

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Masaru Takahashi, et al.
U.S. Patent No.: 6,856,760
Issue Date: February 15, 2005
Appl. Serial No.: 10/191,504
Filing Date: July 10, 2002
Title: RECORDING MEDIUM

DECLARATION OF JIM C. WILLIAMS

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable under Section 1001 of Title 18 of the United States Code.

Date: 1/20/2025

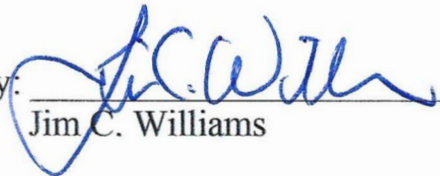
By: 
Jim C. Williams

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I. ASSIGNMENT

1. I have been retained on behalf of LG Electronics Inc. and LG Electronics U.S.A., Inc. (“LG”) to offer technical opinions related to 6,856,760 (“the ’760 patent”) (LG-1001). I understand that LG is requesting that the Patent Trial and Appeal Board (“PTAB” or “Board”) to institute an *inter partes* review (“IPR”) proceeding of the ’760 patent.

2. I have been asked to provide my independent analysis of the ’760 patent based on the prior art publications cited in this declaration.

3. I am not and never have been, an employee of LG. I received no compensation for this declaration beyond my normal hourly compensation based on my time actually spent analyzing the ’760 patent, the prior art publications cited below, and issues related thereto, and I will not receive any added compensation based on the outcome of any IPR or other proceeding involving the ’760 patent.

II. QUALIFICATIONS AND BACKGROUND INFORMATION

4. I am over the age of 18 and am competent to write this declaration. I have personal knowledge, or have developed knowledge of these technologies based upon education, training, or experience, of the matters set forth herein.

5. I am an expert in the fields of digital media, capture, compression, coding, communications, storage, reproduction, display systems, consumer

electronics, information technology, and computing engineering relevant to understanding the '760 Patent. I have experience designing video capture, processing, formatting, recording, reproduction, and display systems and also participated in the development of the JPEG and MPEG standards cited in the patent specification and several dependent claims. I have studied, practiced, and researched in this field for over 40 years. I summarize in this section my educational background, work experience, and other relevant qualifications.

Attached hereto as Exhibit A is a copy of my current Curriculum Vitae (CV), and Exhibit B is a list of my testimony and depositions for at least the past five years.

6. By way of background, I am the owner/principal of Media Strategies and Solutions, LLC ("MediaSandS"), which provides consulting services. I currently serve as President and Founder of MediaSandS. My consultancy works with clients to define and implement new media distribution and product strategies with special focus on technology, business, copyright protection, and regulatory matters. Further, I work as a technology expert in litigation.

7. I received a Bachelor of Science degree in Engineering from the University of California, Los Angeles, and a Master of Science degree in Electrical Engineering from California State University, Long Beach.

8. I have delivered more than 45 addresses on five continents at conferences, summits, fora and other engagements relating to displays, television,

and entertainment technologies. I am a named inventor on fifteen issued U.S. patents, as well as numerous foreign patents, in the field of film, television, video distribution, transmodulation, and anti-piracy technologies. A listing of my publications, speaking engagements and patents is contained in my attached CV. Examples of my patents that include video and image compression and recording include:

- US Patent 5,557,298. Method for receiving a video window's boundary coordinates to partition a video signal and compress it's components. Awarded 9/17/1996.
- US Patent 5,926,611. High resolution digital recorder and method using lossy and lossless compression technique. Awarded 7/20/1999.
- US Patent 6,005,620. Statistical Multiplexer for Live and Pre-Compressed Video. Awarded 12/21/1999.

9. I have received over ten awards for contributions to media technology and engineering, including five Technology and Engineering Emmy Awards and an Advanced Media Technology Emmy Award, jointly with other members of the respective development teams. A listing of these awards is contained in my attached CV.

10. I have more than 40 years of experience in film, television, video, displays, communications, consumer electronics, computer, and information

technologies research, development, design, engineering, operations, testing and manufacturing. I am highly proficient in digital television technologies.

11. For example, I was a regular participant in JPEG and MPEG standards meetings starting from 1991 representing my company in the American (ANSI) standards and the United States in international standards. At times, I served as the head of the United States delegation to the parent group of the JPEG and MPEG working groups, i.e., ISO/IEC JTC1 SC29. I have experience in many international, national, and consortia standardization activities.

12. Prior to founding MediaSandS, I held various positions at the Motion Picture Association of America, Inc. (“MPAA”). I served as Vice President of Television & Video Systems from 2002-2007, and then as Senior Vice President & Chief Technology Officer from 2007-2010. During my time at the MPAA, I led efforts to facilitate a smooth transition to digital technology, including digital television standards work with ATSC, CEA (now CTA), DVB, ITU and similar organizations in the United States and around the world. For example, I represented the MPAA in industry and regulatory efforts both nationally and internationally related to the transition from analog to digital video production, distribution, and consumption systems and standards.

13. Before my time at the MPAA, I held various positions at DIRECTV, Inc., leading the business start-up of DIRECTV Japan, the launch of the first US

nationwide HDTV service, and DIRECTV's first receiver development team. Specifically, I served as Director/Senior Manager of Multi-user Systems from 1995-1997, Director of the Japan Enterprise Startup Team from 1997-1998, Director of the HDTV Program from 1998-1999, and Director of Product Development from 1999-2001. My positions at DIRECTV typically involved oversight of engineering teams and, in some cases, broader teams including engineering, broadcast operations, sales, programming, customer service, IT, finance, legal and public relations personnel. I led the HDTV business start-up for DIRECTV, working with our MPEG-2-based HDTV broadcast encoder manufacturer and multiple MPEG-2-based HDTV consumer electronics manufacturers as they developed their initial DIRECTV HDTV televisions and receivers, which were also ATSC-compliant. I led DIRECTV's set-top box development activity when DIRECTV decided to take control of their middleware and hardware platforms, forming and leading a team of 70 engineers. In these activities, I worked with content producers to define copyright protection requirements and security technology companies to define copy protection and digital rights management solutions for DIRECTV's standard definition and high definition video outputs.

14. Prior to DIRECTV, I worked for its parent company, Hughes Electronics. From 1982 to 1991, I was a hardware, software and chip designer in

an organization that was a leader in Navy and air traffic control workstations having 1280x1024 (within HD range) and 2048 x 2048 (double HD) resolutions, respectively. Among other systems, I designed the display engines for these workstations. From 1991-1995, I led research and development activities in multimedia technologies for entertainment, security, financial, medical, and command and control business initiatives, including participation in JBIG, JPEG, and MPEG picture and video compression standards organizations during the development of those respective standards.

15. In writing this Declaration, I have considered the following: my own knowledge and experience, including my work experience in image and video technologies and related fields; my experience managing other engineers working in those fields; and my experience in working with others involved in those fields, including design engineers, researchers, and academicians from different companies, institutions, and countries. In addition, I have analyzed the following publications and materials, in addition to other materials I cite herein:

LG-1005 U.S. Patent No. 6,005,621 to Linzer et al. (“Linzer”)

LG-1006 U.S. Pat. App. Pub. No. 2002/0131760 to Hirai et al. (“Hirai”)

LG-1007 U.S. Patent No. 6,288,743 to Lathrop (“Lathrop”)

LG-1008 U.S. Patent No. 6,028,603 to Wang et al. (“Wang”)

- LG-1009 International Publication No. WO1998057294A1 to Anderson (“Anderson”)
- LG-1010 U.S. Patent No. 5,724,579 to Suzuki (“Suzuki”)
- LG-1020 “Generic coding of moving pictures and associated audio information: video,” ITU-T, Recommendation H.262, July 1995. (“H.262”)
- LG-1021 Bohoris, “Simulation and optimization of JPEG and motion JPEG.” MSc Telematics (Telecommunications and Computer Engineering), Project report, University of Surrey, UK (1998). (“Bohoris”)
- LG-1022 Czyszczonek, et al., K.W., 1998, June. “Real-time implementation of JPEG encoder/decoder.” In Input/Output and Imaging Technologies (Vol. 3422, pp. 281-292). SPIE. (“Czyszczonek”)
- LG-1023 Fokker, “Functional specification of JPEG decompression, and an implementation for free.” In Programming Paradigms in Graphics: Proceedings of the Eurographics Workshop in Maastricht, The Netherlands, September 2–3, 1995, pp. 102-117. Vienna: Springer Vienna, 1995. (“Fokker”)

