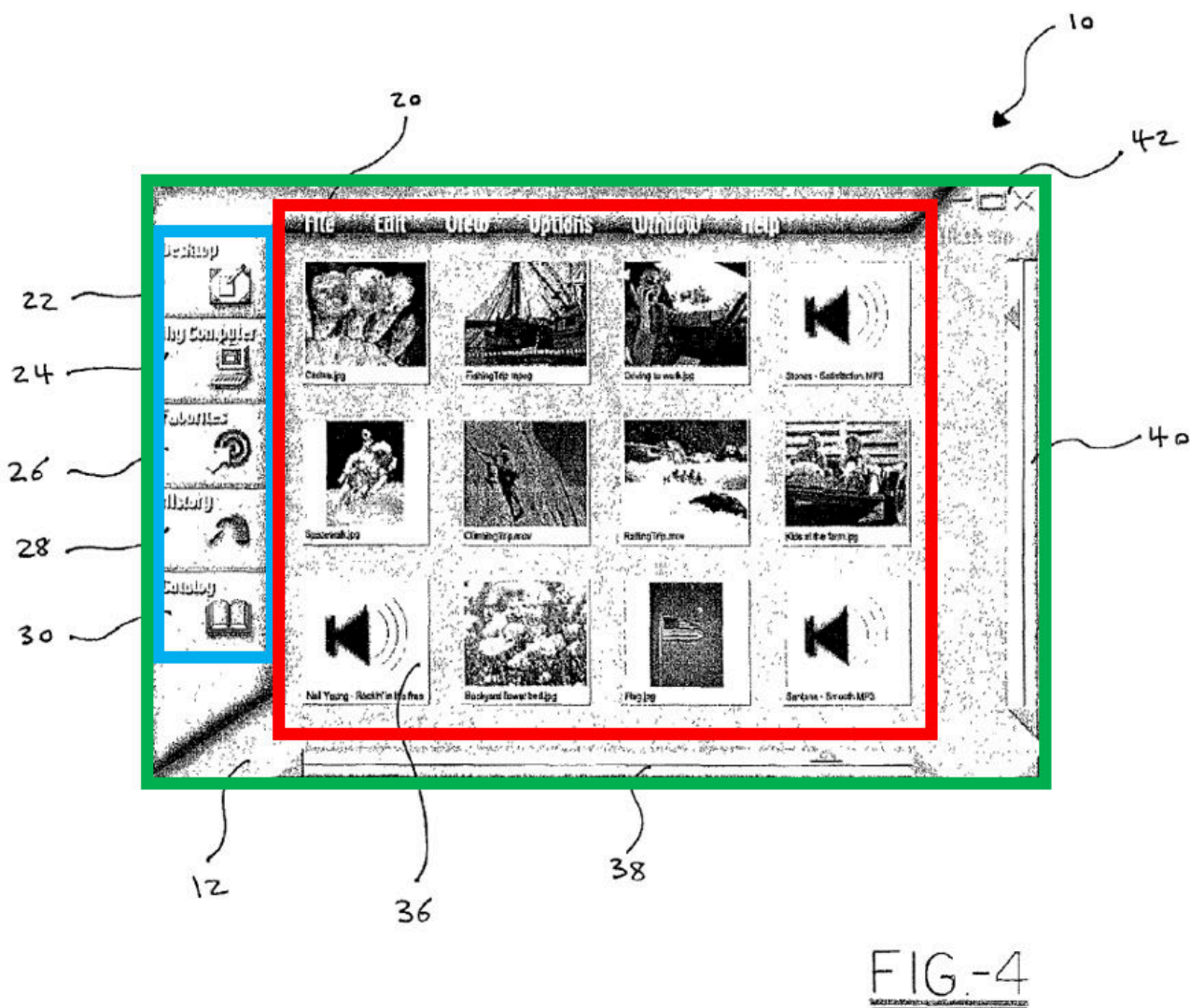
[1.e.i] wherein, when a first group of video data is selected in the menu display by specifying a position of a character corresponding to the first group of video data, the controller controls so that a first group of thumbnails corresponding to the first group of video data is displayed

206. 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 data, the controller controls so that a first group of thumbnails corresponding to the first group of video data is displayed. LG-1004, [0040], [0042]-[0047] (discussing button displays, such as “Favorites,” “History,” and “Catalog”), [0048]-[0050], FIGS. 7-12, 14, 16.

207. Kaplan describes button displays, such as “Favorites,” “History,” and “Catalog,” which are shown, for example, in Figures 4-12. More specifically, Kaplan explains that, when a user selects a first group of video data (e.g., “Favorites” or “History”) in a menu display interface by “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 data (circled in red below). LG-1004, [0040].

208. Figure 4 of Kaplan is provided below. In Figure 4, the user interface 12 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;

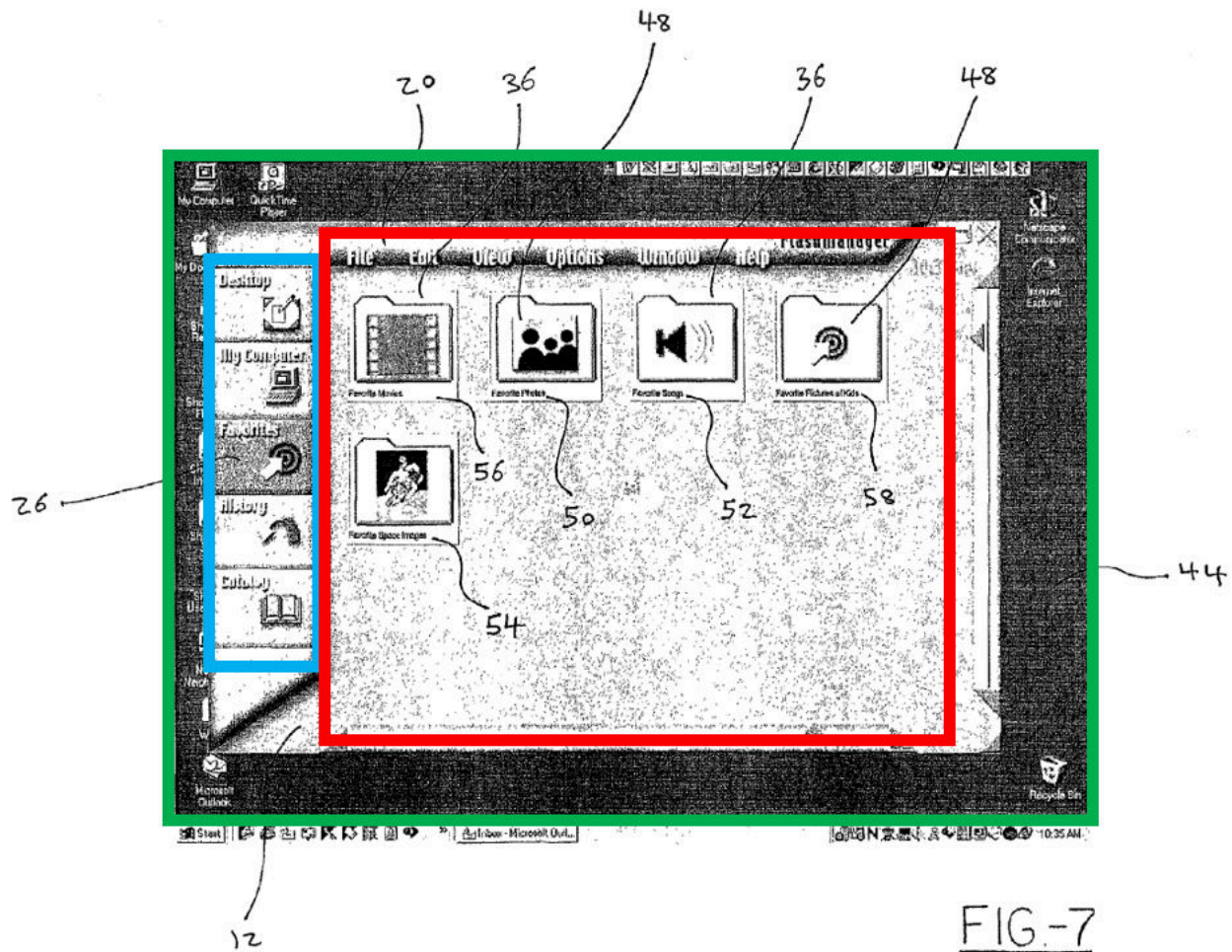
see also id., FIGS. 2, 5-12, 14, 16, 17 (each illustrating an interface with a similar layout).



LG-1004, FIG. 4 (annotated)

209. The first area (blue) is configured to display at least a first group of video data. LG-1004, FIGS. 2, 4-12, 14, 16-17. The second area is configured to display thumbnails corresponding to video data recorded on the recording medium by the recording unit for a given, selected group of video data. 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 data, the corresponding thumbnails for the associated group of video data are shown in the second area.



LG-1004, FIG. 7 (annotated)

210. 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 '072 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 data).

211. 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.e.ii] in a state that an order of the first group of thumbnails is editable,

212. Kaplan discloses or renders obvious that the first group of thumbnails is displayed a state in which an order of the first group of thumbnails is editable. LG-1004, [0040], [0048]-[0049].

213. At a high level, Kaplan describes its user interface as allowing user interaction and modification. The user interface can display “a number of containers 48, which each include a thumbnail 36 that displays an image representation of the category of multimedia content stored by the user in the particular container 48,” where the “thumbnails 36 allow users to easily determine what multimedia content is stored in which container 48, making accessing the multimedia content intuitive and simple for even the least technically inclined users.” LG-1004, [0047]. Kaplan explains, for example, that a user can add content (thumbnails) to folders (containers) and change the appearance of the thumbnails, so the content is user-editable, including through “drag and drop” manipulation of thumbnails. *Id.*, [0048]-[0049]. “[T]o store multimedia content within a predetermined container 48, the user simply uses the ‘drag and drop’ feature provided by the computer and mouse.” *Id.*, [0048].

214. Kaplan further describes its interface as including “operational options that correspond to common features of the Windows operating system.” *Id.*, [0040]. Indeed, a POSITA would have understood that the ability to sort and edit

the order of displayed thumbnails was available in Windows by the Critical Date. LG-1010, 32. For example, Windows 95, which was released well before the Critical Date, offered “[f]lexible and customizable” Windows Explorer, in which “users can view folder contents in several ways, including large icon, small icon, list, and details views.” *Id.* Additionally, the Windows 95 operating system further allowed the contents of folders to be “easily [] sorted by name, size, type, and modification date by selecting the column title.” *Id.* Indeed, this feature was ubiquitous in well known operating systems, such as Windows operating systems, well before the Critical Date. *See, e.g., id.*

215. To the extent it is argued that Kaplan alone does disclose this element, it was well known by the Critical date to allow a user to edit the order of thumbnails. *See, e.g.,* LG-1010, 32. For instance, Bryant describes a user interface that “includes sort options that are selected using a sort items text box 844 and a pull-down arrow icon 846 to select a desired sort option from a list, including sort by date, caption, or keyword.” LG-1005, [0094]; *see also* §VIII.B.i (discussion of Element [1.e.ii]). Horn, for example, describes a “catalog database structure” where object’s properties are stored, including “certain information such as the property name, whether the property is a sortable or searchable property, the order of sorting, the property’s data type, whether changing the property should notify other objects, the B-Tree itself, and so on.” LG-1021, [0235]; *see also*

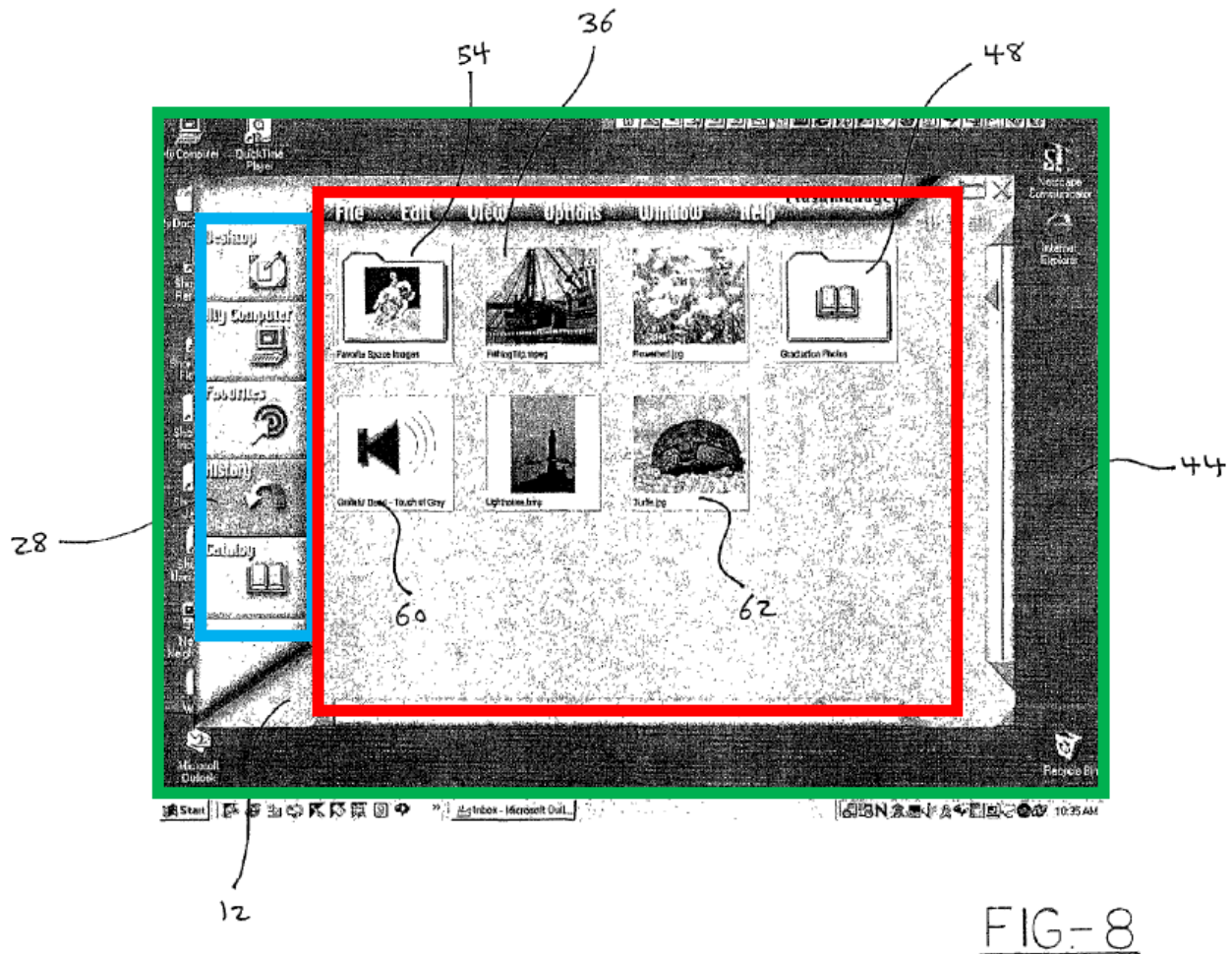
§VIII.G.i (discussion of Element [1.e.ii]). In another example, Bolnick describes a “display arrangement system and method” where a “Sort By field 88 specifies whether graphical representations associated with a frame will be arranged within the frame in accordance with a designated sorting method from a set of sorting methods” and an “Order field 90 specifies whether a sorting method designated in the Sort By field 88 will be applied to sort the icons or minimized windows in ascending or descending order.” LG-1030, Abstract, 9:61-67, 10:14-20. Bolnick explains that “[w]hen both grouping and sorting properties are specified for a frame, the objects for a frame are first grouped, then sorting is applied within the groups as a secondary ordering key.” *Id.*, 10:14-20.

[1.f.i] wherein, 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 data, the controller controls so that a second group of thumbnails corresponding to the second group of video data is displayed

216. Kaplan discloses or renders obvious that, wherein, 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 data, the controller controls so that a second group of thumbnails corresponding to the second group of video data is displayed. 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 data (circled in red below). *Id.*

217. 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 data, the corresponding thumbnails for the associated group of video data are shown in the second area.



LG-1004, FIG. 8 (annotated)

218. 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.f.ii] in a state that an order of the second group of thumbnails is editable,

219. *See* discussion of Element [1.e.ii].

[1.g] wherein, even if one video data stored on the recording medium included in both the first group of video data and the second group of video data is

deleted from the first group of video data, the controller controls so that the one video data continues to be included in the second group of video data and a thumbnail corresponding to the one video data is displayed as one of the second group of thumbnails when the second group of thumbnails is displayed.

220. Kaplan discloses or renders obvious wherein, even if one video data stored on the recording medium included in both the first group of video data and the second group of video data is deleted from the first group of video data, the controller controls so that the one video data continues to be included in the second group of video data and a thumbnail corresponding to the one video data is displayed as one of the second group of thumbnails when the second group of thumbnails is displayed. 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.

221. 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).

222. With indexed database file and pointers, the groups of video data 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.

223. A POSITA would have understood from Kaplan's description of its indexing and use of multiple pointers that, even if one video data recorded on the recording medium included in both the first group of video data and the second group of video data is deleted from the first group of video data, the one video data continue to be included in the second group of video data. With its use of multiple pointers to a single, stored file: (1) video data recorded on a recording medium can be included in multiple groups (e.g., first and second groups); and (2), if video data 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 data 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.

224. 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.

225. 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 6

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

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

[6.a] *a recording medium to record a plurality of video data;*

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

[6.b] *a reproducer configured to reproduce selected video data read out from the recording medium; and*

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

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

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

[6.d.i] *wherein, 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 data, a first group of thumbnails corresponding to the first group of video data is displayed on the display unit

230. See discussion of Element [1.e.i].

[6.d.ii] in a state that the order of the first group of thumbnails is editable,

231. See discussion of Element [1.e.ii].

[6.e.i] wherein, 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 data, a second group of thumbnails corresponding to the second group of video data is displayed on the display

232. See discussion of Element [1.f.i].

[6.e.ii] in a state that the order of the second group of thumbnails is editable, and

233. See discussion of Element [1.f.ii].

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

234. See discussion of Element [1.g].

iii. Claim 11

[11.pre] An information processing method comprising:

235. See discussion of Element [1.pre].

[11.a] recording, by a recording unit, a plurality of video data on a recording medium;

236. See discussion of Element [1.a].

[11.b] outputting a menu display for a user to select one group of video data among a plurality of groups of video data by specifying a position of a character corresponding to the one group of video data;

237. See discussion of Element [1.b].

[11.c] reproducing selected video data read out from the recording medium;

238. See discussion of Element [1.c].

[11.d.i] controlling display, 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 data, a first group of thumbnails corresponding to the first group of video data

239. See discussion of Elements [1.d]-[1.e.i].

[11.d.ii] in a state that the order of the first group of thumbnails is editable,

240. See discussion of Element [1.e.ii].

[11.e.i] controlling to display, 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 data, a second group of thumbnails corresponding to the second group of video data

241. See discussion of Elements [1.d], [1.f.i].

[11.e.ii] in a state that the order of the second group of thumbnails is editable,

242. See discussion of Element [1.f.ii].

[11.f] wherein, when one video data recorded on the recording medium that is included in both the first group of video data and the second group of video data is deleted from the first group of video data, the controller continues to include the one video data in the second group of video data, and a thumbnail corresponding to the one video data is displayed as one of

the thumbnails of the second group of thumbnails when the controller controls to display the second group of thumbnails.