- LG-1024 Wallace, 1992. The JPEG still picture compression standard. IEEE transactions on consumer electronics, 38(1), pp.xviii-xxxiv. (“Wallace”)
- LG-1025 U.S. Patent No. 5,603,002 to Hashimoto (“Hashimoto”)
- LG-1028 McIntyre, et al., IETF RFC 2301, “File Format for Internet Fax,” March 1998, downloaded from the internet <https://datatracker.ietf.org/doc/html/rfc2301> on December 29, 2024
- LG-1029 (Excerpts) Hansen, “The Dictionary of Computing & digital Media: Terms & Acronyms,” Franklin, Beedle & Associated, Incorporated, 1999. (“Hansen”)
- LG-1030 (Excerpts) Botto, “Dictionary of Multimedia and Internet Applications: A Guide for Developers and Users, Wiley & Sons, 1999. (“Botto”)
- LG-1031 IPR2018-00905, Decision Denying Institution of *Inter Partes Review*
- LG-1032 U.S. Patent No. 5,606,379 to Williams (“Williams”)

- LG-1037 (Excerpts) Freedman, “The Computer Desktop Encyclopedia,”
The Computer Language Company Inc., 1996 (“Freedman”)
- LG-1038 (Excerpts) Margolis, “Computer & Internet Dictionary,” Third
Edition, Random House, 1999 (“Margolis”)
- LG-1039 U.S. Patent No. 6,920,150 to Pauls, et al. (“Pauls”)
- LG-1040 U.S. Patent No. 7,359,439 to Conover (“Conover”)
- LG-1041 U.S. Patent No. 6,256,348 to Laczko, et al. (“Laczko”)
- LG-1042 (Excerpts) Downing, et al., “Dictionary of Computer and
Internet Terms, Sixth Edition,” Barron’s Educational Series,
Inc., 1998 (“Downing”)
- LG-1043 IETF RFC 2302, Tag Image File Format (TIFF) - image/tiff
MIME Sub-type Registration, March 1998,
<https://datatracker.ietf.org/doc/html/rfc2302>, *accessed on*
January 10, 2024.
- LG-1044 IETF RFC 2306, Tag Image File Format (TIFF) - F Profile for
Facsimile, March 1998,
<https://datatracker.ietf.org/doc/html/rfc2306>, *accessed on*
January 10, 2025.

- LG-1045 “Adobe Photoshop version 5.0,” Adobe Systems Incorporated, 1998.
- LG-1046 Kylander, et al., “GIMP: The Official Handbook,” The Coriolis Group, 1999, ISBN 1-57610-520-2.
- LG-1047 U.S. Patent No. 8,972,867 to Pavley, et al. (“Pavley”)
- LG-1048 U.S. Patent No. 7,567,276 to Anderson, et al. (“Anderson ’276”)
- LG-1049 U.S. Patent No. 5,528,293 to Watanabe, et al. (“Watanbe”)
- LG-1050 CCITT T.81, “Information Technology – Digital Compression and Coding of Continuous-Tone Still Images – Requirements And Guide-lines,” 1993 (“CCITT”)
- LG-1051 T.I.F.F. Revision 6.0, 1992, Aldus Developers Desk (“TIFF 6.0”)
- LG-1052 “JPEG Still Image Data Compression Standard,” Pennebaker and Mitchell, Van Nostrand Reinhold, 1993 (“Pennebaker”)
- LG-1053 Inside Macintosh, “Imaging With QuickDraw,” 1994.
- LG-1054 Dr. Dobb’s, “The BMP File Format, Part 1,” March 1, 1995.

LG-1055 Rec. ITU-R BT.601-5 (1995), “Studio Encoding Parameters Of Digital Television For Standard 4:3 And Wide-screen 16:9 Aspect Ratios.”

LG-1056 Rec. ITU-R BT.709-3 (1998), “Parameters Values For The HDTV Standards For Production and International Programme Exchange.”

LG-1058 U.S. Patent No. 5,614,952 to Boyce, et al. (“Boyce”)

16. I have reviewed the '760 patent (LG-1001), and relevant excerpts of the prosecution history (LG-1002) of the '760 patent.

17. Counsel (Fish & Richardson) has informed me that I should consider these materials through the lens of one of ordinary skill in the art related to the '760 Patent at the time of the earliest possible priority date of the '760 Patent, and I have done so during my review of these materials. I have been informed by Counsel to use “Foreign Application Priority Date” July 5, 1999, listed on the front page of the '760 Patent.

18. I have no financial interest 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. My opinions, as explained below, are based on my education, experience, and expertise in the fields relating to the ‘760 Patent. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in the art¹ as of the earliest possible priority date. Annotated and modified figures that appear within this document have been prepared with the assistance of Counsel and reflect my understanding of the ‘760 Patent and the prior art discussed below.

III. OVERVIEW OF CONCLUSIONS FORMED

20. This declaration explains the conclusions that I have formed based on my analysis of all of the considered materials and my personal experience. To summarize those conclusions, based upon my knowledge and experience and my review of the prior art references listed above, I believe that:

- Ground 1 renders claims 1-9 obvious.
- Ground 2A renders claims 1 and 3 obvious.
- Ground 2B renders claims 4, 6-7, and 9 obvious.
- Ground 3 renders claims 4, 6-7, and 9 obvious.
- Ground 4 renders claims 1, 3-4, 6-7, and 9 obvious.

¹ Also called person of ordinary skill in the art (POSITA) herein.

21. In support of these conclusions, I provide an overview of the references in Section VIII and more detailed comments regarding the obviousness of claims 1-9 (“**the Challenged Claims**”) of the ‘760 patent in Section IX.

IV. LEVEL OF ORDINARY SKILL IN THE ART

22. In my opinion, one of ordinary skill in the art relating to, and at the time of, the Priority Date would have been someone with (1) at least a bachelor’s degree in computer science, computer engineering, electrical engineering, or a related field, and (2) at least two years of industry experience in the relevant industry. Additional education could compensate for a deficiency in work experience, and *vice-versa*.

23. Based on my experiences, I have a good understanding of the capabilities of a POSITA. As of 1999, I was at least a POSITA, supervised engineers who were POSITAs, and worked closely with many engineers, researchers, and academicians who were POSITAs. Based on my knowledge, skill, and experience, I have an understanding of the capabilities of a POSITA. For example, from my industry experience, I am familiar with what a POSITA would have known and found predictable in the art. From supervising junior engineers, I also have an understanding of the knowledge that a person with this academic and work experience possesses. Furthermore, I possess those capabilities myself.

V. LEGAL STANDARDS

A. Terminology

24. 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 in the art. 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 in the art at the time of the invention was made (not today). The '760 Patent was filed July 10, 2002, and claims priority to 09/446,338, which was filed December 20, 1999, and further claims priority to a Japanese application filed July 5, 1999, which I refer to as the "Critical Date" in this proceeding. Because I do not know at what date the invention as claimed was made, if ever, I have used the Critical Date of the '760 Patent as the point in time for claim interpretation purposes. My opinion does not change if the invention date is earlier.

B. Legal Standards

25. I have been informed by Counsel and understand that documents and materials that qualify as prior art can render a patent claim unpatentable as being anticipated or obvious.

26. I am informed by Counsel and understand that all prior art references are to be looked at from the viewpoint of a person of ordinary skill in the art at the time of the invention, and that this viewpoint prevents one from using his or her own insight or hindsight in deciding whether a claim is anticipated or rendered obvious.

C. Anticipation

27. I understand that patents or printed publications that qualify as prior art can be used to invalidate a patent claim as anticipated or as obvious.

28. I understand that, once the claims of a patent have been properly construed, the second step in determining anticipation of a patent claim requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

29. I understand that a prior art reference “anticipates” an asserted claim, and thus renders the claim invalid, if all limitations of the claim are disclosed in that prior art reference, either explicitly or inherently (i.e., necessarily present).

D. Obviousness

30. I understand that even if a patent is not anticipated, it is still invalid if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA.

31. I have been informed by Counsel and understand that a claim is unpatentable for obviousness and that obviousness may be based upon a combination of references. I am informed by Counsel and understand that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. However, I am informed by Counsel and understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.

32. I am informed by Counsel and understand that when a patented invention is a combination of known elements, a court determines whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue by considering the teachings of prior art references, the effects of demands known to people working in the field or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art.

33. I am informed by Counsel and understand that a patent claim composed of several limitations is not proved obvious merely by demonstrating that each of its limitations was independently known in the prior art. I am informed by Counsel and understand that identifying a reason those elements would be combined can be important because inventions in many instances rely

upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. I am informed by Counsel and understand that it is improper to use hindsight in an obviousness analysis, and that a patent's claims should not be used as a "roadmap."

34. I am informed by Counsel and understand that an obviousness inquiry requires consideration of the following factors: (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.

35. I have been informed by Counsel and understand that an obviousness evaluation can be based on a single reference or a combination of multiple prior art references. I understand that the prior art references themselves may provide a suggestion, motivation, or reason to combine, but that the nexus linking two or more prior art references is sometimes simple common sense. I have been informed by Counsel and understand that obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may be supplied by the direction of the marketplace.

36. I have been informed by Counsel and understand that if a technique has been used to improve one device, and a person of ordinary skill at the time of invention would have recognized that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

37. I have been informed by Counsel and understand that practical and common sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I have been informed by Counsel and understand that a person of ordinary skill looking to overcome a problem will often be able to fit together the teachings of multiple prior art references. I have been informed by Counsel and understand that obviousness analysis therefore takes into account the inferences and creative steps that a person of ordinary skill would have employed at the time of invention.

38. I have been informed by Counsel and understand that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill at the time of invention, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

39. I have been informed by Counsel and understand that a claim can be obvious in light of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense of one of skill in the art.

40. I have been informed by Counsel and understand that there must be a relationship between any such secondary considerations and the invention, and that contemporaneous and independent invention by others is a secondary consideration supporting an obviousness determination.

41. In sum, my understanding is that prior art teachings are properly combined where one of ordinary skill having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of elements recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of multiple prior art references in the claimed manner.

42. I have been informed by Counsel and understand that in an *inter partes* review, “the petitioner shall have the burden of proving a proposition of unpatentability,” including a proposition of obviousness, “by a preponderance of the evidence.” 35 U.S.C. §316(e).

VI. MATERIALS CONSIDERED

43. My analysis and conclusions set forth in this declaration are based on my educational background and experiences in the field (*see* Section II). Based on my knowledge and experience, I believe that I am considered to be an expert in the field. Also, based on my knowledge and experience, I understand and know of the capabilities of persons of ordinary skill in the field around 1999. I had at least the skills and experience of a POSITA in 1999. Further, I supervised more junior engineers in the field in and around that timeframe that were closer to the minimum requirements of a POSITA, which has helped me to place myself in the mindset of such a POSITA for my work on this matter.

44. As part of my independent analysis for this declaration, I have considered the following: the background knowledge/technologies that were commonly known to persons of ordinary skill in this art during the time before the earliest claimed priority date for the '760 patent; my own knowledge and experiences gained from my work experience in the field of the '760 patent and related disciplines; and my experience in working with others involved in this field and related disciplines. In addition, I have analyzed the publications and materials listed in Section II.

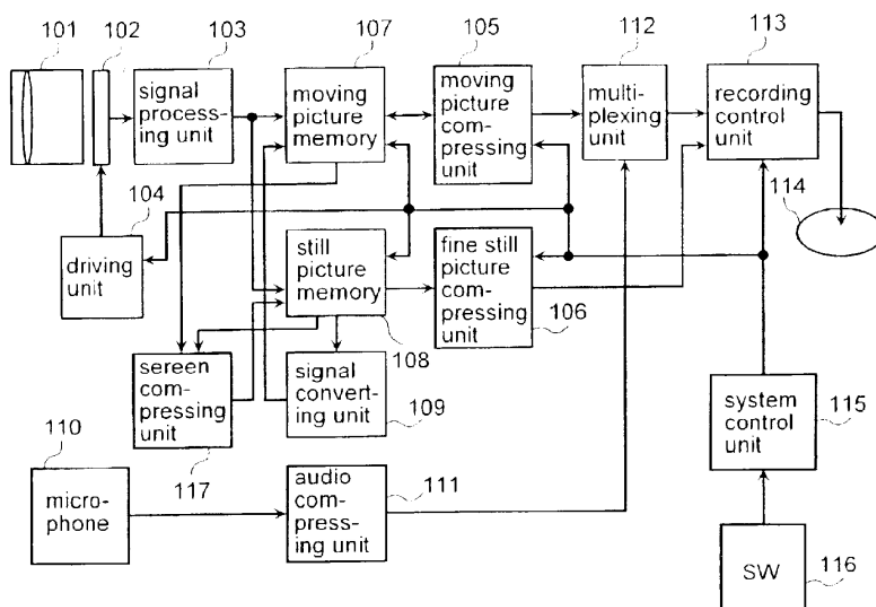
45. My analysis and conclusions set forth in this declaration are based on the perspective of a POSITA.

VII. THE '760 PATENT

A. Overview of the '760 Patent

46. The '760 Patent is directed to “a recording medium which records thereon moving pictures.” LG-1001, Abstract.

47. In one embodiment, the '760 Patent describes a digital camera that records still images using two different recording methods and records thumbnail images to be used when searching images on a display device. LG-1001, 8:31-9:12, 9:33-50. Figure 3 of the '760 Patent is reproduced below:



LG-1001, FIG. 3.

48. Figure 3 is a system block diagram of a camera disclosed in the '760 Patent. *Id.*, 5:41-43. The camera includes moving picture compressing unit 105 for compressing video signals in accordance with a moving picture encoding standard such as MPEG (Moving Picture Experts Group). *Id.*, 8:42-45. The

camera also includes fine still picture compressing unit 106 for compressing video signals in accordance with a fine still picture encoding standard such as JPEG (Joint Photographic Experts Group). *Id.*, 8:45-48. Moving picture memory 107 and still picture memory 108 store picture data temporarily during compressing operations. *Id.*, 8:48-57.

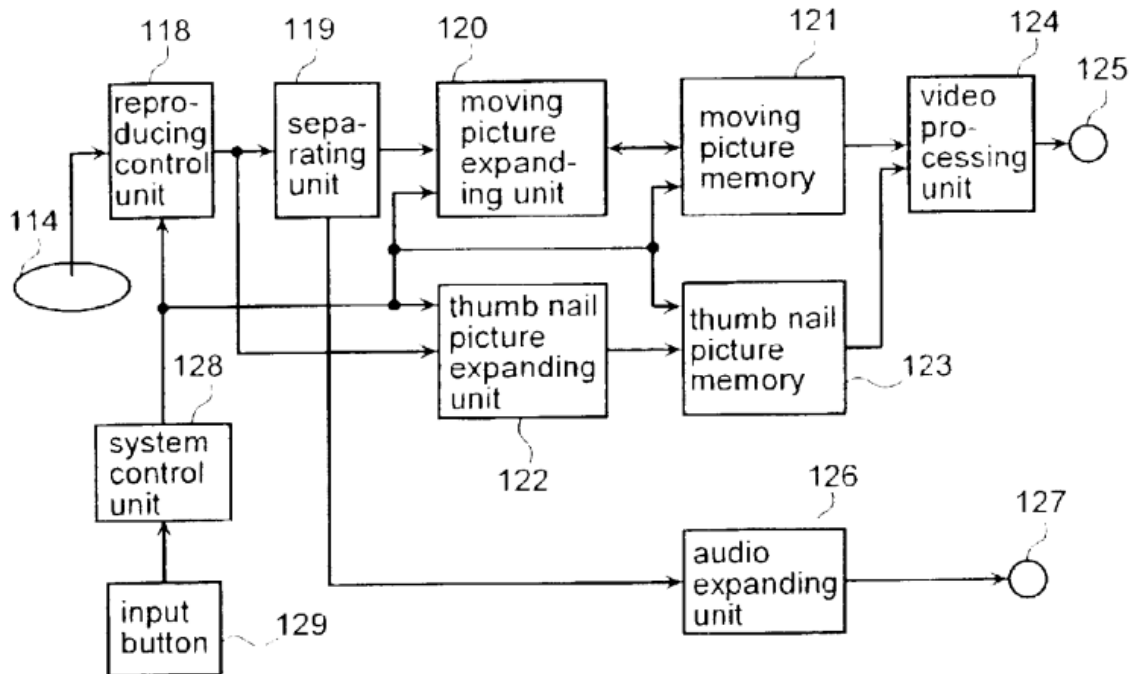
49. When still picture photographing is selected by switch 116, fine still picture compressing unit 106 generates still picture file data that are recorded on recording medium 114. *Id.*, 9:33-36. Signal converting unit 109 converts fine still picture signals to the same signal format as that of single frame moving picture signals and stores them in moving picture memory 107. *Id.*, 8:53-56. Then moving picture compressing unit 105 compresses the signals to MPEG I pictures using an MPEG encoding process and stores them on recording medium 114. *Id.*, 7:7-10, 9:36-39. This method allows still pictures to be reproduced on a player typically used to reproduce MPEG-encoded moving images, so that only one device is needed to decode both moving and still images. *Id.*, 7:12-17. According to the '760 Patent, converting JPEG fine still pictures using an MPEG encoding process and recording such fine still pictures and converted pictures together results in eased compatibility with “ordinary players which reproduce moving pictures” and “omit the signal converting circuit” that would otherwise be required to convert, e.g., “fine still picture signals to the same signal format as that of the

single frame moving picture signals, thereby the apparatus circuit is simplified.”

See id., 1:33-61, 2:19-29, 12:56-58.

50. The camera in Figure 3 also includes screen compressing unit 117, which creates thumbnail pictures by compressing still pictures stored in still picture memory 108 to a smaller screen size and storing them again in still picture memory 108. *Id.*, 9:9-12, 9:39-45. After that, fine still picture processing unit 106 compresses the thumbnail pictures stored in still picture memory 108 and records the thumbnail file data on recording medium 114. *Id.*, 9:45-50. Thus, in this embodiment, a still picture encoded by first and second encoding methods (e.g., JPEG and MPEG) and a corresponding thumbnail picture are stored on the recording medium.