243. See discussion of Element [1.g].

iv. Claim 16

[16.pre] An information processing system comprising:

244. See discussion of Element [1.pre].

[16.a] a recording medium configured to record a plurality of video data ;

245. See discussion of Element [1.a].

[16.b] a reproducer configured to read video data from the recording medium;

246. See discussion of Element [1.c].

[16.c] a display; and

247. See discussion of Element [1.b].

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

248. See discussion of Element [1.d].

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

249. See discussion of Element [1.b].

[16.f.i] upon selection of a character corresponding to a first group of video data in the menu display by specifying a position of the character corresponding to the first group of video data, control the display to display a first group of thumbnails corresponding to the first group of video data

250. See discussion of Element [1.e.i].

[16.f.ii] in a state that the order of the first group of thumbnails is editable, and

251. See discussion of Element [1.e.ii].

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

252. See discussion of Element [1.f.i].

[16.g.ii] in a state that the order of the second group of thumbnails is editable,

253. See discussion of Element [1.f.ii].

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

254. See discussion of Element [1.g].

v. Claim 17

[17.a] The information processing system according to claim 16, wherein upon display of the first group of thumbnails on the display, the controller controls to display a first character corresponding to the first group of video data in a first area, and

255. See discussion of Element [3.a] (Ground 2B).

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

256. See discussion of Element [3.b] (Ground 2B).

vi. Claim 18

[18.a] The information processing system according to claim 17, wherein upon display of the first group of thumbnails on the display, the controller controls to display the first group of thumbnails in a second area, the second area being different from the first area, and

257. See discussion of Element [4.a] (Ground 2B).

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

258. See discussion of Element [4.b] (Ground 2B).

vii. Claim 19

[19] The information processing system according to claim 18, wherein, upon deletion of the one video data from the first group of video data, the controller removes the one video data from the first group of video data without instructing the deletion of the one video data recorded on the recording medium.

259. See discussion of Claim [5] (Ground 2B).

D. Ground 2B: Claims 2-5, 7-10, and 12-15 are obvious over Kaplan in view of Sporer

i. Kaplan-Sporer

260. As discussed above, Kaplan recognizes a need for improved ways in which users can “keep track of and organize their computer files containing multimedia content.” LG-1004, [0002]-[0003]; *see* §VIII.A.ii. In response, Kaplan provides a “multimedia management system for storing, manipulating, and displaying multimedia content” that “provides users with a simple and intuitive method and computer program for reviewing multimedia content, which can include digital video.” LG-1004, [0004]. Kaplan explains that its system “is particularly well suited for use with digital cameras” or other “interface devices that allow video tape images to be digitized and downloaded to computers.” *Id.*, [0058]. Kaplan further explains that its system “can be implemented on ... a personal computer, preferably utilizing” a Windows operating system. *Id.*, [0037]. However, Kaplan does not include details as to how one would implement the system so that various types of multimedia, including video files described in Kaplan, are input from external video devices to a computer. Therefore, a POSITA would have naturally looked to other references available well before the Critical Date that describe such functionality and the components that provide that functionality. Sporer (LG-1029) is one such example.

261. Like Kaplan, Sporer teaches a computer system that stores, processes, and plays back multimedia files and can work with external video devices. LG-1029, Abstract, 4:4-10, FIG. 1. In particular, Sporer explains that it is “related

to computer systems which process motion video information represented as sequences of digital still images in a computer data file,” and that “[s]uch processing includes capture, playback and manipulation of the motion video information.” *Id.*, 4:4-10, FIG. 1. With reference to Figure 1 (below), for example, Sporer describes its “video processing circuit 22 ... in combination with an example computer system with which it may be used.” LG-1029, 3:56-59. The computer system “includes an audio/video input/output system 38 through which analog audio and digital video information are provided,” which “can be connected to receive audio and video information input, for example, from a camcorder 40.” *Id.*, 4:4-10.

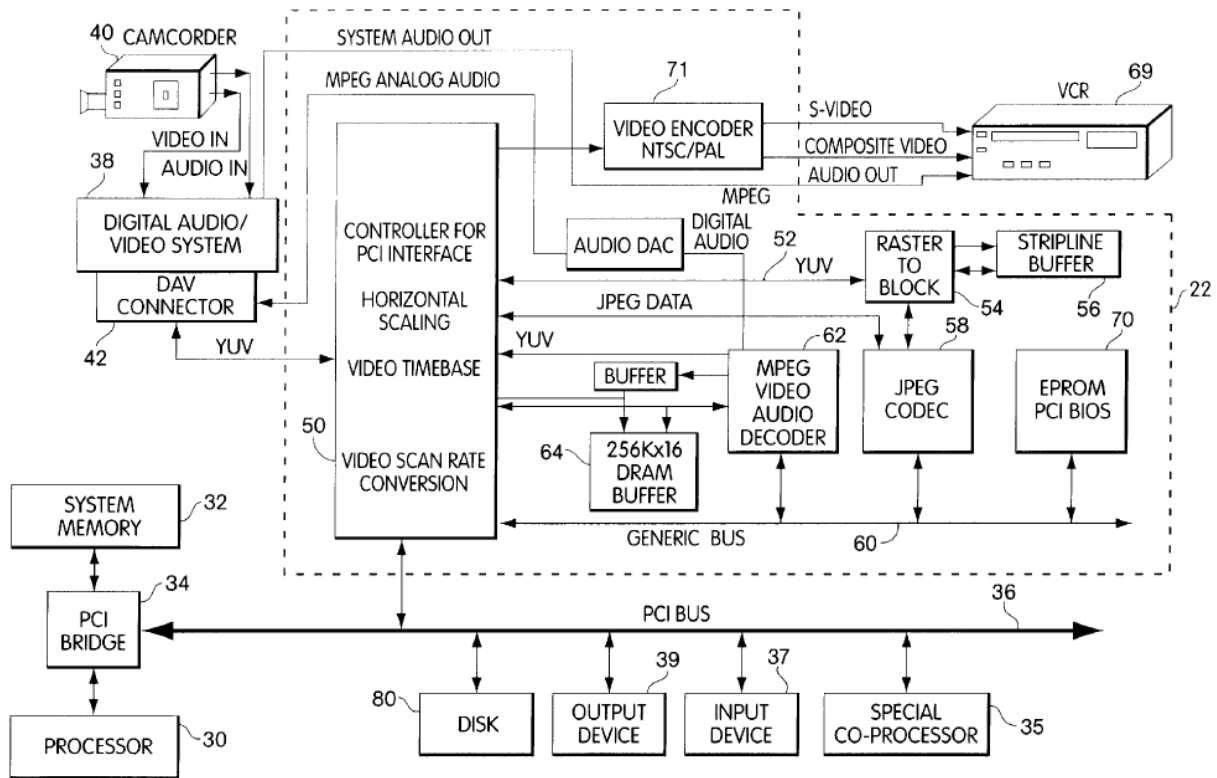


Fig. 1

LG-1029, FIG. 1

262. Sporer further recognizes that “computer systems ... for capturing motion video information as a computer data file including data representative of a sequence of several digital still images,” where such “digitized data is often compressed, using common compression standards such as MPEG (Motion Picture Experts Group) and motion-JPEG (Joint Photographers Expert Group) compression.” LG-1029, 1:17-23. Specifically, while discussing its “video processing circuit 22,” Sporer describes storing and processing MPEG format data by using, among other components, “a video and audio encoder/decoder (codec) 62 for encoding and decoding MPEG format video and audio,” components that

would have been well known to a POSITA before the Critical Date. LG-1029, 5:59-6:8.

263. To the extent that Kaplan does not explicitly describe these components, a POSITA would have found obvious integration of video processing circuit, such as the video processing circuit of Sporer, in Kaplan in order to enhance Kaplan's system "for use with digital cameras" or other "interface devices that allow video tape images to be digitized and downloaded to computers." LG-1004, [0058]; *see also* LG-1004, [0037]. In particular, including video processing circuitry, as Sporer teaches, in Kaplan's system would enable the Kaplan-Sporer combination system to "capture full-rate motion video information" and "playback full-rate motion video" by "using the system memory of a computer as a data buffer for holding compressed video data from the circuit." LG-1029, 3:66-4:5. A POSITA would have been motivated, for example, to include in Kaplan's system, "a video and audio encoder/decoder (codec) 62 for encoding and decoding MPEG format video and audio," as Sporer describes, where Kaplan already describes these types of files as being transferred to, stored, and played on its computer. LG-1029, 6:6-8; LG-1004, [0050] ("display images representing movies saved in ... MPEG multimedia file formats"); *see also* LG-1029, 5:59-6:17. Specifically, Kaplan explains that "thumbnails 80, 82, and 84 display images representing movies saved in the AVI and MPEG multimedia file formats." LG-1004, [0050].

A POSITA would have understood that Sporer's "video and audio encoder/decoder (codec) 62 for encoding and decoding MPEG format video and audio" would allow the Kaplan-Sporer system to process such MPEG files.

264. A POSITA would have found it obvious to include a video processing circuit, as Sporer teaches. This circuitry would include, among other components, an encoder that receives video data input from external devices (e.g., Kaplan's camcorder) and processes that data for storage. Kaplan teaches transferring videos and images from external devices (e.g., digital cameras and interface devices that allow video tape images to be transferred to computers), where files are "downloaded to computers." LG-1004, [0058]. A POSITA would have understood that, in the combination device, input video data from the external devices would be processed (e.g., encoded) using video processing circuitry, as Sporer teaches, and then stored in Kaplan's recording medium ("hard disks, flash memory cards, CD-ROMs, optical storage devices, or magnetic storage devices"), as both Sporer and Kaplan teach. LG-1004, [0034]; LG-1029, 4:66-5:10, 5:59-6:37, 11:50-12:7. Indeed, like Kaplan, Sporer describes various storage mechanisms for storing video data. LG-1029, 4:66-5:10 ("a computer readable and writable non-volatile recording medium 80"; "The disk should have sufficient size to hold the video information to be edited"), 5:59-6:37, 11:50-12:7 ("The video information in the system memory is then copied to disk into a data file").

265. Combining the teachings of Kaplan and Sporer would have merely involved combining prior art elements—for example, a multimedia management system per Kaplan and components (e.g., encoder, decoders, codecs) for processing certain types of input multimedia data per Sporer—according to known methods to yield predictable results. A POSITA would have been motivated to combine the teachings of Kaplan and Sporer to realize the implementation details of Sporer for receiving and processing video data, which are likely present but not explicitly described in Kaplan, which the video data is provided to a computer from external devices, as Kaplan describes. For example, a POSITA would have been motivated to include video codecs, such as an MPEG codec, for encoding video data received from external devices (e.g., camcorder or other interface devices) into a format that can be played back on Kaplan’s computer. Such video codecs would allow Kaplan’s computer to “display images representing movies saved in ... MPEG multimedia file formats.” LG-1004, [0050]. Indeed, a POSITA would have understood that video codecs allow for processing so that video files can be compressed and displayed. *See, e.g.*, LG-1031, [0077] (“When show is encoded, it is converted to a compressed format suitable for storage or transmission; when it is decoded it is converted to a non-compressed (raw) format suitable for presentation.”).

266. A POSITA would have had a reasonable expectation of success implementing the combination given that Kaplan explicitly teaches displaying “MPEG multimedia file formats.” Video processing circuitry, which includes an encoder, as taught by Sporer would merely offer a means or mechanism for encoding and decoding Kaplan’s “MPEG multimedia file[s].” A POSITA would further have had a reasonable expectation of success in the combination given that both Kaplan and Sporer explicitly describe use of the same video format—MPEG.

267. The combination of Kaplan and Sporer would have been predictable and foreseeable because Kaplan and Sporer disclose computing systems that can store, process, and play back multimedia files from external video devices (LG-1004, [0004], [0037], [0058]; LG-1029, Abstract, 4:4-10, FIG. 1) and both describe the use of MPEG files (LG-1004, [0050]; LG-1029, 5:59-6:17). The combination of Kaplan and Sporer would also have been predictable and foreseeable because the combination of Kaplan and Sporer merely involves incorporating known features that are explicitly disclosed by Sporer and would have been understood by a POSITA as likely present, but not explicitly disclosed by Kaplan. The combination is predictable, at least in part, because elements of the combined system would each perform similar functions they had been known to perform prior to the combination. For example, the computer of Kaplan would still perform the same functions, including storing, manipulating, and displaying

multimedia content and receiving such content from external devices, as it did prior to the combination with Sporer.

ii. Claim 2

[2] The information processing apparatus according to claim 1, further comprising an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder.

268. The Kaplan-Sporer combination renders obvious an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder. LG-1004, [0034], [0050], [0058]; LG-1029, 6:6-8, FIG. 1; §VIII.A.iv, §VIII.D.i.

269. Kaplan describes a user interface that displays, among other things, “thumbnails 80, 82, and 84,” which “display images representing movies saved in the AVI and MPEG multimedia file formats.” LG-1004, [0050]. Sporer describes a system that includes “a video processing circuit” with “a video and audio encoder/decoder (codec) 62 for encoding and decoding MPEG format video and audio.” LG-1029, 6:6-8, FIG. 1.

270. As discussed in §VIII.D.i, a POSITA would have found it obvious to include a video processing circuit, as Sporer describes, which includes an encoder that receives video data input from external devices, such as Kaplan’s camcorder or the like. §VIII.D.i. Kaplan explains that videos and images are transferred from

external devices, such as digital cameras and interface devices that allow video tape images to be transferred to computers, where files are “downloaded to computers.” LG-1004, [0058]. As discussed in §VIII.D.i, a POSITA would have understood that, in the combination of Kaplan and Sporer, input video data from the external devices would be processed (e.g., encoded) using video processing circuitry, as Sporer teaches, and the processed data would then be stored in Kaplan’s recording medium (“hard disks, flash memory cards, CD-ROMs, optical storage devices, or magnetic storage devices”). LG-1004, [0034].

iii. Claim 3

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

271. 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.