51. Figure 5 of the '760 Patent is reproduced below:



LG-1001, FIG. 5.

52. Figure 5 is a system block diagram of a video reproducing apparatus in accordance with an embodiment described in the '760 Patent. *Id.*, 5:46-47. The reproducing apparatus includes, among other elements, moving picture expanding unit 120 and thumbnail picture expanding unit 122, which, via reproducing control unit 118, obtain picture data files from recording medium 114. *Id.*, 11:34-46. Video processing unit 124 converts expanded pictures to video signals. *Id.*, 11:54-56. System control unit 128 controls the system to display a list of thumbnail pictures via video processing unit 124, video output terminal 125, and an external display. *Id.*, 12:7-18. The user selects a thumbnail, and a data file corresponding to the selected thumbnail is selected from two types of still picture data files (*e.g.*,

MPEG moving picture format or JPEG fine still picture format) and provided to the output terminal. *Id.*, 12:36-67.

B. Prosecution History of the '760 Patent

53. During prosecution, Applicant added to claim 1, for each of first picture, second picture, and picture, the modifier “having descriptive information associated therewith to allow a machine to recognize and decode the ... picture for display.” LG-1002, 36. Applicant stated that “[i]t is respectfully submitted that it was well within the purview of those skilled in the art to be able to implement some type of descriptive information (e.g., **header, filename extension, etc.**) associated with the respective pictures so as to allow the machine to recognize and decode the pictures.” LG-1002, 43 (emphasis added). Examiner subsequently allowed the claims as amended. LG-1002, 24. However, Examiner did not have the benefit of the prior art cited in this petition. *See generally* LG-1002.

54. Further, during prosecution, the following was recorded, “The examiner takes official notice, that it is well known to generate moving with MPEG and corresponding stills and further to generate other images with corresponding images with JPEG, therefore ***it would have been obvious to one skilled in the art at the time of the invention to incorporate JPEG for the stills and MPEG for moving and corresponding still images***, as is well.” (Emphasis added). LG-1002, 83.

VIII. OVERVIEW AND COMBINATIONS OF PRIOR ART REFERENCES

A. U.S. Patent No. 6,005,621 to Linzer et al. (“Linzer”)

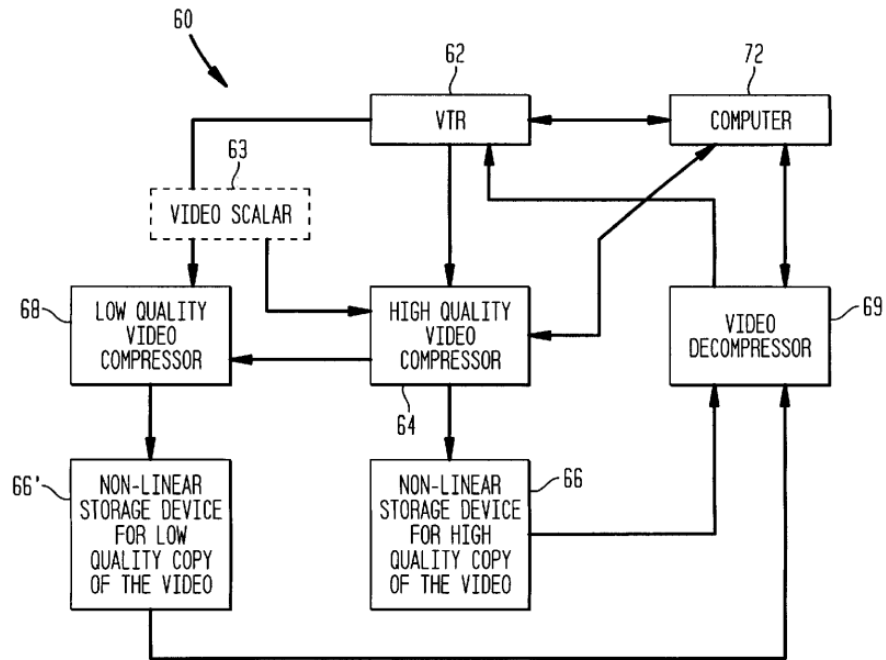
55. Linzer describes a “method for compressing multiple resolution versions of a video signal.” LG-1005, Abstract. Linzer explains that a “multiple resolution video compression system [is] particularly well-suited for use in applications such as ‘non-linear’ video editors,” which enable “the operator to access the video in a random fashion instead of a sequential fashion.” LG-1005, 1:38-40, 5:47-50. A “non-linear video editor includes a decoder which can simultaneously present more low quality compressed video signals than high quality compressed video signals in real time.” LG-1005, 5:18-21. Additionally, “the non-linear video editor includes a computer that can perform more edits/effects (e.g., cuts, wipes, fades, dissolves, trick modes, etc.) on the low quality compressed video signals than on the high quality compressed video signals.” LG-1005, 5:22-25.

56. Linzer further explains that storing “multiple versions of compressed video bit streams is desirable” in video servers which “are used to deliver video bit streams to end users over data communication networks.” LG-1005, 2:64-67. The video server can “deliver video bit streams to different end users over different types of lines,” which can differ substantially in capacity. For example, the server can deliver over “plain old telephone service (POTS) lines, integrated services

digital network (ISDN) lines, T1 lines and the like,” and a “version of a given compressed bit stream that may be suitable for a POTS user would be considered poor quality by a T1 user, and a bit stream suitable for a T1 user would be at too high a bit rate for a POTS user.” LG-1005, 2:67-3:8. Therefore, it is “desirable for the video server to store a given video bit stream at multiple bit rates.” LG-1005, 3:8-10.

57. For example, Linzer’s “FIG. 6 shows a non-linear video editing system 60.” LG-1005, 8:1. A video source “outputs an original video signal to a first video compressor 64 and a second video compressor 68.” LG-1005, 8:3-5. The “first video compressor 64 produces a high quality compressed video bitstream and the second video compressor 68 produces a low quality compressed video bitstream.” LG-1005, 8:5-8. The first and second video compressors can “receive the same version of the input video signal,” as illustrated in FIG. 6, reproduced below. LG-1005, 8:42-43, FIG. 6.

FIG. 6



LG-1005, FIG. 6.

58. The “first video compressor encodes the first resolution version of the video signal to generate a first compressed video bit stream in accordance with MPEG-2 or another suitable video encoding standard.” LG-1005, 4:20-22, claim 10. The second video compressor “produces a lower quality compressed video signal because the video compressor 68 operates according to a less efficient compression standard (e.g. MPEG-1, motion JPEG, H.261, H.263), uses fewer compression options (i.e., users [sic] intra-coding only, uses frame prediction only,

uses a smaller motion vector search range, etc.) or simply compresses the video to a lower bit rate than the second² video compressor 64.” LG-1005, 8:44-52.

59. The “high quality compressed version of the video signal is stored on a first non-linear storage device 66,” and the “low quality compressed version of the video signal is stored on a second non-linear storage device 66’,” and “[p]referably, the first and second non-linear storage devices 66 and 66’ are a single non-linear storage device.” LG-1005, 8:62-9:1. Further, Linzer’s system includes a computer “for viewing and editing video signals and a decompressor 69 for decompressing the low and high quality compressed video signals stored in the non-linear storage devices 66 and 66’.” LG-1005, 9:1-3.

60. Linzer’s invention relies on both video streams produced from the linear video source. LG-1005, 9:14-46. Linzer explains that “the ***low quality compressed video signal*** is easier to store, retrieve, decompress and manipulate (perform edit operations on) than the high quality compressed video signal,” e.g., “it may be easier to play back simultaneously a large number of low quality (low bit rate) bit streams, to play back such bit streams in reverse order, to play back

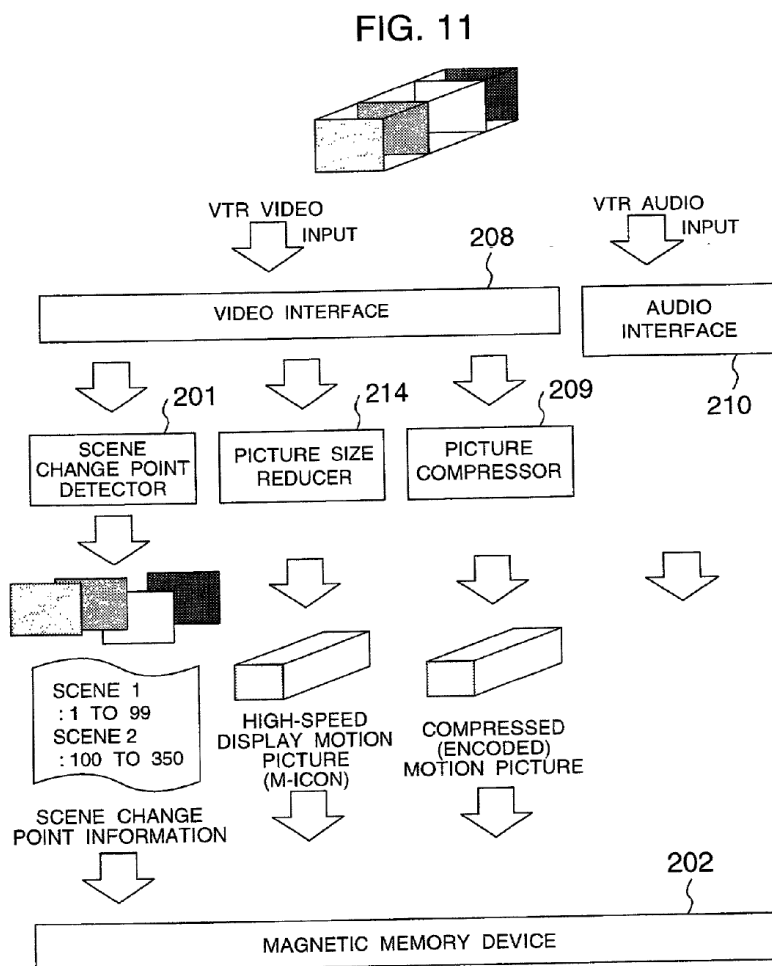
² In some alternatives, Linzer refers to video compressor 64 as the “first video compressor.” LG-1005, 8:1-41. However, in this alternative, Linzer refers to video compressor 64 as the “second video compressor.” LG-1005, 8:50-52.

such bit streams in fast forward or fast-reverse, etc.” LG-1005, 9:29-35. Further, “the operator can easily preview several complex transitions on the *low quality compressed video signal* to determine which produces the best results.” LG-1005, 10:13-15. Once satisfied with the result, the “operator selects a desired complex transition and performs such a transition on the *high quality compressed video signal*.” LG-1005, 10:20-22. Based on this disclosure, and Figure 6’s illustration of the high and low quality compression occurring on the linear video source, a POSITA would have understood that both types of compression are occurring for an incoming video signal.

B. U.S. Pat. App. Pub. No. 2002/0131760 to Hirai et al. (“Hirai”)

61. Hirai describes a non-linear “moving picture editing apparatus for use in production of such a moving picture program as television broadcasting program or video program.” LG-1006, [0001], [0003], FIG. 2. With Hirai’s invention, “since editing can be realized on a scene or cut (or clip) basis, story making can be facilitated.” LG-1006, [0011]. Further, “since [the] division of the input moving pictures into cut units can be automatically carried out, operator’s inconvenience of manually doing so can be eliminated,” and “since the moving pictures can be stored and managed in the form of a hierarchical structure, retrieval of a necessary scene or cut (or clip) can be facilitated.” LG-1006, [0011].

62. As illustrated in FIG. 11, in Hirai, a video tape recorder (VTR) “reproduces a series of moving picture information containing plurality of scenes, sends moving picture in the reproduced information to the video interface,” which “converts the received moving picture information to information having a format processable by the moving picture editing apparatus.” LG-1006, [0006]. The picture compressor “compresses digital data of the reproduced moving pictures, e.g., based on a moving picture experts group (MPEG) or motion joint photographic experts group (motion JPEG) system” and a “magnetic memory device 202 stores therein the received video information.” LG-1006, [0006].



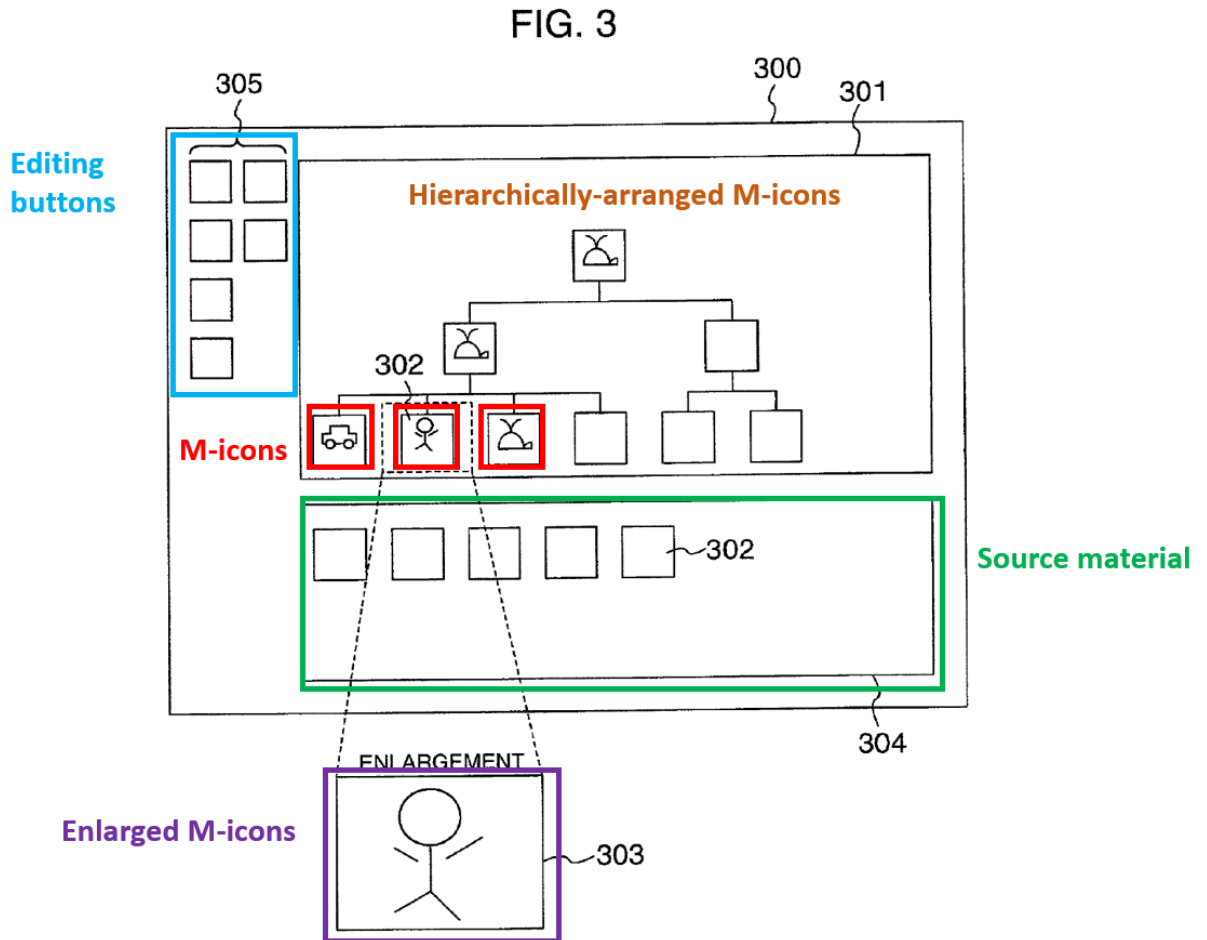
LG-1006, FIG. 11.

63. Then, a “picture size reducer 214 generates a reduced moving picture (M-icon) by thinning out data of each frame into video or moving picture data of 80×60 pixels on the basis of an analysis result of the scene change point detector 201.” LG-1006, [0006]. An M-icon is “a miniature image (for example, of 80×60 pixels)” that is “stored in the magnetic memory device.” LG-1006, [0060]. Hirai explains that when the M-icon “is previously stored as a high-speed display image[], the need for the decoding time can be eliminated, the processing time can

be shortened, and the contents of the image can be quickly confirmed.” LG-1006, [0060].

64. When editing video, the “operator sequentially edits the reduced moving picture (M-icon) on which the scene analysis information obtained at the scene change point detector 201 is reflected, and constructs them into a tree structure.” LG-1006, [0008]. The “operator instructs reading of an M-icon registered in the magnetic memory device 202 with use of such an input device 206 as a mouse or a keyboard,” which “causes the CPU 211 to read out scene/cut analysis information on the corresponding moving picture from the magnetic memory device 202, and on the basis of the information, to read out only the first frame of each scene or each cut from the M-icon and display it on the monitor 203.” LG-1006, [0062].