272. 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.*

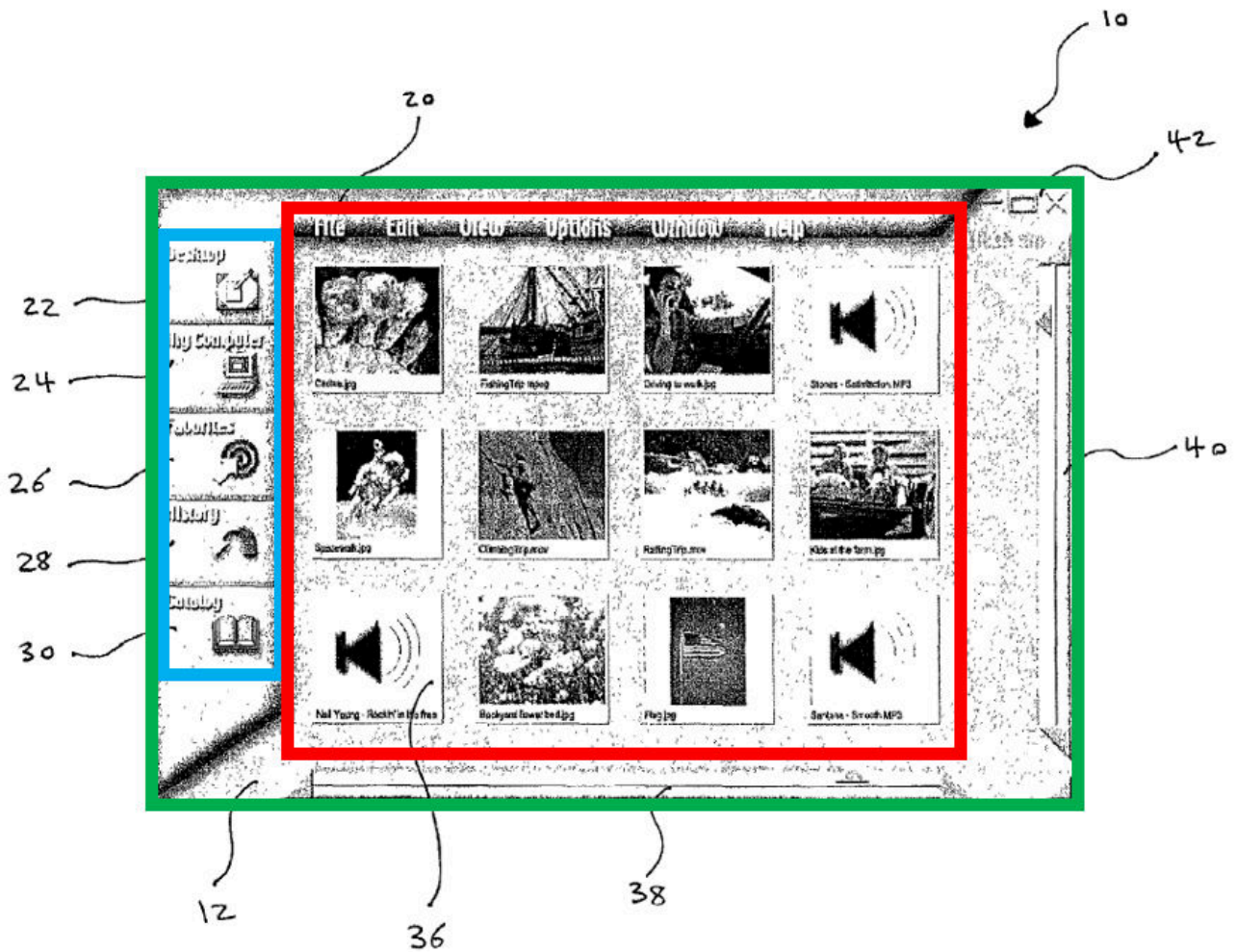


FIG.-4

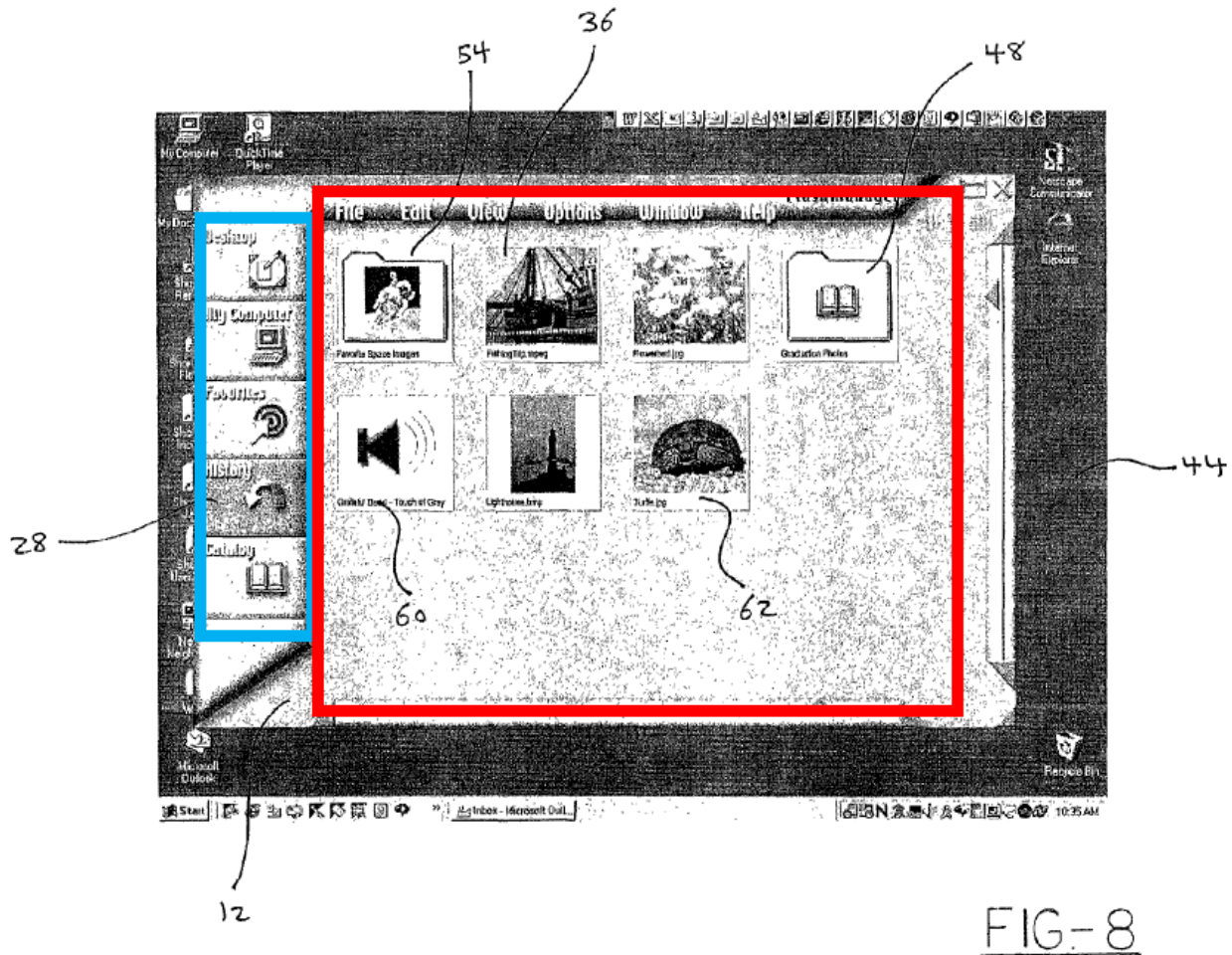
LG-1004, FIG. 4 (annotated)

273. 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

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

274. 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].

275. 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.



LG-1004, FIG. 8 (annotated)

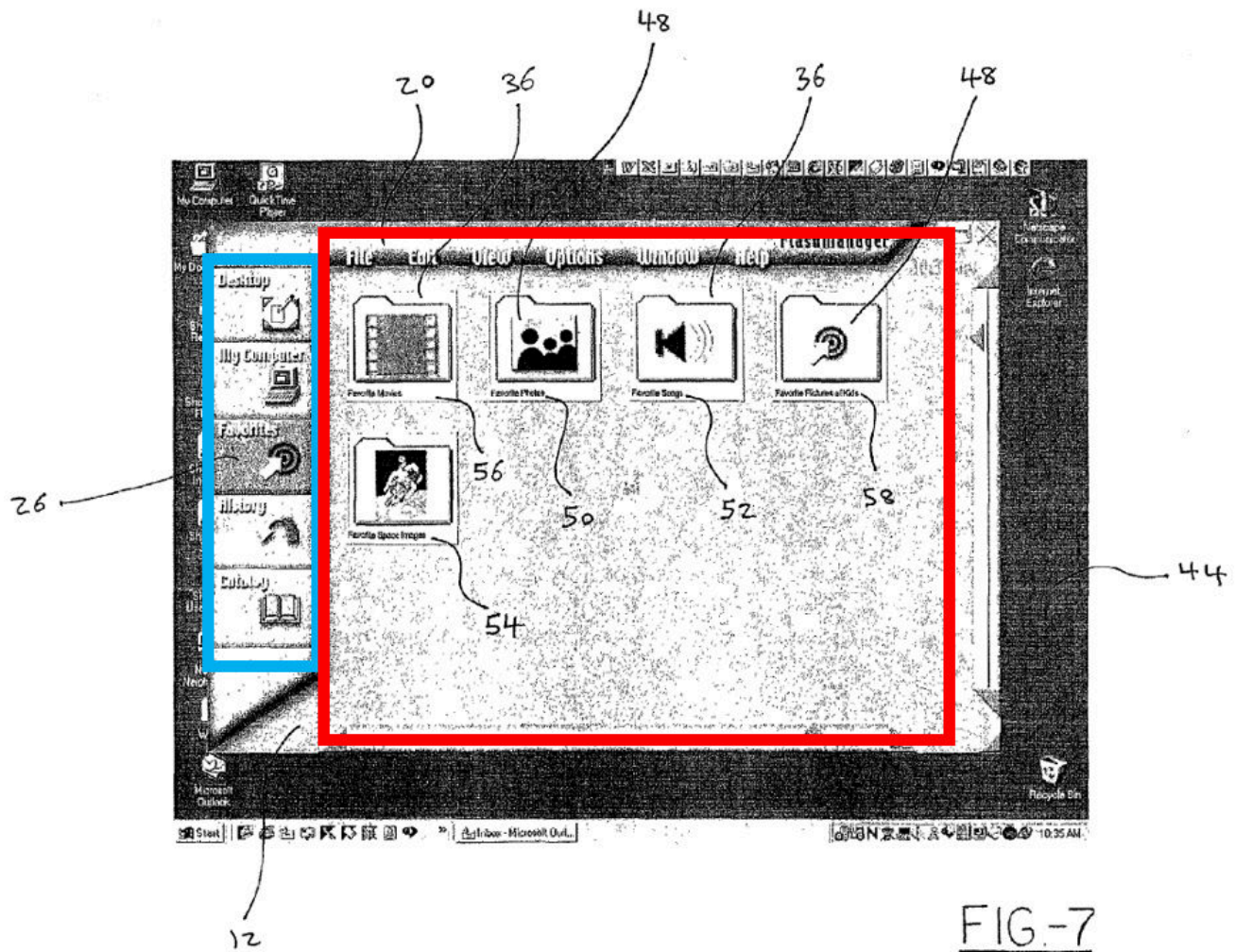
iv. Claim 4

[4.a] The information processing apparatus according to claim 3, 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, and

276. 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 [3.a]-[3.b].

277. 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)

[4.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.

278. 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 [4.a].

279. 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.

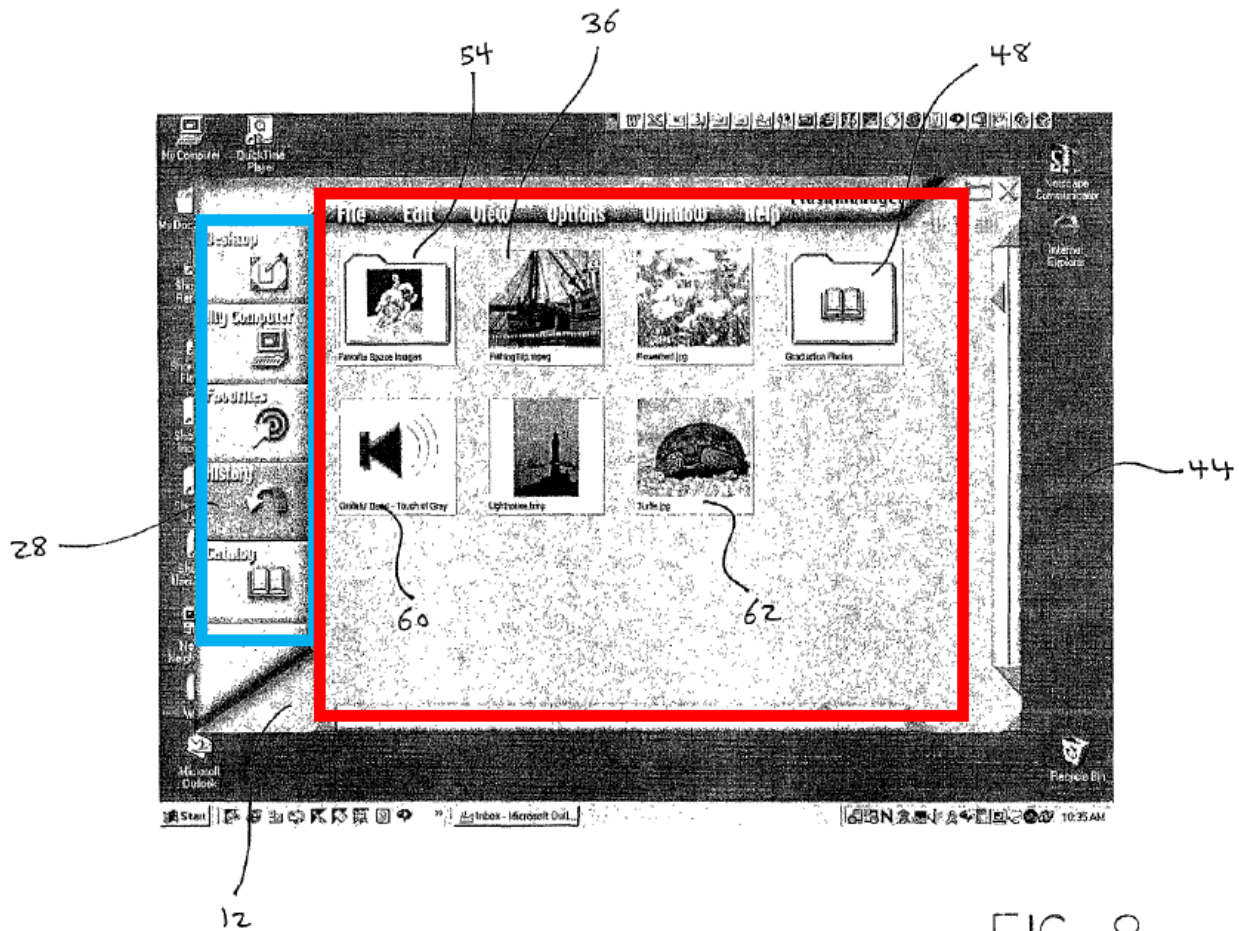


FIG-8

LG-1004, FIG. 8 (annotated)

v. Claim 5

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

280. 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].

281. 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.*

282. 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.

283. 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.

284. 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.

285. 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.

vi. Claim 7

[7] The information processing system according to claim 6, further comprising an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder.

286. *See* discussion of Claim [2].

vii. Claim 8

[8.a] The information processing system according to claim 7, wherein a first character corresponding to the first group of video data in a first area when the first group of thumbnails is displayed on the display, and

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

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

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

viii. Claim 9

[9.a] The information processing system according to claim 8, wherein the first group of thumbnails is displayed in a second area when the first group of thumbnails is displayed on the display, the second area being different from the first area, and

289. See discussion of Element [4.a].

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

290. See discussion of Element [4.b].

ix. Claim 10

[10] The information processing system according to claim 9, further comprising: a controller, wherein, when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

291. See discussion of Claim [5].

x. Claim 12

[12] The information processing method according to claim 11, further comprising encoding inputted video data with an encoder, and storing the plurality of video data encoded by the encoder on the recording medium.

292. See discussion of Claim [2].

xi. Claim 13

[13.a] The information processing method according to claim 12, further comprising: controlling, by the controller, to display a first character corresponding to the first group of video data in a first area when the first group of thumbnails is displayed; and

293. See discussion of Element [3.a].

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

294. See discussion of Element [3.b].

xii. Claim 14

[14.a] The information processing method according to claim 13, further comprising: controlling, by the controller, 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

295. See discussion of Element [4.a].

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

296. See discussion of Element [4.b].

xiii. Claim 15

[15] The information processing method according to claim 14, wherein, when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

297. See discussion of Claim [5].

E. Ground 3: Claims 1-19 are obvious over Bryant in view of Kaplan

298. 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 2A. See discussion of §§ VIII.B and VIII.C.

299. Just as a POSITA would have been motivated to supplement Kaplan with Bryant, per Grounds 4A and 4B, the converse is also true. That is, a POSITA would have been motivated to supplement the teachings of Bryant with those of Kaplan.

300. 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:

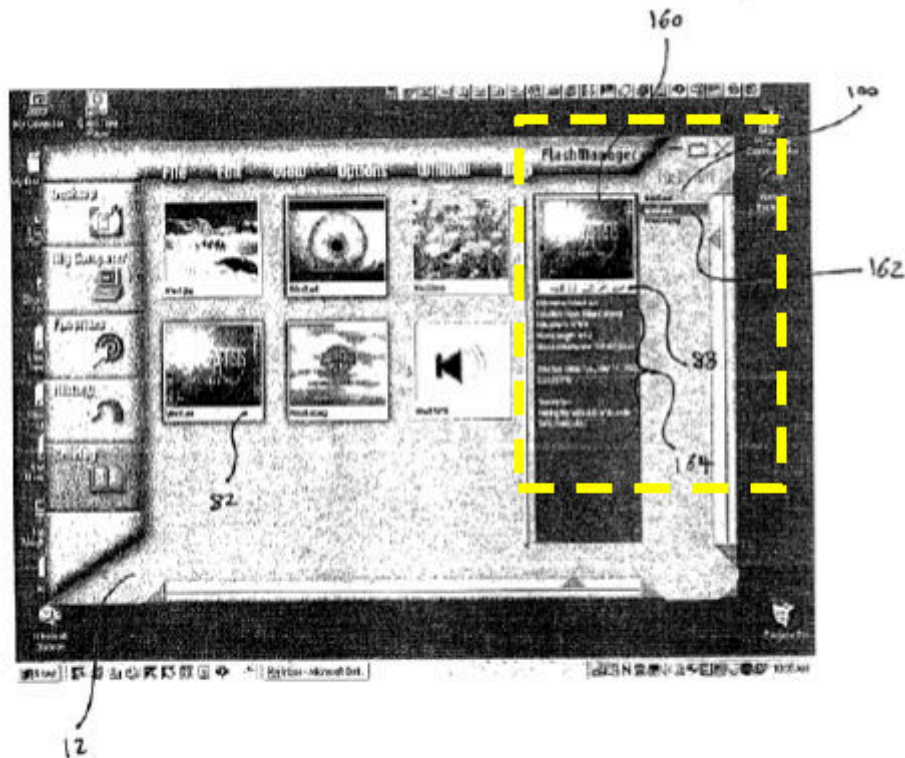


FIG.-16

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].

301. 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.

302. 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.

303. 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.

F. Grounds 4A and 4B: Claims 1, 6, 11, and 16-19 are obvious over Kaplan in view of Bryant, and claims 2-5, 7-10, and 12-15 are obvious over Kaplan in view of Bryant and Sporer

304. The combinations of Kaplan and Bryant and/or Kaplan-Sporer and Bryant disclose 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 Grounds 2A-2B. *See* discussion of §§ VIII.B, VIII.C, and VIII.D.

305. A POSITA would have been motivated to combine Kaplan and Bryant, and/or Kaplan-Sporer and Bryant, for at least two reasons.

306. 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.

307. 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.i]-[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]. In addition, Bryant explicitly teaches other user-customizable features, such as, for example, options for sorting thumbnails. LG-1005, [0094]. In particular, Bryant teaches a GUI screen that "includes sort options that are selected using a sort items text box 844 and a pull-down arrow icon 846 to select a desired sort option from a list, including sort by date, caption, or keyword" in addition to a "reverse order checkbox ... to reverse the display of the thumbnail images." *Id.* A POSITA would have included these sort options as one of the "functions associated with the user interface" in Kaplan. LG-1004, [0040].

Indeed, Kaplan describes its interface with reference to the “most popular operating system available today,” “Microsoft Windows,” and explains that its “interface for controlling functions of the multimedia management system [] include[s] operational options that correspond to common features of the Windows operating system.” *Id.* With its emphasis on user-customization and control, Bryant itself motivates the combination.

308. 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.

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

G. Ground 5A: Claims 1, 6, 11, and 16-19 are obvious over Horn

i. Claim 1

[1.pre] An information processing apparatus comprising:

310. 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.