65. Hirai’s “FIG. 3 shows an example of the editing display screen displayed on the monitor.” LG-1006, [0009].



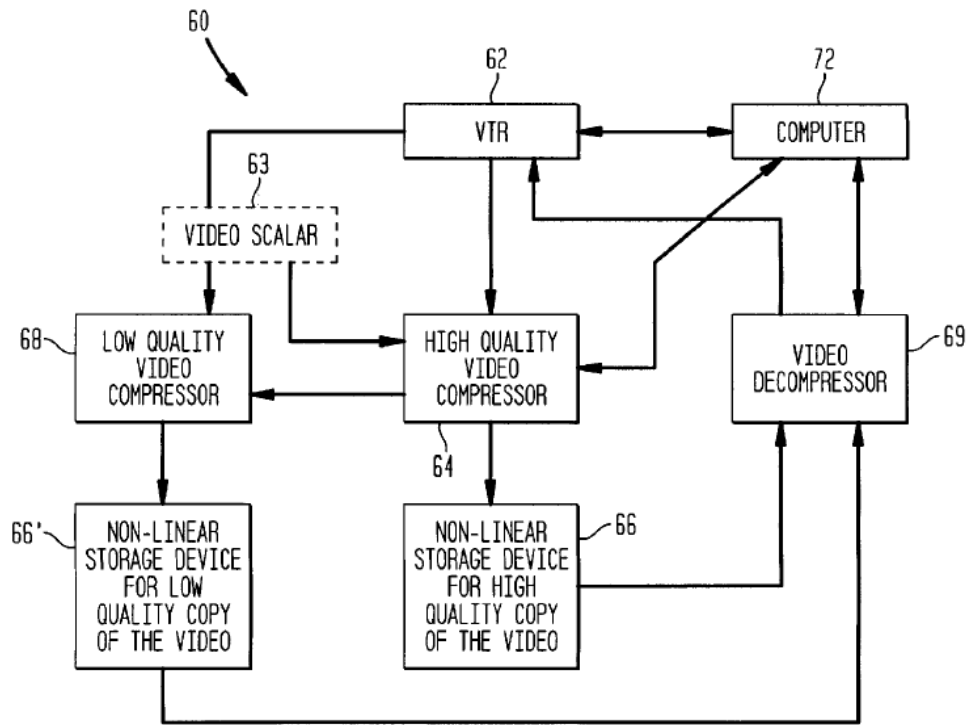
LG-1006, FIG. 3 (annotated)

66. Hirai explains that “[e]diting is carried out by constructing M-icons into such a hierarchical structure as shown in the hierarchical structure area 301 of an editing screen,” where, in the tree area, “M-icons (for example M-icon 302) of a lowest layer are cuts which are composed a plurality of frame images, M-icons of a upper layer of said lowest layer are scenes which are composed a plurality of cuts, and a M-icon of a uppermost layer are moving pictures which are composed a plurality of scenes” such that “in the tree having a plurality of layers, an M-icon is

in upper layer represents a combination of M-icons in a lower layer belonging to the upper layer, which corresponds to a chapter or section in a story.” LG-1006, [0009]. Therefore, “[a]n M-icon in the uppermost layer represents the story.” LG-1006, [0009]. When editing is complete, the compressed moving picture is used “to see a final edited result in detail.” LG-1006, [0061].

C. Linzer-Hirai Combination

67. Linzer describes a “method for compressing multiple resolution versions” of “the same version of [an] input signal,” including a “first video compressor 64 [that] produces a high quality compressed video bitstream and [a] second video compressor 68 [that] produces a low quality compressed video bitstream.” LG-1005, Abstract, 8:3-8, 8:42-43, FIG. 6. Linzer explains that its method can be implemented with a computer “embodied as a general purpose work station or a general purpose work station” with “discrete integrated circuits” or “a single integrated circuit” for compression and decompression and with one or more storage devices for storing the compressed data, illustrated in Figure 6 below. LG-1005, 8:59-9:10 (“a computer 72 for viewing and editing video signals and a decompressor 69 for decompressing the low and high quality compressed video signals in the non-linear storage devices 66 and 66”).

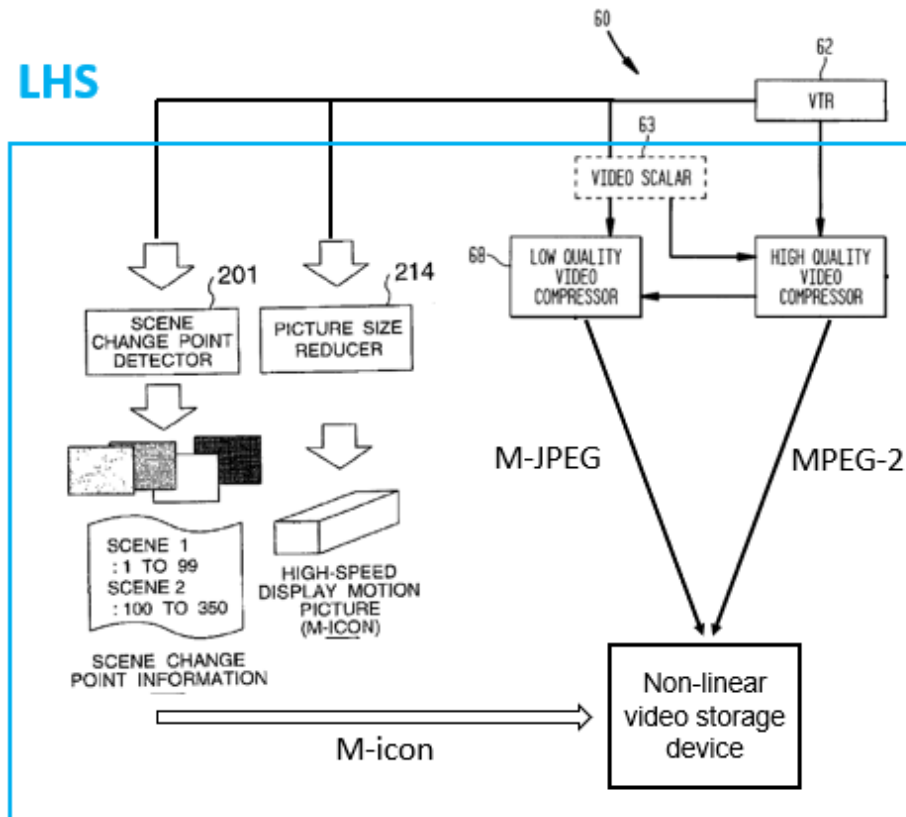


LG-1005, FIG. 6.

68. Linzer further explains that a non-linear storage device can be “a magnetic disk,” and “preferably,” the first and second non-linear storage devices “are a single non-linear storage device,” as illustrated below in modified Figure 6.

LG-1005, 1:19-20, 8:66-9:1.

71. The resulting Linzer-Hirai System (“LHS”), illustrated below, includes low-quality and high-quality video compressors, per Linzer, as implemented in a non-linear editor that includes a picture size reducer 214, per Hirai, which assists in creating a “story,” which is a collection of video segments. LG-1005, 8:5-18; LG-1006, [0009], [0060], FIG. 11. In LHS, the low-quality “version of the video signal may be used to determine how to edit the video to produce a final edited video event,” and the high-quality version “may be used to create the final edited video event.” LG-1005, 3:60-64. To enable the creation of a story, per Hirai, LHS further includes a scene change point detector that “analyzes the received moving pictures on a frame basis and detects a scene change point and a cut change point on the basis of a degree of change in a color distribution between frames” and a picture size reducer that “generates a reduced moving picture (M-icon) by thinning out data of each frame into video or moving picture data of 80×60 pixels.” LG-1006, [0006], [0060]. The image below illustrates the resulting LHS.



LG-1005, FIG. 6 (modified); LG-1006, FIG. 11 (modified).

72. LHS also includes a “single non-linear storage device” for storing both the “high quality compressed version of the video signal” (MPEG-2) and the “low quality compressed version of the video signal” (M-JPEG), per Linzer. LG-1005, 8:63-9:1. A POSITA would have found obvious that LHS further stores the M-icons on the non-linear storage device, as Linzer and Hirai disclose or suggest. LG-1005, FIG. 6; LG-1006, [0060], FIG. 11. By storing the M-icon in this manner, “the need for the decoding time can be eliminated, the processing time can be shortened, and the contents of the image can be quickly confirmed,” per Hirai. LG-1006, [0060].

73. In operation, to enable composition of a video story, LHS produces less efficiently compressed video in M-JPEG and a more efficiently-compressed video in MPEG-2, as Linzer discloses. LG-1005, 4:20-22, claim 10, 8:44-52. According to Linzer, the dual streams enable an operator of a non-linear video editor “to access the video in a random fashion instead of a sequential fashion.” LG-1005, 1:38-40, 5:47-50 (“multiple resolution video compression system [is] particularly well-suited for use in applications such as ‘non-linear’ video editors”). The MPEG-2 is stored on a non-linear storage device (per Linzer), where it can be used to create a final video. LG-1005, 3:62-64, 10:63-65.