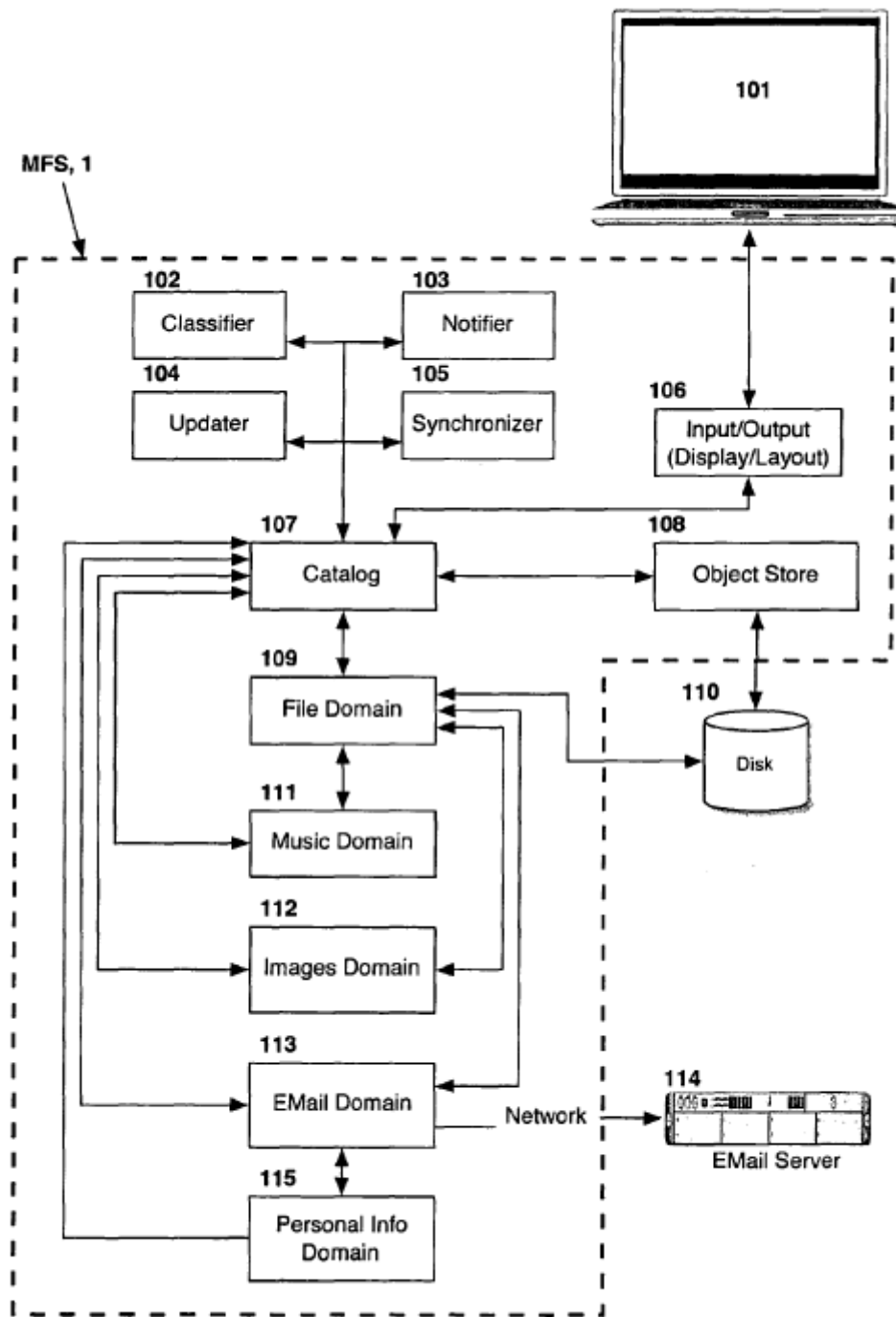


Figure 1

LG-1021, FIG. 1

[1.a] a recording medium to store a plurality of video data;

311. Horn discloses or renders obvious a recording medium to store a plurality of video data. 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.*

312. 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].

313. 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].

314. A POSITA would have understood that the “disk drive” or “hard disk” of Horn necessarily includes a circuitry (claim 11’s “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.

315. 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.

316. 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 data among a plurality of groups of video data by a

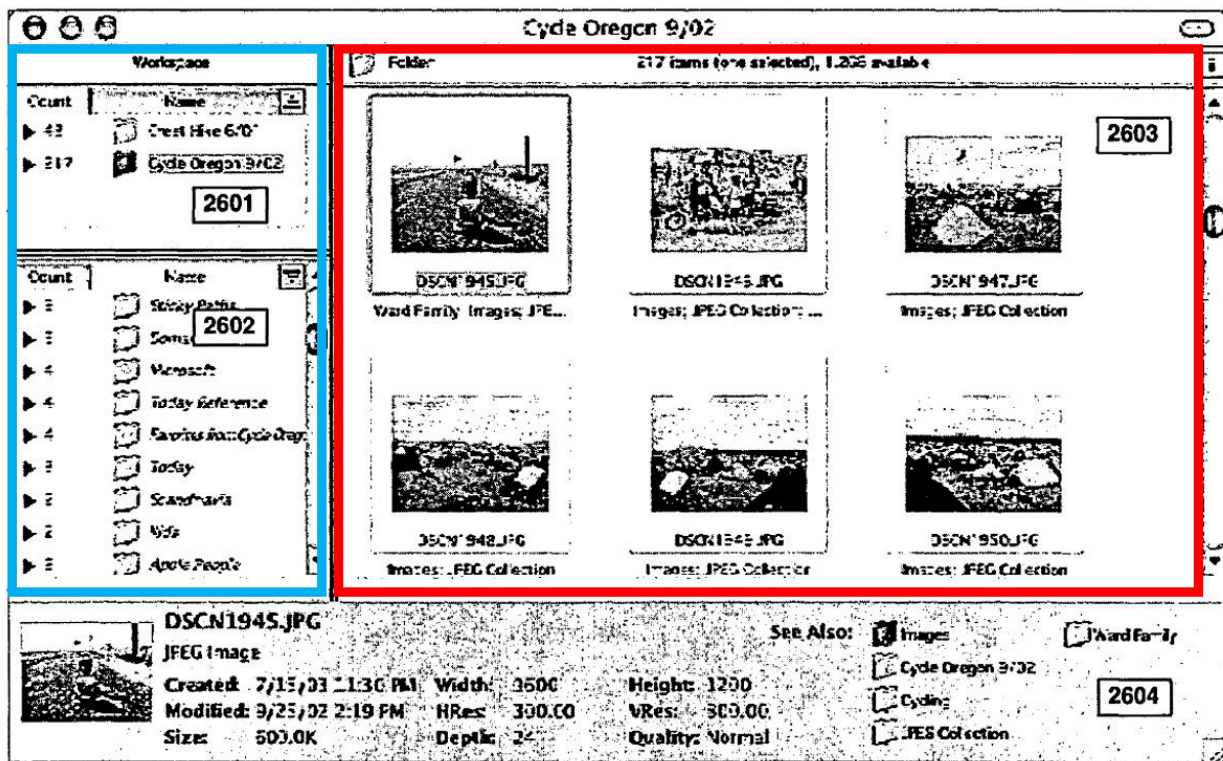
specifying position of a character corresponding to the one group of video data;

317. 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 data among a plurality of groups of video data by specifying a position of a character corresponding to the one group of video data. 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.*

318. 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.

319. 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 reproducer configured to reproduce the selected video data read out from the recording medium; and

320. Horn discloses or renders obvious a reproducer configured to reproduce the selected video data 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.

321. 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.

322. 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”).

323. A POSITA would have additionally understood that the “hard drive 110” of Horn necessarily includes a circuitry (“reproducer”), 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.

324. 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.

325. 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 (reproducer) 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,

326. 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.*

327. 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.i] wherein, 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 data, the controller controls so that a first group of thumbnails corresponding to the first group of video data is displayed

328. Horn 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 data, the controller controls so that a first

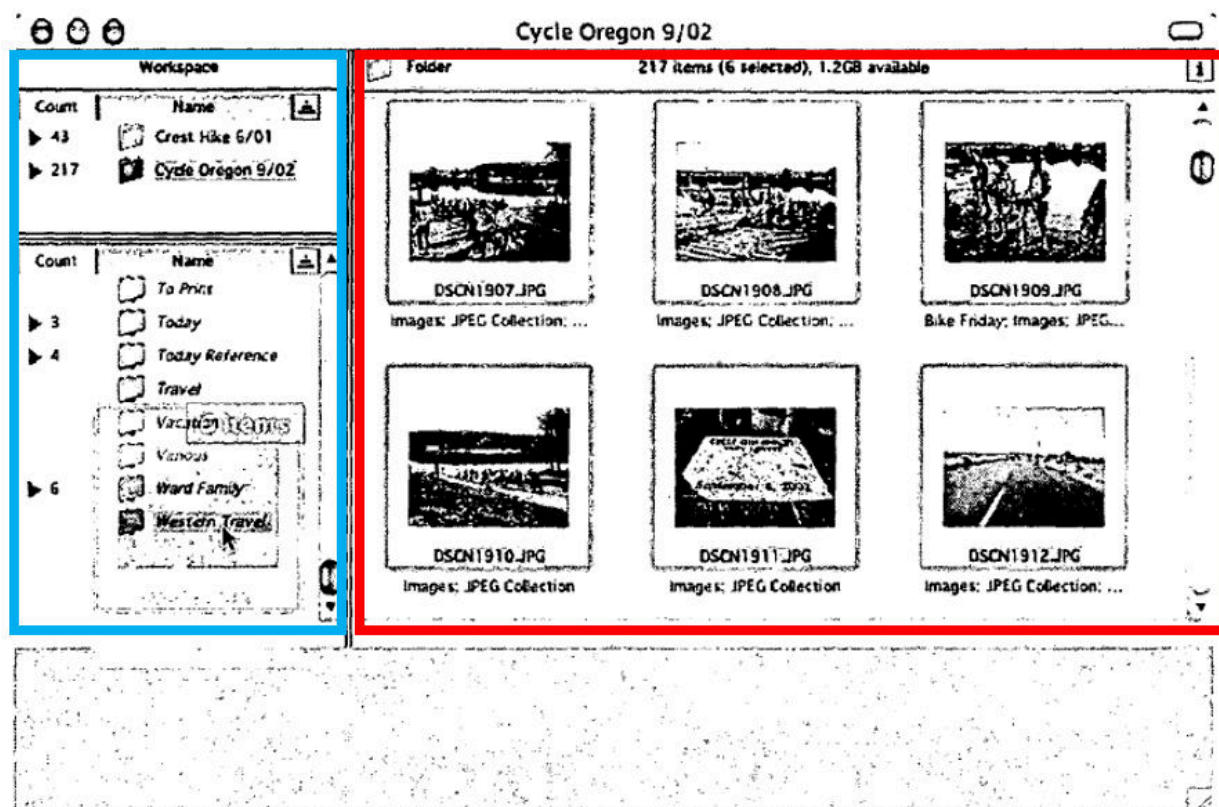
group of thumbnails corresponding to the first group of video data is displayed.

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 data (“Western Travel”), including video data, 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 so that a first group of thumbnails corresponding to the first group of video data is displayed in an area circled in red below in FIG. 30. *Id.*

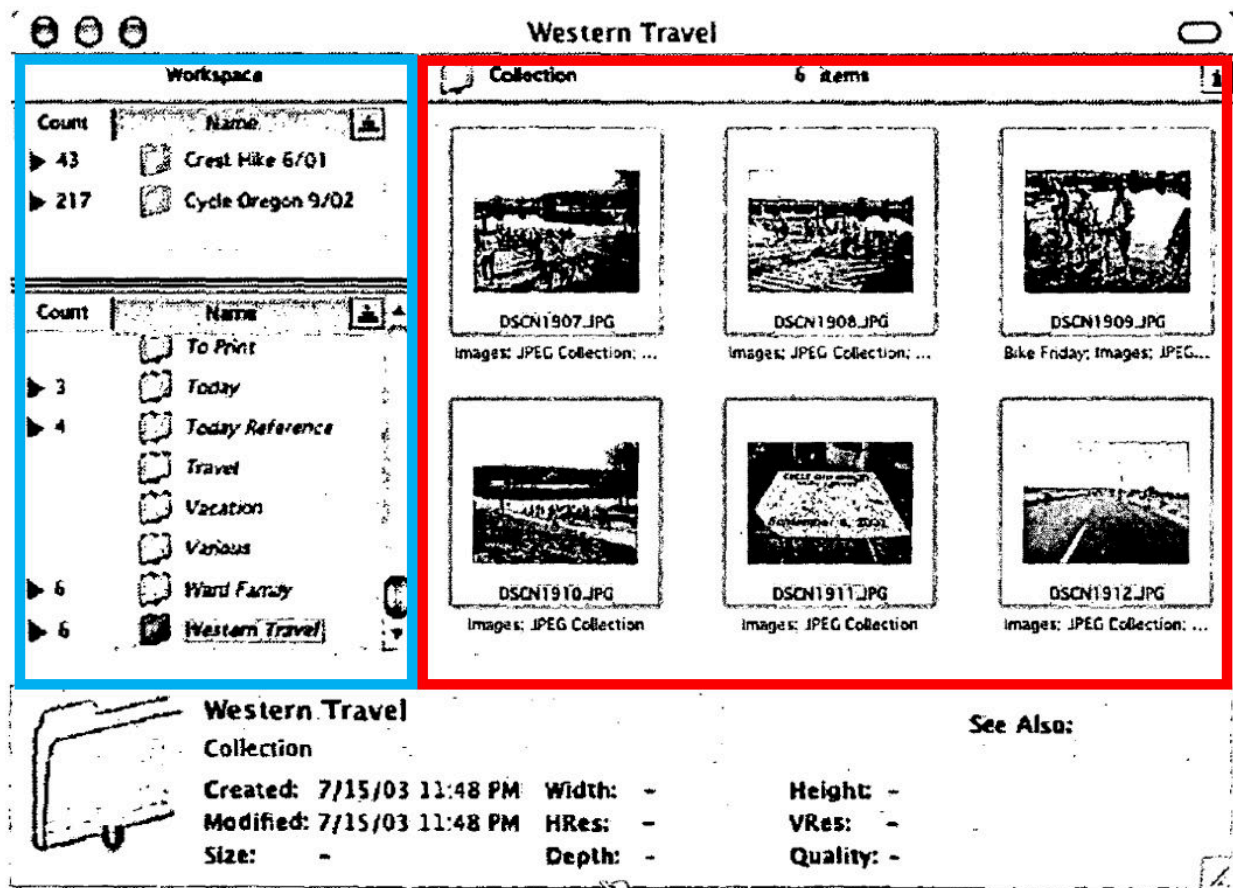
329. Horn explains that the “content pane” (circled red in FIG. 30 below) “dynamically displays the contents of whatever item is selected in the first two views.” LG-1021, [0156], FIGS. 26, 30. Therefore, when the first group, “Western Travel,” is selected, the thumbnails corresponding to the first group 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 Horn 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.e.ii] *in a state that an order of the first group of thumbnails is editable,*

330. Horn discloses or renders obvious that the first group of thumbnails is displayed a state in which an order of the first group of thumbnails is editable. LG-1021, [0152], [0235].

331. In particular, Horn explains that a user can “navigate [the] folder using the standard and traditional methods of disk navigation in graphical user interfaces,” including displaying “well-known icon and list views showing icons representing either the type of the file [] or a miniature “slide” view (thumbnail) of

the image itself.” LG-1021, [0152]. The thumbnails can be displayed with “properties of the object such as the object’s physical size, its image dimensions, the last modified date, and so on.” *Id.*

332. Horn also explains that its system “enables the user to organize all kinds of information, not merely simple files, through a drag-and-drop windows-and-icons software functionality, making it easy to organize objects and cross-reference them from place to place using a desktop-style interface.” LG-1021, [0050]. Horn explains that “clicking on the icon or list reference to an object in one collection window and dragging it to another collection window establishes a new link; the object is not accessible from both locations.” *Id.* That is, “rather than being duplicated in an object database, only the link metadata is placed in the catalog, with that catalog being updated for retrieval of the reference object from either collection.” *Id.* Thus, Horn explicitly discloses *spatial* arrangements – “Window and icon sizes and locations are maintained persistently, to preserve the user’s spatial arrangements.” *See* LG-1021, [0108]. So, if the user drags an icon to a particular spatial location (changing its order), Horn discloses that that spatial location will be preserved. *Id.* Thus, Horn discloses that the user can edit the order of the thumbnails.

333. Horn’s system also “provides additional features for viewing the images,” including “basic editing features.” LG-1021, [0152]. In the context of a

list view of items, Horn teaches that objects “may be sorted ascending or descending,” and that “the control (606) determines this, while clicking on the column headers determine the property on which to sort.” *Id.*, [0111]. Horn also generally explains, regardless of the type of view (e.g., list view, icon view, etc.), that objects can be “sorted by a variety of properties that are shared by most objects: by name, by date, by size, by count (for folders and other containers); and by kind.” *Id.*, [0113]. Thus, Horn provides further disclosure that the order of the thumbnails (e.g., in an icon view) can be editable by a user based on various sorting parameters. *Id.*

334. Moreover, while describing the implementation of its system, Horn explains that the “catalog database structure stores” an objects property values, including “whether the property is sortable or searchable property” and “the order of sorting.” *Id.*, [0235]. Thus, to the extent that it is argued that Horn does not explicitly teach editing the order of thumbnails, which it does, as discussed above, a POSITA would have found obvious allowing a user to sort the order of thumbnails displayed in the user interface.

335. To the extent it is argued that Horn alone does disclose this element, it was well known by the Critical date to allow a user to edit the order of thumbnails. *See, e.g.*, LG-1010, 32. For instance, Bryant describes a user interface that “includes sort options that are selected using a sort items text box 844 and a pull-

down arrow icon 846 to select a desired sort option from a list, including sort by date, caption, or keyword.” LG-1005, [0094]; *see also* §VIII.B.i (discussion of Element [1.e.ii]). Horn, for example, describes a “catalog database structure” where object’s properties are stored, including “certain information such as the property name, whether the property is a sortable or searchable property, the order of sorting, the property’s data type, whether changing the property should notify other objects, the B-Tree itself, and so on.” LG-1021, [0235]; *see also* §VIII.G.i (discussion of Element [1.e.ii]). In another example, Bolnick describes a “display arrangement system and method” where a “Sort By field 88 specifies whether graphical representations associated with a frame will be arranged within the frame in accordance with a designated sorting method from a set of sorting methods” and an “Order field 90 specifies whether a sorting method designated in the Sort By field 88 will be applied to sort the icons or minimized windows in ascending or descending order.” LG-1030, Abstract, 9:61-67, 10:14-20. Bolnick explains that “[w]hen both grouping and sorting properties are specified for a frame, the objects for a frame are first grouped, then sorting is applied within the groups as a secondary ordering key.” *Id.*, 10:14-20.

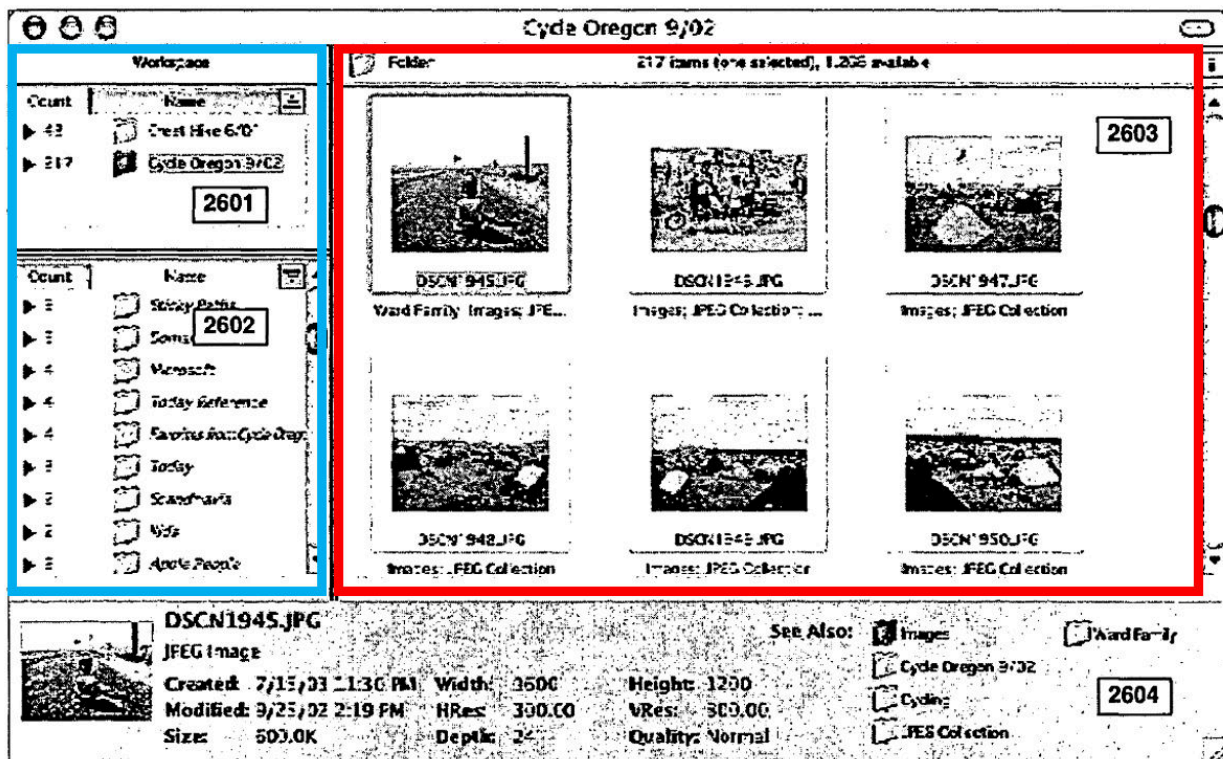
336. Since Horn describes providing “features for viewing the images,” including “basic editing features,” it would have been obvious to a POSITA for

Horn to include the well-known ability to edit the order of items in a list or display of thumbnails.

[1.f.i] wherein, 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 data, the controller controls so that a second group of thumbnails corresponding to the second group of video data is displayed

337. Horn discloses or renders obvious 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 data, the controller controls so that a second group of thumbnails corresponding to the second group of video data is displayed. *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 data (“Cycle Oregon 9/02”), including video data, 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 so that a second group of thumbnails corresponding to the second group of video data is displayed (circled in red below in FIG. 26). *Id.*

338. 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.f.ii] in a state that an order of the second group of thumbnails is editable,

339. See discussion of Element [1.e.ii].

[1.g] wherein, even if one video data stored on the recording medium included in both the first group of video data and the second group of video data is deleted from the first group of video data, the controller controls so that the one video data continues to be included in the second group of video data and a thumbnail corresponding to the one video data is displayed as one of the second group of thumbnails when the second group of thumbnails is displayed.

340. Horn discloses or renders obvious wherein, even if one video data stored on the recording medium included in both the first group of video data and the second group of video data is deleted from the first group of video data, the controller controls so that the one video data continues to be included in the second group of video data and a thumbnail corresponding to the one video data is displayed as one of the second group of thumbnails when the second group of thumbnails is displayed. 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.

341. 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.*

342. 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 6

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

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

[6.a] *a recording medium to record a plurality of video data;*

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

[6.b] *a reproducer configured to reproduce selected video data read out from the recording medium; and*

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

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

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

[6.d.i] *wherein, 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 data, a first group of thumbnails corresponding to the first group of video data is displayed on the display unit*

347. *See discussion of Element [1.e.i].*

[6.d.ii] *in a state that the order of the first group of thumbnails is editable,*

348. *See discussion of Element [1.e.ii].*

[6.e.i] *wherein, 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 data, a second group of thumbnails corresponding to the second group of video data is displayed on the display

349. See discussion of Element [1.f.i].

[6.e.ii] in a state that the order of the second group of thumbnails is editable, and

350. See discussion of Element [1.f.ii].

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

351. See discussion of Element [1.g].

iii. Claim 11

[11.pre] An information processing method comprising:

352. See discussion of Element [1.pre].

[11.a] recording, by a recording unit, a plurality of video data on a recording medium;

353. See discussion of Element [1.a].

[11.b] outputting a menu display for a user to select one group of video data among a plurality of groups of video data by specifying a position of a character corresponding to the one group of video data ;

354. See discussion of Element [1.b].

[11.c] reproducing selected video data read out from the recording medium ;

355. See discussion of Element [1.c].

[11.d.i] controlling display, 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 data, a first group of thumbnails corresponding to the first group of video data

356. See discussion of Elements [1.d]-[1.e.i].

[11.d.ii] in a state that the order of the first group of thumbnails is editable,

357. See discussion of Element [1.e.ii].

[11.e.i] controlling to display, 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 data, a second group of thumbnails corresponding to the second group of video data

358. See discussion of Elements [1.d], [1.f.i].

[11.e.ii] in a state that the order of the second group of thumbnails is editable,

359. See discussion of Element [1.f.ii].

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

360. See discussion of Element [1.g].

iv. Claim 16

[16.pre] An information processing system comprising:

361. See discussion of Element [1.pre].

[16.a] a recording medium configured to record a plurality of video data;

362. See discussion of Element [1.a].

[16.b] a reproducer configured to read video data from the recording medium;

363. See discussion of Element [1.c].

[16.c] a display; and

364. See discussion of Element [1.b].

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

365. See discussion of Element [1.d].

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

366. See discussion of Element [1.b].

[16.f.i] upon selection of a character corresponding to a first group of video data in the menu display by specifying a position of the character corresponding to the first group of video data, control the display to display a first group of thumbnails corresponding to the first group of video data

367. See discussion of Element [1.e.i].

[16.f.ii] in a state that the order of the first group of thumbnails is editable, and

368. See discussion of Element [1.e.ii].

[16.g.i] upon selection of a character corresponding to the second group of video data in the menu display by specifying a position of the character corresponding to the second group of video data, control the display to

display a second group of thumbnails corresponding to the second group of video data

369. See discussion of Element [1.f.i].

[16.g.ii] in a state that the order of the first group of thumbnails is editable,

370. See discussion of Element [1.f.ii].

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

371. See discussion of Element [1.g].

v. Claim 17

[17.a] The information processing system according to claim 16, wherein upon display of the first group of thumbnails on the display, the controller controls to display a first character corresponding to the first group of video data in a first area, and

372. See discussion of Element [3.a] (Ground 5B).

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

373. See discussion of Element [3.b] (Ground 5B).

vi. Claim 18

[18.a] The information processing system according to claim 17, wherein upon display of the first group of thumbnails on the display, the controller

controls to display the first group of thumbnails in a second area, the second area being different from the first area, and

374. See discussion of Element [4.a] (Ground 5B).

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

375. See discussion of Element [4.b] (Ground 5B).

vii. Claim 19

[19] The information processing system according to claim 18, wherein, upon deletion of the one video data from the first group of video data, the controller removes the one video data from the first group of video data without instructing the deletion of the one video data recorded on the recording medium.

376. See discussion of Claim [5] (Ground 5B).

H. Ground 5B: Claims 2-5, 7-10, and 12-15 are obvious over Horn in view of Sporer

i. Horn-Sporer

377. As discussed above, 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.” LG-1021, [0013]; *see* §VIII.A.iii. Horn describes “management of data objects including dynamic and automatic organization, linking, finding, cross-referencing, viewing and retrieval of multiple objects.” LG-1021, Abstract. Horn explains that its system allows for “organizing and retrieving images created with a digital camera and stored on the computer in individual image files” and generally discloses using its system for organizing all types of files, including “movies.” *Id.*, [0103] (“movies”), [0145]; *see also id.*, [0148], [0212]. Horn offers “a step-by-step description of a typical use of the inventive system” including “organizing and retrieving images created with a digital camera and stored on the computer in individual image files.” *Id.*, [0145]. However, Horn does not describe implementation details about how data—including images and movies—captured with a digital camera can be input from the digital camera to a computer with Horn’s metadata filing system. As such, a POSITA would have naturally looked to other references available well before the Critical Date that describe such functionality and the components that provide that functionality. Sporer is one such reference.

378. Much like Horn, Sporer teaches a computer system that stores, processes, and plays back multimedia files and can work with external video devices (e.g., camera). LG-1029, Abstract, 4:4-10, FIG. 1. In particular, Sporer explains that it is “related to computer systems which process motion video

379. Sporer recognizes that “computer systems ... for capturing motion video information as a computer data file including data representative of a sequence of several digital still images,” where such “digitized data is often compressed, using common compression standards such as MPEG (Motion Picture Experts Group) and motion-JPEG (Joint Photographers Expert Group) compression.” LG-1029, 1:17-23. In particular, Sporer describes storing and processing MPEG format data by using, among other components, “a video and audio encoder/decoder (codec) 62 for encoding and decoding MPEG format video and audio.” LG-1029, 5:59-6:8.

380. To the extent that Horn does not explicitly describe these components, a POSITA would have found obvious integration of video processing circuit, such as the video processing circuit of Sporer, in Horn in order to enhance Horn’s system for “organizing and retrieving images created with a digital camera.” LG-1021, [0145]. In particular, including video processing circuitry in Horn’s computer, as Sporer teaches, would enable the combination system of Horn and Sporer to “capture full-rate motion video information” and “playback full-rate motion video” by “using the system memory of a computer as a data buffer for holding compressed video data from the circuit.” LG-1029, 3:66-4:5. A POSITA would have been motivated, for example, to include in Horn’s system, “a video and audio encoder/decoder (codec) 62 for encoding and decoding MPEG format

video and audio,” as Sporer teaches, where Horn already describes “movies” as being stored and played on its computer. LG-1029, 6:6-8; LG-1021, [0103] (“movies ... stored and retrieved on a computer”); *see also* LG-1029, 5:59-6:17; §VIII.G.i (discussion of [1.c]).

381. A POSITA would have found it obvious to include a video processing circuit, as Sporer teaches, where that video processing circuitry would include, among other components, an encoder that receives video data input from external devices (e.g., Horn’s digital camera) and processes that data for storage. LG-1021, [0102]; LG-1029, 4:66-5:10, 5:59-6:37, 11:50-12:7. Horn teaches using its system for “organizing and retrieving images created with a digital camera and stored on the computer in individual image files.” LG-1021, [0145]. A POSITA would have understood that, in light of Horn’s discussion of using its system for various multimedia files, including “movies,” its system could similarly be used for “organizing and retrieving” movies (i.e., video data) created with a digital camera. *Id.*, [0103]. A POSITA would have understood that, in the combination device (“Horn-Sporer”), input video data from an external device (e.g., digital camera) would be processed (e.g., encoded) using video processing circuitry, as Sporer teaches, and then stored in Horn’s recording medium (hard drive 110), as both Sporer and Horn teach. LG-1021, Abstract, [0003], [0016], [0018], [0019], [0020], [0028], [0029], [0038], [0039], [0045], [0046], [0052], [0102], [0103], [0107]; LG-

1029, 4:66-5:10, 5:59-6:37, 11:50-12:7. Indeed, like Horn, Sporer describes various storage mechanisms for storing video data. LG-1029, 4:66-5:10 (“a computer readable and writable non-volatile recording medium 80”; “The disk should have sufficient size to hold the video information to be edited”), 5:59-6:37, 11:50-12:7 (“The video information in the system memory is then copied to disk into a data file”).

382. Combining the teachings of Horn and Sporer would have merely involved combining prior art elements—for example, a multimedia management system, as described in Horn, and components (e.g., codecs) for processing certain types of input multimedia data, as described in Sporer—according to known methods to yield predictable results. A POSITA would have been motivated to combine the teachings of Horn and Sporer to realize the implementation details (of Sporer) for receiving and processing video data an external device, as Horn describes. For example, a POSITA would have been motivated to include video codecs, such as an MPEG codec, for encoding video data (e.g., Horn’s movies) received from external devices (e.g., digital camera) into a format that can be played back on Horn’s computer. LG-1021, [0050]; *see also* LG-1031, [0077]. Specifically, a POSITA reading Horn would have found it obvious to include an encoder (e.g., Sporer’s MPEG codec) to be able to process movie files captured by an external digital camera and transferred to Horn’s computer such that those

movie files could be properly processed in a format for playback and storage, such that those movie files were useful and accessible on Horn's computer.

383. A POSITA would have had a reasonable expectation of success implementing the combination given that Horn explicitly teaches organizing and retrieving movies, and video processing circuitry, including an encoder, as taught by Sporer would merely offer a means for encoding and decoding such movie files. Such a means for encoding and decoding the movie files described in Horn would offer a mechanism for ensuring that those movie files could be processed (e.g., encoded) for properly playback and storage, thus making those files useful to a user (i.e., making them viewable for playback).

384. The combination of Horn and Sporer would have been predictable and foreseeable because both Horn and Sporer disclose computing systems that can store, process, and play back multimedia files from external video devices (LG-1021, [0103], [0145], [0156], FIG. 26; LG-1029, Abstract, 4:4-10, FIG. 1). the combination merely involves incorporating known features that are explicitly disclosed by Sporer and would have been understood by a POSITA as likely present, but not explicitly disclosed by Horn. The combination of Horn and Sporer would additionally have been predictable and foreseeable at least in part, because elements of the combined system would each perform similar functions they had been known to perform prior to the combination. For instance, the computer, as

described in Horn, would still perform the same functions, including storing and displaying multimedia content and receiving such content from external devices, as it did prior to the combination with Sporer.

ii. Claim 2

[2] *The information processing apparatus according to claim 1, further comprising an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder.*

385. The Horn-Sporer combination renders obvious an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder. LG-1021, [0103], [0145]; LG-1029, 6:6-8, FIG. 1.

386. Preliminarily, Horn's system supports the organizing of various files. LG-1021, [0145]. Though the examples in Horn are largely focused on image files, Horn makes clear that its system also supports "movies." LG-1021, [0103]. Sporer describes a system that includes "a video processing circuit" with "a video and audio encoder/decoder (codec) 62 for encoding and decoding MPEG format video and audio." LG-1029, 6:6-8, FIG. 1.

387. As discussed in §VIII.H.i, a POSITA would have found it obvious to include, in Horn's system, a video processing circuit, as Sporer describes. The video processing circuit would include an encoder that receives video data input

from external devices, such as Horn’s digital camera or the like, and processes (e.g., encodes) the video data (e.g., movies) for playback and storage. §VIII.H.i. Horn describes “organizing and retrieving images created with a digital camera and stored on the computer” where the multimedia content includes “movies,” so a POSITA would have found it obvious for Horn to further provide for “organizing and retrieving” movies, in addition to images, from a digital camera and stored on the computer. LG-1021, [0103], [0145]. A POSITA would have understood that, in the Horn-Sporer combination, movies transferred from the external devices would be processed (e.g., encoded) using video processing circuitry, as Sporer describes, and then stored in Horn’s recording medium (hard drive).

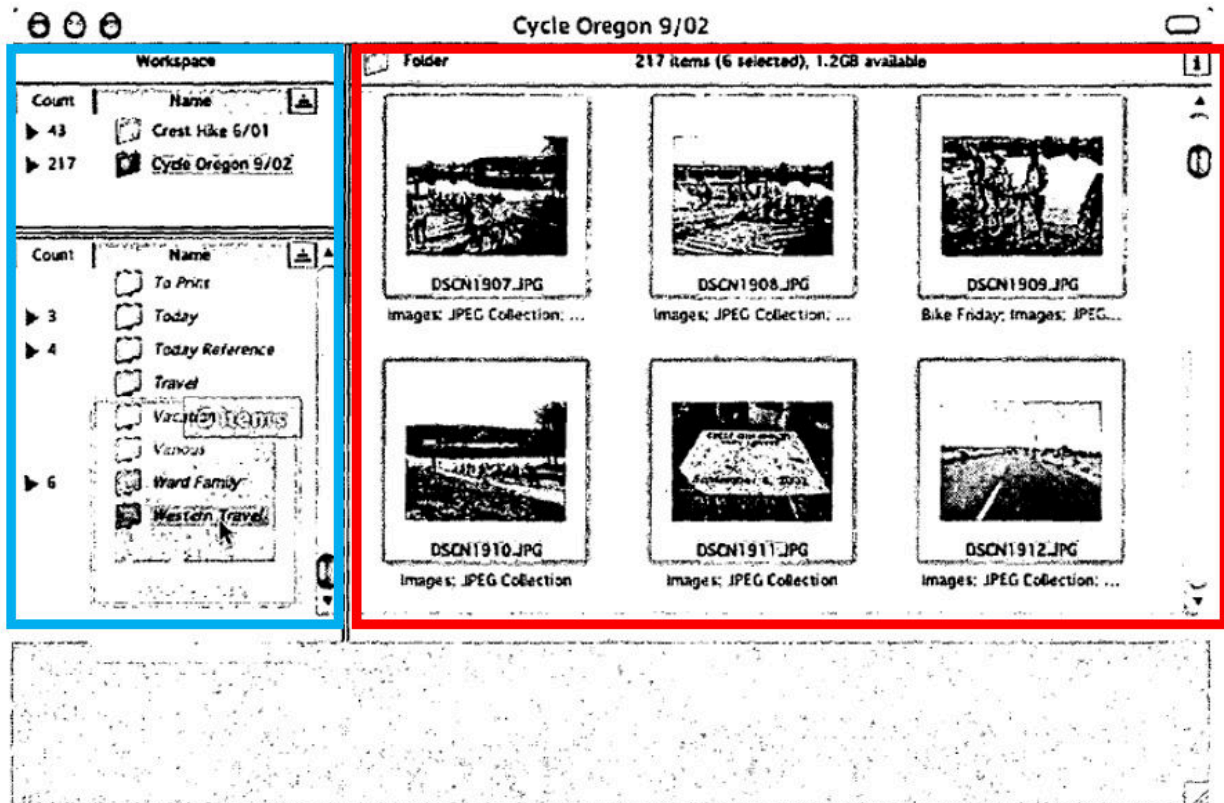
iii. Claim 3

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

388. Horn discloses the controller controlling the output unit to display a first character corresponding to the first group of video data 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.*