74. The low quality video compressor 68 of LHS (shown in the modified figure above) provides an M-JPEG video, as both Linzer and Hirai disclose. LG-1005, 3:58-64; LG-1006, [0006]. Note that the low-quality (M-JPEG producing) video compressor of Linzer and the picture compressor of Hirai perform the same function (transforming video into M-JPEG), so Hirai’s video compressor is unnecessary in LHS. After generating the M-JPEG, the picture size reducer 214 of LHS, shown above in the modified figure, generates “a reduced moving picture (M-icon) by thinning out data of each frame into video or moving picture data of 80×60 pixels on the basis of an analysis result of the scene change point detector,” as Hirai discloses. LG-1006, [0006]. By generating an M-icon, the improved LHS eliminates the need for decoding time, as described above. LG-1006, [0060].

75. Once the M-icons are generated, “the operator organizes the M-icons
302 into such a hierarchical structure as shown in a hierarchical structure display
window 301 to thereby make a story,” as Hirai discloses. LG-1006, [0064]. When
editing is complete, the compressed moving picture is used “to see a final edited
result in detail,” per Hirai. LG-1006, [0061]. Once the operator is satisfied with
the video, LHS “produce[s] a final edited high quality video event” using the
MPEG-2 where it is available for viewing on a computer, per Linzer. LG-1005,
4:1-2, 9:1-2.

76. A POSITA would have had a reasonable expectation of success in
combining Linzer and Hirai because both describe complementary functions of a
non-linear editing system. Linzer discloses generating MPEG-2 and M-JPEG
streams from a video stream so that editing can be performed efficiently. Hirai
discloses generating reduced-pixel M-icons from the M-JPEGs for further
efficiency. LG-1005, 4:20-23, 8:42-52; LG-1006, [0006], [0060].

77. The combination of Linzer and Hirai would have required only
routine programming knowledge well within the skill of a POSITA before the
Critical Date. Indeed, implementing the combination would have amounted to
using known techniques to improve similar systems (non-linear video editing) and
combining prior art elements according to known methods to yield the predictable
results described above.

78. Finally, the elements of the resulting LHS would each perform functions they performed prior to combination—Linzer’s video generation techniques generate video streams and Hirai’s techniques generate M-Icons from the M-JPEG version of the stream. A POSITA would have therefore expected success when combining Linzer’s and Hirai’s teachings.

D. U.S. Patent No. 6,288,743 to Lathrop (“Lathrop”)

79. Lathrop explains that prior art digital cameras “capture and digitize images from a single charge coupled device (CCD) image sensor and store the resultant digital data as relatively ‘raw’ (unprocessed) data in a non-volatile image memory, such as a PCMCIA-ATA type III removable hard drive.” LG-1007, 1:12-17. However, Lathrop explains that “[i]f the processing time per picture is long, either the time the user must wait before taking the next picture will be equally long, or else an expensive, multi-image buffer memory must be provided.” LG-1007, 1:51-54.

80. Per Lathrop, “the image processor incrementally processes the original digital image data such that processed image data of each increment is stored in the non-volatile memory as each increment of processing is completed,” and the “incremental processing of the original image data can then be interrupted in order to capture a new image, while the processed image data for the completed increments of the original image is saved in the non-volatile memory.” LG-1007,

2:13-24. Lathrop explains that “the storage device 32 accordingly is a non-volatile PCMCIA memory card containing either solid state memory, such as Flash EPROM memory,” or “in the preferred embodiment” is “a small hard drive (categorized as a PCMCIA-ATA Type III Hard Drive under the PCMCIA card interface standard).” LG-1007, 4:37-45.

81. Once the camera stores the data, the data are “conveyed to the host computer 12 preferably by removing the storage device 32 from the camera 10 and then inserting the device 32 into a reader 34, e.g., a PCMCIA memory card reader, associated with the computer 12.” LG-1007, 4:52-57. Lathrop also provides an alternative in which “[i]nstead of conveying the digital image data to the host computer 12 by physically transporting the storage device 32 to the computer 12, the camera 10 may be tethered directly to the computer 12 and the data may be transferred directly to the computer 12 via a host interface 42, such as an IEEE 1394 interface connected via cable 44 to a corresponding interface 46 on the computer.” LG-1007, 4:64-5:3. In either case “the computer 12 does not require camera-specific processing capability, and need only handle the conventional JPEG format.” LG-1007, 6:62-64.

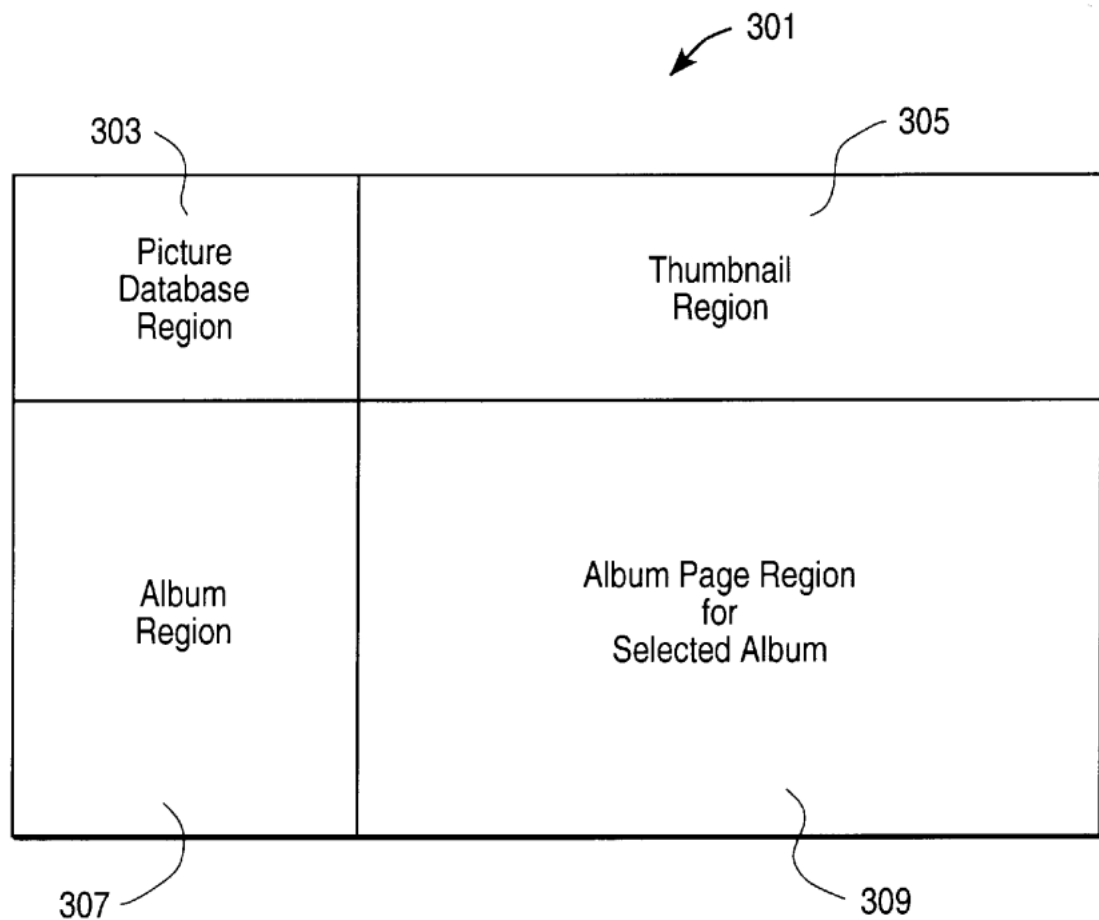
E. U.S. Patent No. 6,028,603 to Wang et al. (“Wang”)

82. Wang is directed to “presenting a collection of digital media in a media container,” e.g., a “digital picture album.” LG-1008, Abstract, 5:28. Wang

explains that the “creation and editing of electronic documents ... has allowed users of such systems to create elaborate and creative documents.” LG-1008, 1:11-14. However, “[o]ne obstacle to the use of such systems is the interface between the user and the computer system,” which “is sometimes so difficult to understand and/or to use that only relatively trivial electronic documents can be created and edited by a typical user.” LG-1008, 1:14-20.

83. In response, Wang describes techniques for “presenting a collection of digital media in a media container.” LG-1008, 1:67-2:1. Wang explains that “digital media or digital pictures are assembled into a picture album, where the album has multiple pages and where at least some of the pages include multiple pictures,” and provides non-limiting examples of JPEG and BMP media objects. LG-1008, 8:23-26, 8:34-35. (A POSITA would have understood that “BMP” indicates a bitmap file.) However, Wang further explains that “[w]hile digital pictures represent one embodiment of the present invention, it will be appreciated that digital media or media objects” can also refer to “video digital media.” LG-1008, 8:18-22.

84. Wang’s system includes a user interface for an album authoring, e.g., “four regions which may be displayed simultaneously” to the user: a picture database region, the thumbnail region, the album list region, and an album page region 309 for a selected album. LG-1008, 6:49-50.