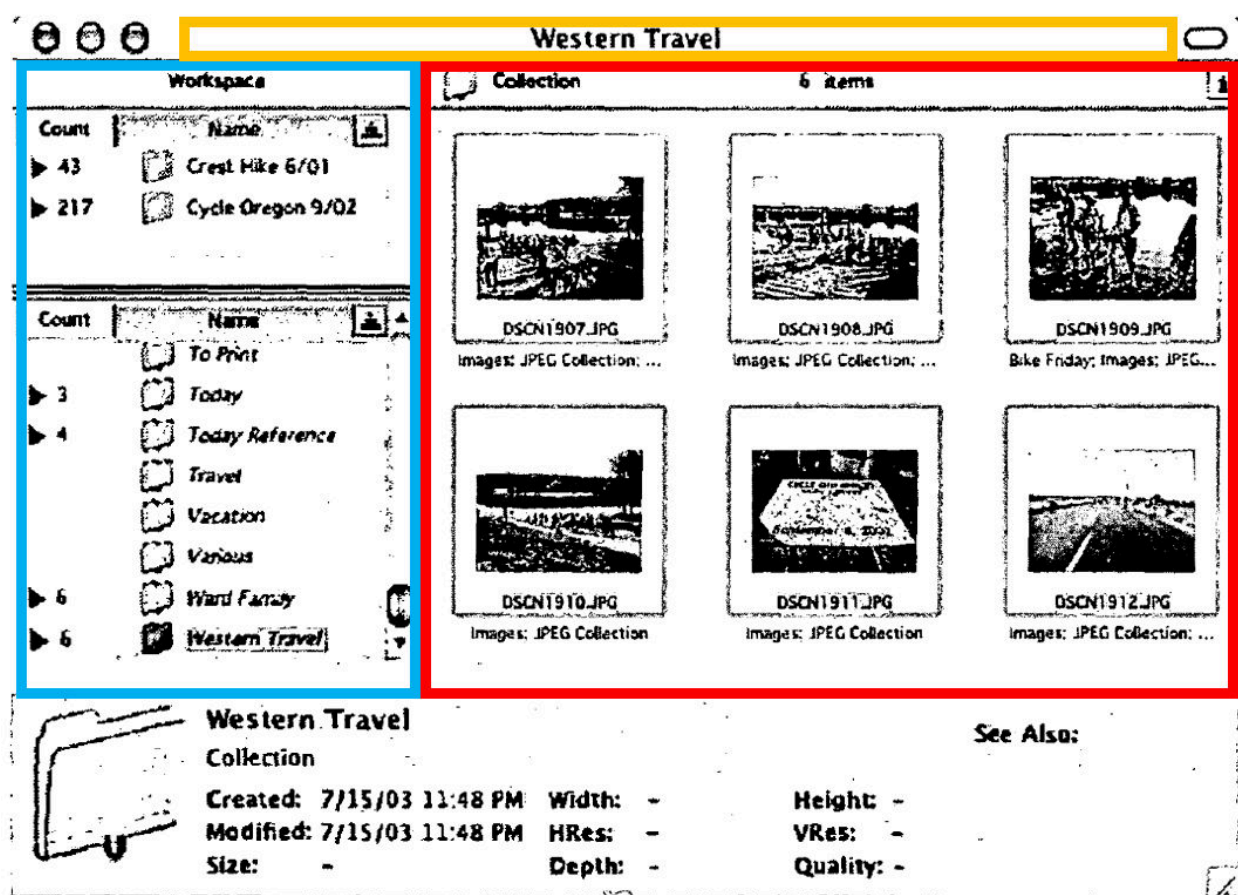
389. As shown in FIG. 30, below, a first character (“Western Travel” or one or more of its letters) corresponding to the first group of video data (“Western Travel” collection) is displayed in a first area (circled blue) when the first group of thumbnails is displayed (circled red). LG-1021, [0153]-[0158], 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 (one or more letters of "Western Travel") corresponding to the first group 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.

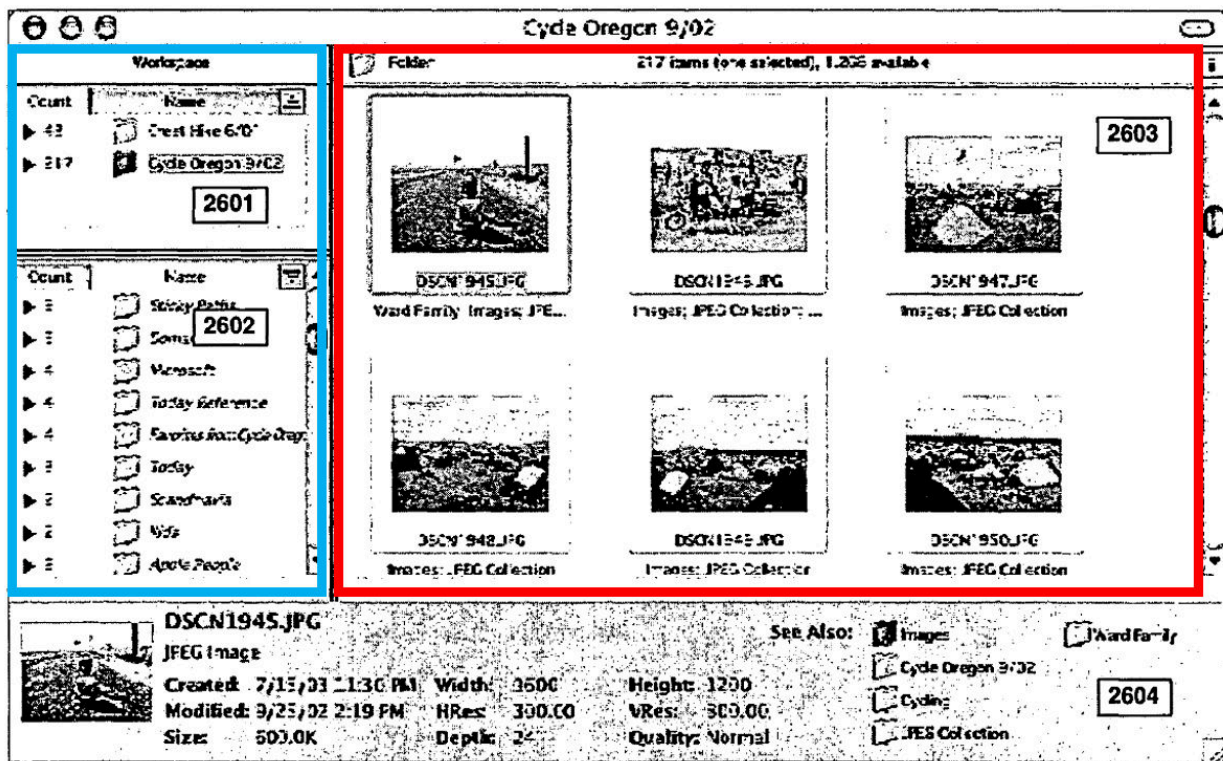


Modified image based on LG-1021, FIGS. 29-30

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

390. Horn discloses the controller controlling the output unit to display a second character corresponding to the second group of video data in the first area when the second group of thumbnails is displayed. LG-1005, FIG. 26; *see* discussion of Element [3.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.*

391. 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 data (“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].



LG-1021, FIG. 26 (annotated)

iv. Claim 4

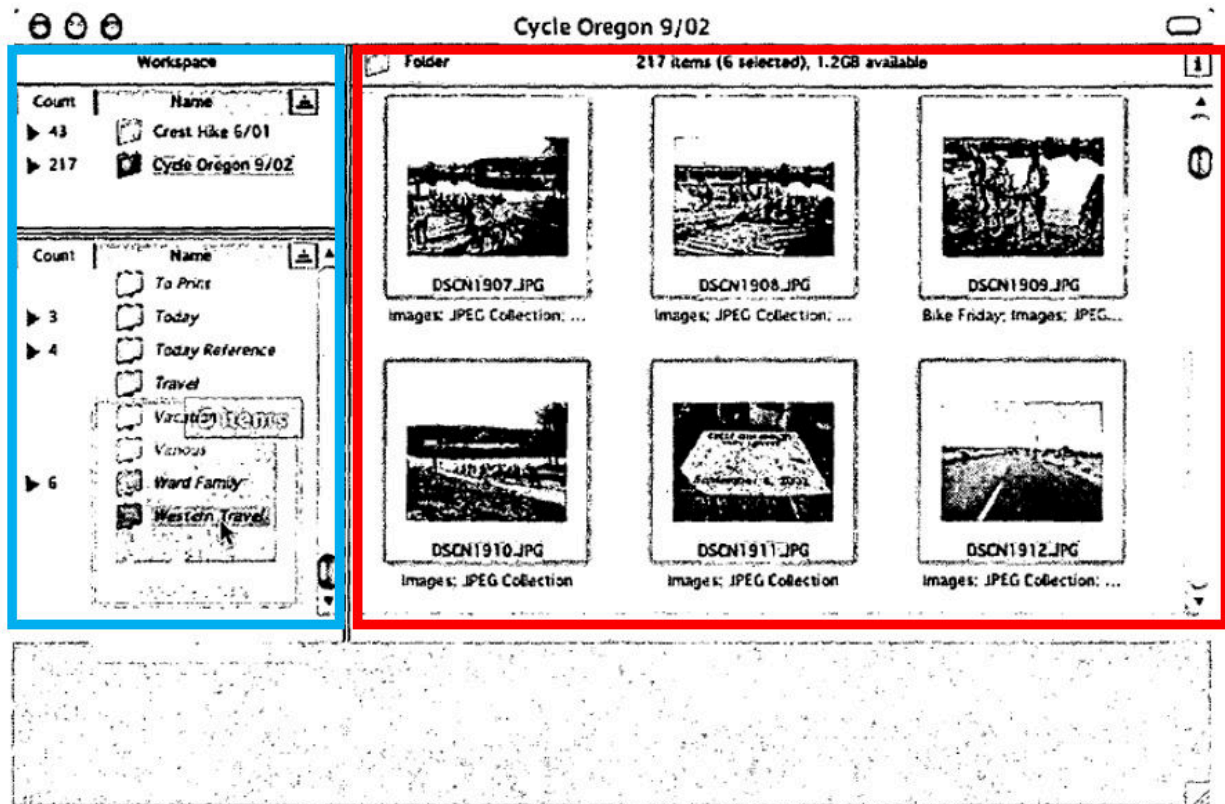
[4.a] *The information processing apparatus according to claim 3, wherein the controller controls the output unit to display the first group of thumbnails in a second area when the first group of thumbnails is displayed, the second area being different from the first area, and*

392. 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 [3.a]-[3.b].

393. 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 data is displayed.

Id.

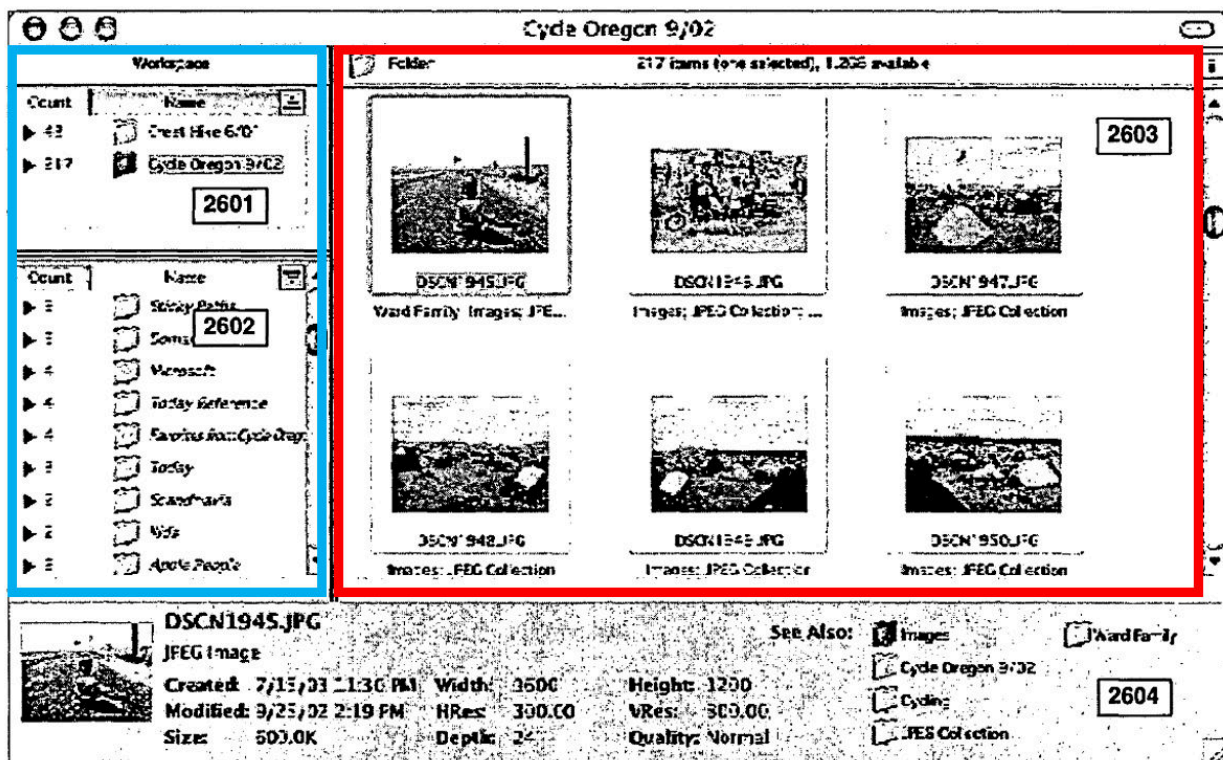


LG-1021, FIG. 30 (annotated) (excerpted)

[4.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.

394. 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 [4.a].

395. 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 data is displayed. *Id.*



LG-1021, FIG. 26 (annotated)

v. Claim 5

[5] *The information processing apparatus according to claim 4, wherein, when the one video data is deleted from the first group of video data, the*

controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

396. Horn discloses wherein, when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data 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].

vi. Claim 7

[7] The information processing system according to claim 6, further comprising an encoder configured to encode inputted video data, wherein the recording medium stores the plurality of video data encoded by the encoder.

397. See discussion of Claim [2].

vii. Claim 8

[8.a] The information processing system according to claim 7, wherein a first character corresponding to the first group of video data in a first area when the first group of thumbnails is displayed on the display, and

398. See discussion of Element [3.a].

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

399. See discussion of Element [3.b].

viii. Claim 9

[9.a] The information processing system according to claim 8, wherein the first group of thumbnails is displayed in a second area when the first group of thumbnails is displayed on the display, the second area being different from the first area, and

400. See discussion of Element [4.a].

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

401. See discussion of Element [4.b].

ix. Claim 10

[10] The information processing system according to claim 9, further comprising: a controller, wherein, when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

402. See discussion of Claim [5].

x. Claim 12

[12] The information processing method according to claim 11, further comprising encoding inputted video data with an encoder, and storing the plurality of video data encoded by the encoder on the recording medium.

403. See discussion of Claim [2].

xi. Claim 13

[13.a] The information processing method according to claim 12, further comprising: controlling, by the controller, to display a first character corresponding to the first group of video data in a first area when the first group of thumbnails is displayed; and

404. See discussion of Element [3.a].

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

405. See discussion of Element [3.b].

xii. Claim 14

[14.a] The information processing method according to claim 13, further comprising: controlling, by the controller, 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

406. See discussion of Element [4.a].

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

407. See discussion of Element [4.b].

xiii. Claim 15

[15] The information processing method according to claim 14, wherein, when the one video data is deleted from the first group of video data, the controller removes the one video data from the first group of video data without deleting the one video data recorded on the recording medium.

408. See discussion of Claim [5].

IX. SECONDARY CONSIDERATIONS

409. At this time, I am not aware of any objective evidence (or “secondary considerations”) that would suggest claims 1-19 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 1-19 would have been obvious to one of skill in the art.

410. 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
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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	Multuser 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 Columbia	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 Billinghamurst 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.
- J7 A Cockburn, P Dragicevic, L Besançon and C Gutwin. Threats of a Replication Crisis in Empirical Computer Science. *Communications of the ACM*. 63(8):70-79. August 2020.
- J8 M Claypool, A Cockburn and C Gutwin. The Impact of Motion and Delay on Selecting Game Targets with a Mouse. *ACM Transactions on Multimedia Computing, Communications, and Applications*. 16(2s):73, 1-14. June 2020.
- J9 P Quinn and A Cockburn. Loss Aversion and Preference in Interaction. *Human-Computer Interaction Journal*. 35(2):143-190. 2020. (Online from 2018).

- J10 A Cockburn, D Masson, C Gutwin, P Palanque, A Goguey, M Yung, C Gris and C Trask. Design and Evaluation of Braced Touch for Touchscreen Input Stabilisation. *International Journal of Human-Computer Studies*. 122:21-37. 2018.
- J11 B Lafreniere, C Gutwin, and A Cockburn. Investigating the Post-Training Persistence of Expert Interaction Techniques. *ACM Transactions on Human-Computer Interaction*. 24(4): Article 29 (46 pages). 2017.
- J12 A Cockburn, P Quinn and C Gutwin. The Effects of Interaction Sequencing on User Experience and Preference. *International Journal of Human-Computer Studies*. 108:89-104. 2017.
- J13 J Aceituno, S Malacria, P Quinn, N Roussel, A Cockburn and G Casiez. The Design, Use, and Performance of Edge-Scrolling Techniques. *International Journal of Human-Computer Studies*. 97:58-76. 2017.
- J14 J Scarr, C Gutwin, A Cockburn and A Bunt. StencilMaps and EphemeralMaps: Spatially Stable Interfaces that Highlight Command Subsets. *Behaviour and Information Technology*. 34(11):1092-1106. 2015.
- J15 S Fitchett and A Cockburn. An Empirical Characterisation of File Retrieval. *International Journal of Human-Computer Studies*. 74:1-13. 2015.
- J16 A Cockburn, C Gutwin, J Scarr and S Malacria. Supporting Novice to Expert Transitions in User Interfaces. *ACM Computing Surveys*. 47(2):31:1-36. 2014.
- J17 J Scarr, A Cockburn and C Gutwin. Supporting and Exploiting Spatial Memory in User Interfaces. *Foundations and Trends in Human-Computer Interaction*. 6(1):1-84. 2013.
- J18 P Quinn, A Cockburn and J Delamarche. Examining the Costs of Multiple Trajectory Pointing Techniques. *International Journal of Human-Computer Studies*. 71(4):492-509. 2013.
- J19 S Tak and A Cockburn. Enhanced Spatial Stability with Hilbert and Moore Treemaps. *Transactions on Visualization and Computer Graphics*. 19(1):141-148. 2013.
- J20 A Cockburn, D Ahlstrom and C Gutwin. Understanding Performance in Touch Selections: Tap, Drag, and Radial Pointing Drag with Finger, Stylus and Mouse. *International Journal of Human-Computer Studies*. 70(3):218-233. 2012.
- J21 J Hauber, A Cockburn, M Billinghamurst and H Regenbrecht. The Impact of Collaborative Style on the Perception of 2D and 3D Videoconferencing Interfaces. *Open Software Engineering Journal*. 6:1-20. 2012.
- J22 A Cockburn, P Quinn, C Gutwin, G Ramos and J Looser. Air Pointing: Design and Evaluation of Spatial Target Acquisition with and without Visual Feedback. *International Journal of Human-Computer Studies*. 69:401-414. 2011.
- J23 E Tanvir, A Bunt, A Cockburn and P Irani. Improving Cascading Menu Selections with Adaptive Activation Areas. *International Journal of Human-Computer Studies*. 69:769-785. 2011.
- J24 A Cockburn and C Gutwin. A Model of Novice and Expert Navigation Performance in Constrained Input Interfaces. *ACM Transactions on Computer-Human Interaction*. ACM Press. 7(3):1-38. 2010.

- J25 A Cockburn and C Gutwin. A Predictive Model of Human Performance with Scrolling and Hierarchical Lists. *Human-Computer Interaction Journal*. Taylor and Francis. 24(3): 273-314. 2009.
- J26 A Cockburn, A Karlson and B Bederson. A Review of Overview+Detail, Zooming, and Focus+Context Interfaces. *ACM Computing Surveys*. ACM Press. 41(1): 1-31. 2008.
- J27 J Alexander, A Cockburn and R Lobb. AppMonitor: A Tool for Recording User Actions in Unmodified Windows Applications. *Behavior Research Methods*. Psychonomic Society. 40(2): 413-421. 2008.
- J28 G Casiez, D Vogel, R Balakrishnan and A Cockburn. The Impact of Control-Display Gain on User Performance in Pointing Tasks. *Human-Computer Interaction Journal*. Taylor and Francis. 23(3): 215-250. 2008.
- J29 S Jones, M Jones, G Marsden, D Patel and A Cockburn. An Evaluation Of Integrated Zooming and Scrolling On Small Screens *International Journal of Human-Computer Studies*. 63(3): 271–303. Elsevier Science. 2005.
- J30 A Cockburn and S Brewster. Multimodal Feedback for the Acquisition of Small Targets *Ergonomics*. Taylor & Francis. 48(9): 1129–1150. 2005.
- J31 M Moyle and A Cockburn. A Flick in the Right Direction: A Case Study of Gestural Input *Behaviour and Information Technology*. 24(4): 275–288. Taylor & Francis. 2005.
- J32 A Cockburn. Web Browsers *Berkshire Encyclopedia of Human-Computer Interaction*. Bainbridge, WS (Editor). Volume 1: 80–83. Berkshire Publishing. 2004.
- J33 A Cockburn and B McKenzie. Evaluating Spatial Memory in Two and Three Dimensions *International Journal of Human-Computer Studies*. 61(3): 359–373. Elsevier Science. 2004.
- J34 A Cockburn and M Smith. Hidden Messages: Evaluating the Efficiency of Code Elision in Program Navigation *Interacting with Computers: The Interdisciplinary Journal of Human-Computer Interaction*. 15(3): 387–407. 2003.
- J35 A Cockburn, S Greenberg, S Jones, B McKenzie and M Moyle. Improving Web Page Revisitation: Analysis, Design, and Evaluation *Information Technology and Society: Special Issue on Web Navigation*, editors B Shneiderman, J Lazar, M Ivory. 3(1): 159–183. 2003.
- J36 A Cockburn, B McKenzie and M JasonSmith. Pushing Back: Evaluating a New Behaviour for the Back and Forward Buttons in Web Browsers *International Journal of Human-Computer Studies*. 57(5):397–414. Elsevier Science. 2002.
- J37 T Bell, A Cockburn, B McKenzie and J Vargo. Digital Lectures: If You Make Them, Will Students Use Them? Constraints on Effective Delivery of Flexible Learning Systems *International Multimedia Electronic Journal of Computer-Enhanced Learning*. 3(2). Association for the Advancement of Computing in Education. 2001 This paper was one of 25 (from 115 full papers) selected from the proceedings of ED-MEDIA 2001 for adaptation and inclusion in the journal.
- J38 A Cockburn. Supporting Tailorable Program Visualisations with Literate Programming and Fish-eye Views. *Information and Software Technology*. 43(13):745–758. Elsevier Science. 2001.

- J39 A Cockburn, T Bell and B McKenzie. Death to the Office of the Nineties: An HCI Perspective on Some Problems in Modern Office Information Systems *Journal of Research and Practice in Information Technology, Special Issue on Human-Computer Interaction (HCI)*., 33(1):68–82. Australian Computer Society. 2001.
- J40 A Cockburn and B McKenzie. What Do Web Users Do? An Empirical Analysis of Web Use. *International Journal of Human-Computer Studies*, 54(6):903–922. Academic Press. 2001.
- J41 A Cockburn and S Greenberg. Issues of Page Representation and Organisation in Web Browser’s Revisitation Tools. *Australian Journal of Information Systems*, 7(2):120–127. 2000.
- J42 A Cockburn and P Weir. An Investigation of Groupware Support for Collaborative Awareness Through Distortion-Oriented Views. *International Journal of Human Computer Interaction*, 11(3):231–255. Lawrence Erlbaum Associates. 1999.
- J43 A Cockburn and S Greenberg. The Design and Evolution of TurboTurtle, a Collaborative Microworld for Exploring Newtonian Physics. *International Journal of Human-Computer Studies*, 48(6):777–801. Academic Press. 1998.
- J44 A Cockburn and A Bryant. Leogo: An Equal Opportunity User Interface for Programming. *Journal of Visual Languages and Computing*, 8(5–6):601–619. Academic Press. 1997.
- J45 A Cockburn and S Jones. Which way now? Analysing and Easing Inadequacies in WWW Navigation. *International Journal of Human-Computer Studies*, 45(1):105–129. Academic Press. 1996.
- J46 A Cockburn and S Jones. Four Principles for Groupware Design. *Interacting with Computers: The Interdisciplinary Journal of Human-Computer Interaction*, 7(2):195–210. Elsevier. 1995.
- J47 HW Thimbleby, SP Marsh, SR Jones, and AG Cockburn. Trust in CSCW. In S Scrivener, editor, *Computer-Supported Cooperative Work*, pages 253–271. Ashgate Publishing, 1994.
- J48 H Thimbleby, A Cockburn, and S Jones. Hypercard: An Object-Oriented Disappointment. In P Gray and R Took, editors, *Building Interactive Systems: Architectures and Tools*, pages 35–55. Springer-Verlag, 1992.

Papers in Refereed Conference Proceedings

- C1 K Kargut, C Gutwin, A Cockburn. Effects of Device Environment and Information Layout on Spatial Memory and Performance in VR Selection Tasks. *Proceedings of ACM CHI 2024*. Hawai’i. 2024.
- C2 P Suwanaposee, C Gutwin, Z Chen, A Cockburn. ‘Specially For You’ – Examining the Barnum Effect’s Influence on the Perceived Quality of System Recommendations. *Proceedings of ACM CHI 2023*. Hamburg, Germany. 2023.
- C3 A Cockburn, P Quinn, C Gutwin, Z Chen, P Suwanaposee. Probability Weighting in Interactive Decisions: Evidence for Overuse of Bad Assistance, Underuse of Good Assistance. *Proceedings of ACM CHI 2022*. New Orleans, USA. 2022.
- C4 K Lam, C Gutwin, M Klarkowski, and A Cockburn. More Errors vs. Longer Commands: The Effects of Repetition and Reduced Expressiveness on Input Interpretation Error, Learning, and User Preference. *Proceedings of ACM CHI 2022*. New Orleans, USA. 2022.

- c5 A Goguet, C Gutwin, Z Chen, P Suwanaposee, and A Cockburn. Interaction Pace and User Preferences. *Proceedings of ACM CHI 2021*. Yokohama, Japan. 2021. **Honourable mention award**
- c6 K Lam, C Gutwin, M Klarkowski, and A Cockburn. The Effects of System Interpretation Errors on Learning New Input Mechanisms. *Proceedings of ACM CHI 2021*. Yokohama, Japan. 2021. **Honourable mention award**
- c7 S Liu, M Claypool, A Cockburn, R Eg, C Gutwin, and K Raaen. Datasets – Moving Target Selection with Delay. *Proceedings of the 12th ACM Multimedia Systems Conference (MMSys '21)*, Istanbul, Turkey. 2021.
- c8 N Bandeira Romao Tome, M Klarkowski, C Phillips, RL Mandryk, A Cockburn, and C Gutwin. Risking Treasure: Testing Loss Aversion in an Adventure Game. *Proceedings of ACM CHI PLAY 2020 Symposium on Computer-Human Interaction in Play*. Ottawa, Canada. 2020.
- c9 P Schmid, S Malacria, A Cockburn and M Nancel. Interaction Interferences: Implications of Last-Instant System State Changes. *Proceedings of ACM UIST'2020 Symposium on User Interface Software and Technology*. Minneapolis, USA. 2020.
- c10 P Palanque, A Cockburn and C Gutwin. A Classification of Faults Covering the Human-Computer Interaction Loop. *Proceedings of SafeComp 2020: 39th International Conference on Computer Safety, Reliability and Security*. Lisbon, Portugal. 2020.
- c11 A Mairena, M Dechant, C Gutwin and A Cockburn. A Baseline Study of Emphasis Effects in Information Visualization. *Proceedings of Graphics Interface 2020*. Toronto, Canada. 2020.
- c12 C Gutwin, A Cockburn, M van der Kamp, J Storrington and C Philips. Testing the Limits of the Spatial Approach: Comparing Retrieval and Revisitation Performance of Spatial and Paged Data Organizations for Large Item Sets. *Proceedings of Graphics Interface 2020*. Toronto, Canada. 2020.
- c13 A Cockburn, B Lewis, P Quinn and C Gutwin. Framing Effects Influence Interface Feature Decisions. *Proceedings of ACM CHI 2020*. Hawai'i. 2020.
- c14 B Lewis, G d'Eon, A Cockburn and D Vogel. KeyMap: Improving Keyboard Shortcut Vocabulary Using Norman's Mapping. *Proceedings of ACM CHI 2020*. Hawai'i. 2020.
- c15 A Goguet, S Malacria, A Cockburn, and C Gutwin. Reducing Error Aversion to Support Novice-to-Expert Transitions with FastTap. *Proceedings of the 31st Francophone Conference on Human-Computer Interaction – IHM 2019*. Grenoble, France. 2019. **Best paper award**
- c16 P Palanque, A Cockburn, L Désert-Legendre, C Gutwin and Y Délérès. Brace Touch: a Dependable, Turbulence-Tolerant, Multi-Touch Interaction Technique for Interactive Cockpits. *Proceedings of the 38th International Conference on Computer Safety, Reliability and Security - SafeComp 2019*. Turku, Finland. 2019.
- c17 C Martinie, P Palanque, E Bouzekri, A Cockburn, A Canny and E Barboni. Analysing and Demonstrating Tool-Supported Customizable Task Notations. *Proceedings of the 11th ACM SIGCHI Symposium on Engineering Interactive Computing Systems*. Valencia, Spain. 2019.

- c18 Q Roy, C Zakaria, W Kim, M Nancel, ST Perrault, A Misra and A Cockburn. A Comparative Study of Pointing Techniques for Eyewear Using a Simulated Pedestrian Environment. *Proceedings of the 17th IFIP TC.13 International Conference on Human-Computer Interaction*. Cyprus. 2019.
- c19 A Cockburn and C Gutwin. Anchoring Effects and Troublesome Asymmetric Transfer in Subjective Ratings. *Proceedings of ACM CHI 2019*. Glasgow, Scotland. 2019.
- c20 AF Mairena, C Gutwin, A Cockburn and LJ Elias The Effects of Feature Combination and Task Demands on Peripheral Notifications in Large Displays. *Proceedings of ACM CHI 2019*. Glasgow, Scotland. 2019.
- c21 M Claypool, A Cockburn and C Gutwin. Game Input with Delay – Moving Target Selection Parameters. *Proceedings of ACM Multimedia Systems Conference 2019*. Amhurst, MA. 2019.
- c22 A Cockburn, D Woolley, K Tran Pham Thai, D Clucas, S Hoermann, and C Gutwin. Reducing the Attentional Demands of In-Vehicle Touchscreens with Stencil Overlays. *Proceedings of ACM Automotive UI 2018*. Toronto, Canada. 2018.
- c23 A Cockburn, C Gutwin and A Dix. HARK No More: On the Preregistration of CHI Experiments. *Proceedings of ACM CHI 2018*. Montreal, Canada. 2018. Paper 141. **Best paper award**
- c24 A Goguet, G Casiez, A Cockburn and C Gutwin. Storyboard-Based Empirical Modelling of Touch Interface Performance. *Proceedings of ACM CHI 2018*. Montreal, Canada. 2018. Paper 445. **Honourable mention award**
- c25 A Cockburn, C Gutwin, P Palanque, Y Deleris, C Trask, A Coveney, M Yung and K MacLean. Turbulent Touch: Touchscreen Input for Cockpit Flight Displays. *Proceedings of ACM CHI 2017*. Denver, CO. 2017. 6742-6753.
- c26 C Gutwin, A Cockburn and N Gough. A Field Experiment of Spatially-Stable Overviews for Document Navigation. *Proceedings of ACM CHI 2017*. Denver, CO. 2017. 5905-5916.
- c27 C Gutwin, A Cockburn and A Coveney. Peripheral Popout: The Influence of Visual Angle on Popout Effects. *Proceedings of ACM CHI 2017*. Denver, CO. 2017. 208-219.
- c28 S Uddin, C Gutwin and A Cockburn. The Effects of Artificial Landmarks on Learning and Performance in Spatial-Memory Interfaces. *Proceedings of ACM CHI 2017*. Denver, CO. 2017. 3843-3855.
- c29 P Quinn and A Cockburn. When Bad Feels Good: Assistance Failures and Interface Preferences. *Proceedings of CHI'2016*. San Jose, California. 2016. 4005-4010.
- c30 B Lafreniere, C Gutwin, A Cockburn and T Grossman. Faster Command Selection on Touchscreen Watches *Proceedings of CHI'2016*. San Jose, California. 2016. 4663-4674.
- c31 K Schramm, C Gutwin and A Cockburn. Supporting Transitions to Expertise in Hidden Toolbars *Proceedings of CHI'2016*. San Jose, California. 2016. 4687-4698.
- c32 C Gutwin, C Rooke, A Cockburn, R Mandryk and B Lafreniere. Peak-End Effects on Player Experience in Casual Games *Proceedings of CHI'2016*. San Jose, California. 2016. 5608-5619. **Honourable mention award**

- c33 C Gutwin, A Cockburn and B Lafreniere. Testing the Rehearsal Hypothesis with Two FastTap Interfaces. *Proceedings of GI'2015*. Halifax, Canada. 2015. 223-231.
- c34 A Cockburn, C Gutwin and P Quinn. Examining the Peak-End Effects of Subjective Experience. *Proceedings of CHI'2015*. Seoul, S. Korea. 2015. 357-366.
- c35 S Malacria, J Acetuno, P Quinn, G Casiez, A Cockburn, and N Roussel. Push-Edge and Slide-Edge: Scrolling by Pushing Against the Viewport Edge. *Proceedings of CHI'2015*. Seoul, S. Korea. 2015. 2773-2776.
- c36 S Fitchett, A Cockburn and C Gutwin. Finder Highlights: Field Evaluation and Design of an Augmented File Browser. *Proceedings of CHI'2014*. Toronto, Canada. 2014. 3685-3694. **Honourable mention award**
- c37 C Gutwin, A Cockburn, J Scarr and S Malacria. Faster Command Selection on Tablets with FastTap. *Proceedings of CHI'2014*. Toronto, Canada. 2014. 2617-2626.
- c38 M Nancel and A Cockburn. Causality: A Conceptual Model of Interaction History. *Proceedings of CHI'2014*. Toronto, Canada. 2014. 1777-1786. **Honourable mention award**
- c39 J Scarr, A Cockburn, C Gutwin, A Bunt, and J Cechanowicz. The Usability of CommandMaps in Realistic Tasks. *Proceedings of CHI'2014*. Toronto, Canada. 2014. 2241-2250.
- c40 SA Seah, DM Plasencia, P Bennet, A Karnik, V Ortoloc, J Knibbe, A Cockburn, and S Subramanian. SensaBubble: A Chrono-Sensory Mid-Air Display of Sight and Smell. *Proceedings of CHI'2014*. Toronto, Canada. 2014. 2863-2872. **Honourable mention award**
- c41 P Quinn, S Malacria and A Cockburn. Touch Scrolling Transfer Functions. *Proceedings of ACM UIST'2013 Symposium on User Interface Software and Technology*. St Andrews, Scotland. 2013. 61-71.
- c42 S Malacria, J Scarr, A Cockburn, C Gutwin and T Grossman. Skillometers: Reflective Widgets that Motivate and Help Users to Improve Performance. *Proceedings of ACM UIST'2013 Symposium on User Interface Software and Technology*. St Andrews, Scotland. 2013. 321-330.
- c43 M Jain, A Cockburn, and S Madhvanath. Comparison of Phone-Based Distal Pointing Techniques for Point-Select Tasks. *Proceedings of INTERACT'13*. Cape Town, South Africa. 2013. 714-721.
- c44 S Malacria, G Bailly, J Harrison, A Cockburn, and C Gutwin. Promoting Hotkey Use through Rehearsal with ExposeHK. *Proceedings of CHI'2013*. Paris, France. 2013. 573-582.
- c45 J Scarr, A Cockburn, C Gutwin, and S Malacria. Testing the Robustness and Performance of Spatially Consistent Interfaces. *Proceedings of CHI'2013*. Paris, France. 2013. 3139-3148. **Honourable mention award**
- c46 S Fitchett, A Cockburn, and C Gutwin. Improving Navigation-Based File Retrieval. *Proceedings of CHI'2013*. Paris, France. 2013. 2329-2338. **Best paper award**
- c47 T Piumsomboon, A Clark, M Billinghamurst, and A Cockburn. User-Defined Gestures for Augmented Reality. *Proceedings of INTERACT'13*. Cape Town, South Africa. September. 2013. 282-299.

- c48 P Quinn, A Cockburn, G Casiez, N Roussel, and C Gutwin. Exposing and Understanding Scrolling Transfer Functions. *Proceedings of ACM UIST'2012 Symposium on User Interface Software and Technology*. Cambridge, Massachusetts, October. 2012. 341-350.
- c49 A Cockburn, P Quinn, C Gutwin, and S Fitchett. Improving Scrolling Devices with Document-Length-Dependent Gain. *Proceedings of CHI'2012*. Austin, Texas, May. 2012. 267-276.
- c50 J Scarr, A Cockburn, C Gutwin, and A Bunt. Improving Command Selection with CommandMaps. *Proceedings of CHI'2012*. Austin, Texas, May. 2012. 257-266. **Best paper award**
- c51 S Fitchett and A Cockburn. AccessRank: Predicting What Users Will Do Next. *Proceedings of CHI'2012*. Austin, Texas, May. 2012. 2239-2242. **Honourable mention award**
- c52 J Scarr, A Cockburn, C Gutwin, and P Quinn. Dips and Ceilings: Understanding and Supporting Transitions to Expertise in User Interfaces. *Proceedings of CHI'2011*. Vancouver, Canada, May. 2011. 2741-2750.
- c53 V Levesque, L Oram, KE MacLean, A Cockburn, N Marchuk, D Johnson, JE Colgate, and M Peshkin. Enhancing Physicality in Touch Interaction with Programmable Friction. *Proceedings of CHI'2011*. Vancouver, Canada, May. 2011. 2481-2490. **Best paper award**.
- c54 P Quinn, A Cockburn, KJ Raiha, and J Delemarche. On the Costs of Multiple Trajectory Pointing Methods. *Proceedings of CHI'2011*. Vancouver, Canada, May. 2011. 859-862. **Honourable mention award**
- c55 R Xiao, M Nacenta, RL Mandryk, A Cockburn and C Gutwin. Ubiquitous Cursor: A Comparison of Direct and Indirect Pointing Feedback in Multi-Display Environments. *Proceedings of Graphics Interface '2011*. St Johns, Canada. 2011. 135-142. **Michael A. J. Sweeney best student paper award**.
- c56 S Bateman, A Doucette, C Gutwin, RL Mandryk and A Cockburn. Effects of View, Input Device, and Track Width on Video Game Driving. *Proceedings of Graphics Interface '2011*. St Johns, Canada. 2011. 207-214.
- c57 S Tak, J Scarr, C Gutwin and A Cockburn. Supporting Window Switching With Spatially Consistent Thumbnails Zones: Design and Evaluation. *Proceedings of INTERACT'2011*. Lisbon, Portugal. 2011. 331-347.
- c58 B Ens, D Ahlstrom, A Cockburn and P Irani. Characterizing User Performance with Assisted Direct Off-Screen Pointing. *Proceedings of Mobile HCI'2011*. Stockholm. 2011. 331-347.
- c59 D Ahlstrom, A Cockburn, C Gutwin, and P Irani. Why it's Quick to be Square: Modelling New and Existing Hierarchical Menu Designs. *Proceedings of CHI'2010*. Atlanta, GA, April. 2010. 1371-1380. **Best paper nomination**.
- c60 J Oosterman and A Cockburn. An Empirical Comparison of Tag Clouds and Tables. *Proceedings of OzCHI'2010*. Brisbane, Australia, 22-26 November. 2010. 288-295.
- c61 S Fitchett and A Cockburn. Using Multitouch Input to Support Hybrid Relative and Absolute Mobile Scrolling *People and Computers 24*. *Proceedings of the British HCI Conference*. Dundee, 6-10 September. 2010.

- c62 S Fitchett and A Cockburn. Evaluating Flick-Scrolling and Tilt Scrolling for Reading Tasks on Mobile Devices. *Proceedings of OzCHI'2009*. Melbourne, Australia, 23-27 November. 2009. 225-232.
- c63 P Quinn and A Cockburn. Zoofing! Faster List Selections with Pressure-Zoom-Flick-Scrolling. *Proceedings of OzCHI'2009*. Melbourne, Australia, 23-27 November. 2009. 185-192.
- c64 S Tak and A Cockburn. Window Watcher: A Visualisation Tool for Understanding Window Switching Activities. *Proceedings of OzCHI'2009*. Melbourne, Australia, 23-27 November. 2009. 241-248.
- c65 S Tak, A Cockburn, K Humm, D Ahlstrom, C Gutwin and J Scarr. Improving Window Switching Interfaces. *Proceedings of INTERACT'2009*. Uppsala, Sweden, 24-28 August. 2009. 187-200.
- c66 J Zucco, B Thomas, K Grimmer-Sommers and A Cockburn. A Comparison of Menu Configurations and Pointing Devices for use with Wearable Computers while Mobile and Stationary. *Proceedings of ACM ISWC'2009: 13th International Symposium on Wearable Computers*. Linz, Austria, 5-7 September. 2009. 63-70.
- c67 J Alexander, A Cockburn, S Fitchett, C Gutwin and S Greenberg. Revisiting Read Wear: Analysis, Design, and Evaluation of a Footprints Scrollbar. *Proceedings of ACM CHI'2009 Conference on Human Factors in Computing Systems*. Boston, MA, 5 April - 9 April. 2009. 1665-1674.
- c68 E Tanvir, J Cullen, P Irani and A Cockburn. Improving Selection in Cascading Pull-Down Menus. *Proceedings of ACM CHI'2008 Conference on Human Factors in Computing Systems*. Florence, Italy, 5 April - 10 April. 2008. 1381-1384.
- c69 J Alexander and A Cockburn. An Empirical Characterisation of Electronic Document Navigation. *Proceedings of Graphics Interface '08*. Windsor, Ontario, Canada, May 28-30. 2008. 123-130. **Michael A. J. Sweeney best student paper award.**
- c70 P Quinn, A Cockburn, Indratmo and C Gutwin. An Investigation of Dynamic Landmarking Functions. *Proceedings of Advanced Visual Interfaces (AVI'08)*. Napoli, Italy, May 28-30. 2008. ACM Press.
- c71 P Quinn and A Cockburn. The Effects of Menu Parallelism on Visual Search and Selection. *Proceedings of AUIC'08: Australasian User Interface Conference*. 2008, 79-84. ACM Press.
- c72 V Buchmann, M Billinghamurst and A Cockburn. Directional Interfaces for Wearable Augmented Reality. *Proceedings of CHINZ'08 2008*, 47-54. ACM Press.
- c73 J Looser, M Billinghamurst, R Grasset and A Cockburn. An Evaluation of Virtual Lenses for Object Selection in Augmented Reality. *Proceedings of GRAPHITE 2007*. Perth, Australia, 1-4 December. 2007, 203-210. ACM Press.
- c74 A Cockburn, C Gutwin and S Greenberg. A Predictive Model of Menu Performance *Proceedings of ACM CHI'2007 Conference on Human Factors in Computing Systems* San Jose, CA, 24-27 April. 2007, 627-636. ACM Press.
- c75 A Cockburn, PO Kristennson, J Alexander and S Zhai. Hard Lessons: Effort-Inducing Interfaces Benefit Spatial Learning *Proceedings of ACM CHI'2007 Conference on Human Factors in Computing Systems* San Jose, CA, 24-27 April. 2007, 1571-1580. ACM Press.

- c76 M Hancock, S Carpendale and A Cockburn. Shallow Depth 3D Interaction: Design and Evaluation of One-, Two-, and Three-Touch Techniques *Proceedings of ACM CHI'2007 Conference on Human Factors in Computing Systems* San Jose, CA, 24–27 April. 2007, 1147–1156. **Nominated for best paper award.** ACM Press.
- c77 G Ramos, A Cockburn, M Beaudouin-Lafon and R Balakrishnan. Pointing Lenses *Proceedings of ACM CHI'2007 Conference on Human Factors in Computing Systems* San Jose, CA, 24–27 April. 2007, 757–766.. ACM Press.
- c78 T Bell, A Cockburn, A Wingkvist and R Green. Podcasts as a supplement in tertiary education: an experiment with two Computer Science courses *Proceedings of MoLTA 2007: Conference on Mobile Learning Technologies and Applications* Auckland, New Zealand. 2007, 70–77.
- c79 T Amer, A Cockburn, R Green and G Odgers. Evaluating Swiftpoint as a Mobile Device for Direct Manipulation Input *Proceedings of AUIC'2007 Australasian User Interface Conference* Ballarat, Australia. 2007, 63–70.
- c80 J Hauber, H Regenbrecht, M Billinghamurst and A Cockburn. Spatiality in Videoconferencing: Trade-offs between Efficiency and Social Presence *Proceedings of ACM CSCW'2006 Conference on Computer Supported Cooperative Work* Banff, Canada, November 4–8. 2006, 413–422.
- c81 V Jurgens, A Cockburn and M Billinghamurst Depth Cues For Augmented Reality Stakeout *Proceedings of CHINZ'2006: Conference of the New Zealand Chapter of the ACM Special Interest Group on Human-Computer Interaction* Canterbury, New Zealand 2006, 117–124.
- c82 C Gutwin and A Cockburn. Improving List Revisitation with LispMaps *Proceedings of ACM AVI'2006 Conference on Advanced Visual Interfaces*. Venice, Italy, May 23–26. 2006, 396–403. 32 accepted from 127 submissions.
- c83 A Cockburn and A Gin. Faster Cascading Menu Selections with Enlarged Activation Areas *Proceedings of Graphics Interface 2006*. Quebec City, Canada, June 7–9. 2006, 65–71.
- c84 A Cockburn and P Brock. Human On-Line Response to Visual and Motor Target Expansion *Proceedings of Graphics Interface 2006*. Quebec City, Canada, June 7–9. 2006, 81–87.
- c85 A Cockburn, C Gutwin and J Alexander. Faster Document Navigation with Space-Filling Thumbnails *Proceedings of ACM CHI'2006 Conference on Human Factors in Computing Systems* Montreal, Canada, 24–27 April. 2006, 1–10. ACM Press.
- c86 J Looser, A Cockburn and J Savage. On the Validity of Using First-Person Shooters for Fitts' Law Studies Acceptance rate: 35%, 26 from 73. *People and Computers XVII (Volume 2): British Computer Society Conference on Human Computer Interaction* Edinburgh, Scotland, September 2005, 33–36. Springer-Verlag.
- c87 J Savage and A Cockburn. Comparing Automatic and Manual Zooming Methods for Acquiring Off-Screen Targets *People and Computers XIX: British Computer Society Conference on Human Computer Interaction* Edinburgh, Scotland, September 2005, 439–454. Springer-Verlag. Acceptance rate: 34%, 31 from 92.
- c88 J Hauber, H Regenbrecht, A Hills, A Cockburn and M Billinghamurst. Social Presence in Two- and Three-dimensional Videoconferencing *Proceedings of 8th Annual International Workshop on Presence* London, UK, September 21–23, 2005, 189–198.

- c89 A Cockburn, J Savage and A Wallace. Tuning and Testing Scrolling Interfaces that Automatically Zoom *Proceedings of ACM CHI'2005 Conference on Human Factors in Computing Systems* Portland, Oregon, 2–7 April. 2005, 71–80. ACM Press. Acceptance rate: 25%, 93 from 371. **Nominated for best paper award.**
- c90 T Wright and A Cockburn. Evaluation of Two Textual Programming Notations for Children *Proceedings of the Sixth Australasian User Interface Conference (AUIC2005)* Newcastle, Australia, 2–3 February 2005, 55–62. Australian Computer Society.
- c91 L Rennie and A Cockburn. Aiding Text Entry of Foreign Alphabets with Visual Keyboard Plus *Proceedings of the Sixth Australasian User Interface Conference (AUIC2005)* Newcastle, Australia, 2–3 February 2005, 119–125. Australian Computer Society.
- c92 S Blinmann and A Cockburn. Program Comprehension: Investigating the effects of naming style and documentation *Proceedings of the Sixth Australasian User Interface Conference (AUIC2005)* Newcastle, Australia, 2–3 February 2005, 73–78. Australian Computer Society.
- c93 J Looser, M Billinghamurst 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 Billinghamurst 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 PProgramming 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/csc1/06.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

- 01 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.
- 02 National Science Challenges report. ‘Meet the researchers: Andy Cockburn, Turbulent touch’. 22/03/2019.
- 03 Marsden update. ‘Young researchers experience international science.’ (PhD student Stephen Fitchett). February 2012.
- 04 Magazine article. New Zealand Listener. “Charge of the tech brigade”. Mar 31, 2012.
- 05 Newspaper article. The Press. “Conference acceptance a coup”. Dec 22, 2011.
- 06 Newspaper article. The Press. “Intuitive Innovations”. Feb 22, 2011.
- 07 UC Communications. ‘UC/Microsoft internship opens up world for computer science student.’ Mar 22, 2011.
- 08 Marsden update. ‘Highlights of the 2010 funding round.’ November 2010.
- 09 Magazine article. ‘Profiling Excellence’. Royal Society of New Zealand. “Thirty years of research in a single hit”, March 2010.
- 010 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>
- 011 Newspaper article. Dominion Post. ‘Next-step mouse on its way’, Feb 1, 2010.
- 012 Radio Interview (Live). ABC Perth. ‘Drive Time’ program. January 19th, 2010.
- 013 Newspaper article. The Press. ‘Boost for Computer Activation Project’, Nov. 5, 2009.
- 014 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>
- 015 Newspaper article. Dominion Post. ‘Kiwi mouse comes out of hiding’, March 10, 2008. <http://www.stuff.co.nz/4433363a28.html>
- 016 Newspaper article. Christchurch Press. ‘Fast Kiwi mouse attracts interest from big players’, March 5, 2008. <http://www.stuff.co.nz/4425499a28.html>
- 017 Newspaper article. The Age (Australia). ‘Kiwi mouse attracts interest’, March 5, 2008. <http://www.theage.com.au/news/biztech/kiwi-mouse-attracts-interest/2008/03/10/1204998342852.html>
- 018 Magazine article. Marsden Update. ‘Document Navigation’, December 2008.
- 019 Interview. IEEE Spectrum. ‘A New Spin on the Computer Mouse’, October 2006. <http://www.spectrum.ieee.org/oct06/4668>

- 020 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>
- 021 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>
- 022 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>
- 023 Radio Interview. BBC World Service. 'Go Digital' program. January 14th, 2003 <http://news.bbc.co.uk/2/hi/technology/2677337.stm>
- 024 Nature Journal's Science Update. 'Browsers go back to the future' www.nature.com/nsu/021230/021230-3.html
- 025 'The Register' in the UK. 'Kiwis redesign the Back button'. <http://www.theregister.co.uk/content/6/28729.html>
- 026 Canadian Broadcast Corporation. Programmers try out alternative to browser's back button. http://cbc.ca/storyview/CBC/2002/12/30/back_button021230
- 027 Slashdot. 'Redesigning The "Back" Button' slashdot.org/article.pl?sid=02/12/30/1727206&mode=thread&tid=95
- 028 NZOOM's Technology Page. technology.nzzoom.com/technology_subcategory/0,1610,113-116,00.html
- 029 Newspaper Interview. Christchurch Press. 'Better Going Back', Feb 11, 2003.
- 030 University Chronicle. "Taking the frustration out of the web", Feb 20, 2003.
- 031 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.
- 032 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.
- 033 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.
- 034 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.
- 035 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
Pythodogical	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.
Rapporteur	2018	Habilitation, Dr Eric Lecolinet, Université Paris Sud, France.
Rapporteur	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
Rapporteur	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 Columbia, Canada.	August, 2010.
Keynote address, Australasian Computer Science Week.	January, 2010.
Department of Computer Science, University of British Columbia, 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 Regentral (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. Salla Ovasa	University of Tampere, Finland	Nine months, 2009-2010
Dr. David Ahlstrom	Klagenfurt University, Austria.	Eighteen months, 2008-2010.
Prof. Carl Gutwin	University of Saskatchewan, Saskatoon, Canada.	Three months, 2008.
Prof. Karon MacLean	University of British Columbia, 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, Cupertino, 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. <i>Employment relations authority (regarding text auto-correct functionality).</i>
Dates	May 2024 – June 2024.
Role	Expert witness for Fish & Richardson, counsel for Apple. (analysis, reports).
Case	Smith Interface Technologies v. Apple. <i>Patent Trial and Appeal Board.</i>
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. <i>Patent Trial and Appeal Board. IPR2023-00664, IPR2024-00290</i>
Dates	July 2023 –
Role	Expert witness for Finnegan, Henderson, Farabow, Garrett & Dunner, counsel for Samsung. (analysis).
Case	Smith Interface Technologies v. Samsung. <i>Eastern District of Texas. 2:22-cv-00290-JRG</i>
Dates	November 2022 – June 2023.
Role	Expert witness for Morrison Foerster, counsel for Apple. (analysis, reports, deposition).
Case	Firstface Co. Ltd. v. Apple Inc. <i>Northern District of California. 3:18-cv-02245-JD.</i>
Dates	June 2022 – March 2024.
Role	Expert witness for Finnegan, Henderson, Farabow, Garrett & Dunner, counsel for Samsung. (analysis).
Case	Village Green Technologies v. Samsung. <i>Eastern District of Texas. 2:21-cv-00323-JRG-RSP</i>
Dates	January 2022 – March 2022.
Role	Expert witness for Desmarais, counsel for IBM. (analysis, reports, deposition).
Case	Chewy, Inc. v. IBM. <i>Southern District of New York. 1:21-cv-01319-JSR.</i>
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. <i>Western District of Texas. 6:20-cv-101-ADA.</i>
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 <i>et al.</i> versus Wrinkl <i>Patent Trial and Appeal Board. IPR2021-00882, -00883</i>
Dates	February 2021 – November 2022.

Role	Expert witness for Morrison & Foerster, counsel for Renesas. (analysis).
Case	Neodron versus Renesas Electronics Corp. <i>Western District of Texas</i> . 6:20-CV-00529.
Dates	December 2020 – August 2021.
Role	Expert witness for DLA Piper, counsel for Samsung. (analysis, declaration).
Case	Neonode versus Samsung. <i>Western District of Texas</i> . 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. <i>US International Trade Commission</i> . 337-TA-1193.
Dates	May 2020 – November 2020.
Role	Expert witness for Desmarais, counsel for IBM. (analysis, reports).
Case	IBM versus Zillow Group. <i>Central District of California</i> . 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. <i>US International Trade Commission</i> . 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. <i>Federal Court of Australia</i> . 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. <i>Northern District of California</i> 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. <i>Patent Trial and Appeal Board</i> . 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. <i>US International Trade Commission</i> . 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. <i>Patent Trial and Appeal Board</i> . 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. <i>Eastern District of Texas</i> . 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. <i>Southern District of Florida</i> . 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. <i>Northern District of California</i> . 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. <i>Federal Court of Australia</i> . 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.