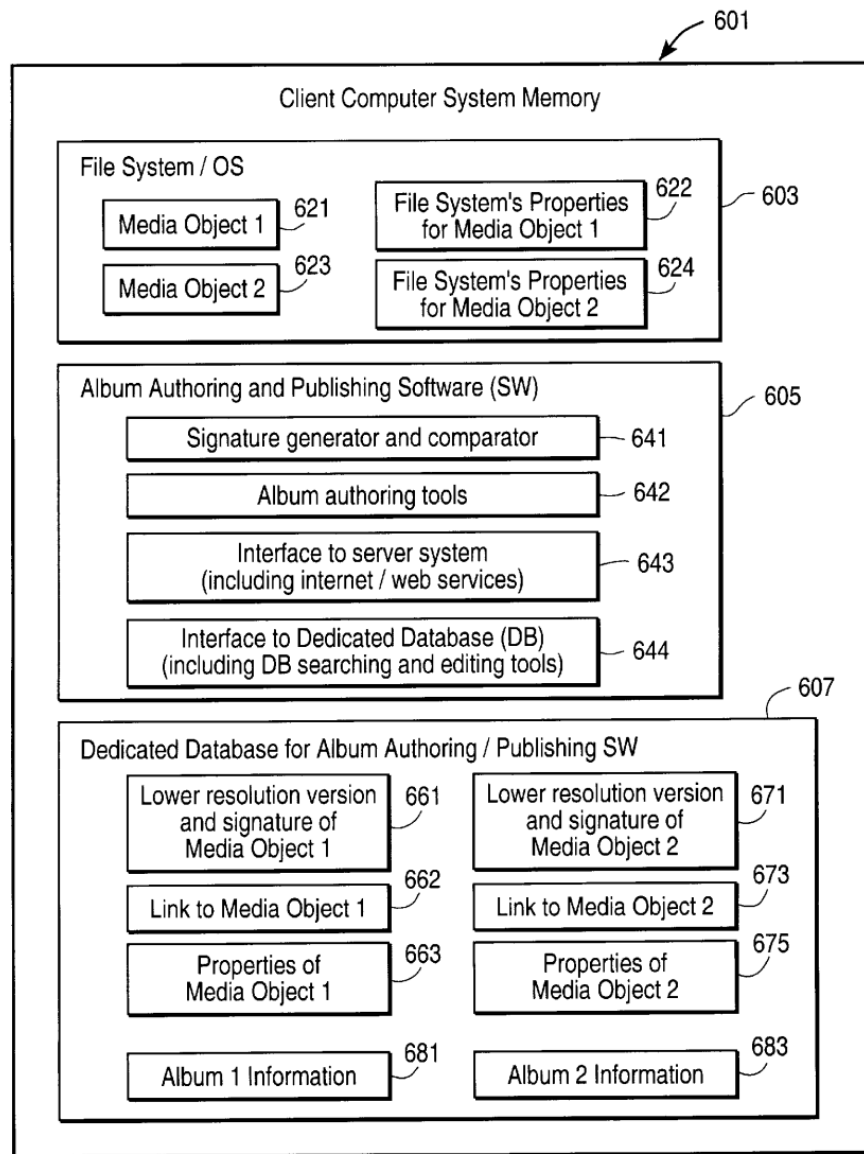


LG-1008, FIG. 5.

85. Wang explains that the “**picture database region** 303 displays an icon ... for all pictures which have been inputted into the album authoring software;” the “**thumbnail region** 305 displays miniaturized thumbnail versions for the images in either the entire database (if the icon for the database is selected) or for the particular album if the icon in the region 303 for that album has been selected;” and the “**album list region** 307 displays icons or representations of the various albums which have been created using the album authoring software.” LG-1008,

6:48-7:17. When “the user selects “a particular icon in the album list region,” it causes “a page to be displayed from that selected album in the *album page region* 309.” LG-1008, 7:17-20.

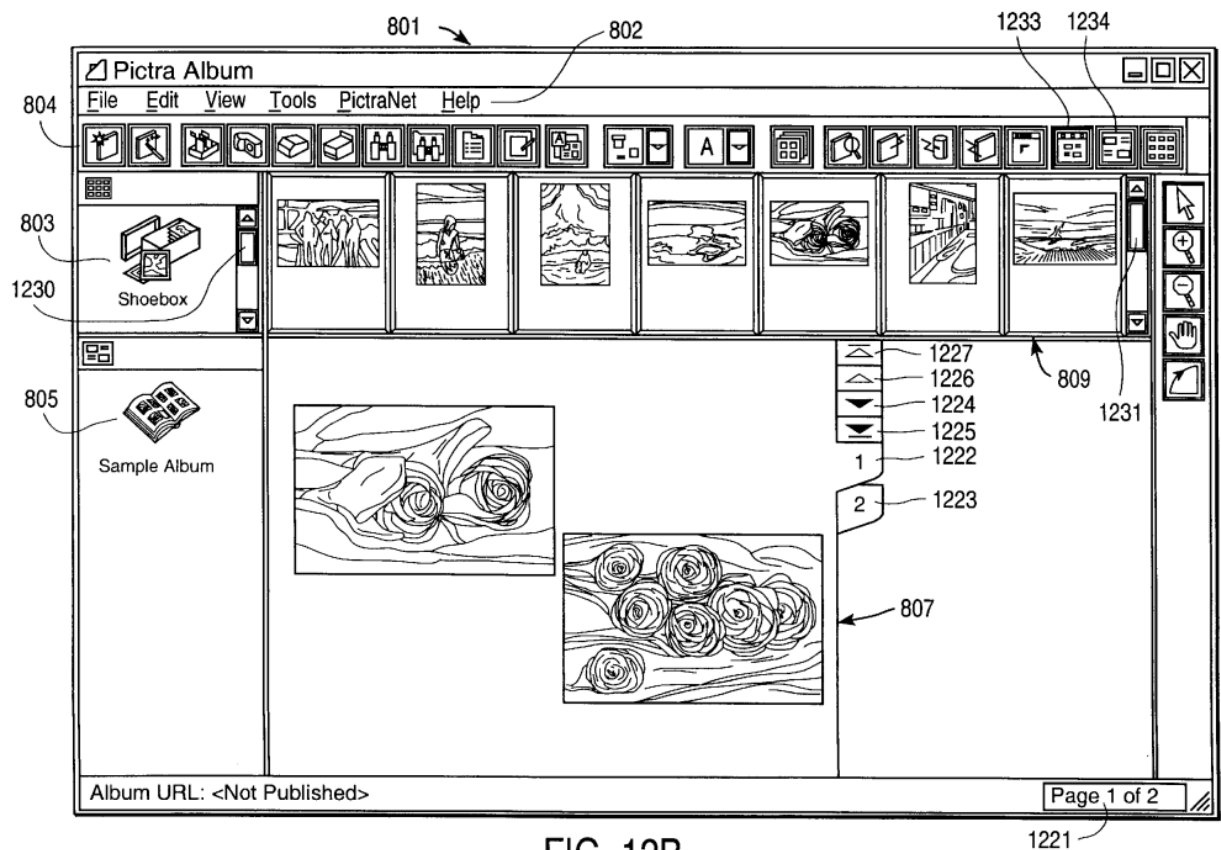
86. Wang’s “FIG. 6 illustrates an example of a computer readable storage medium containing various elements which are used with one embodiment of the present invention,” and includes a “database element 607 includes information for the various pictures in the various albums a user may create.” LG-1008, 8:3-17. The database stores, for each media object, “a lower resolution version of the digital picture, as well as the signature of the media object and a link to the original (higher resolution) media object as well as information indicating the properties of the media object.” LG-1008, 8:56-60. Wang explains that the lower resolution version can be “a thumbnail image.” LG-1008, 8:65-9:1.



LG-1008, FIG. 6.

87. Wang's FIG. 12B "shows a window created by one embodiment of the album authoring software." LG-1008, 13:4-5. In the figure, the currently selected view shown "is the thumbnail and album page view which may be invoked by clicking on the icon 1233," which "causes the album authoring

software to display thumbnails 809 in the thumbnail region for all the pictures in the picture database since the opened shoebox icon 803 has been selected.” LG-1008, 13:7-13. In this example, “the user is viewing the first page of two pages of this sample album.” LG-1008, 13:21-23. Using the editor, “the user may add a picture to a picture album by selecting a thumbnail representation in the thumbnail region and dragging this representation onto a slot of a page displayed in the album page region.” LG-1008, 13:61-63.



LG-1008, FIG 12B.

88. Wang's invention can automatically create "a media container for a collection of digital media." LG-1008, 10:55-60. The "defines at least one parameter or criteria in order to perform the search," and the results are displayed in a search results window, and "may be displayed along with thumbnails of each of the images found in the search." LG-1008, 10:59-60, 11:45-49. Wang's interface enables a user to "select particular pictures displayed within the search result window," allowing the user to "create a picture album from some but not all of the images displayed in the window 1101 by performing a conventional multiple select operation." 11:63-12:1.

F. Lathrop-Wang Combination

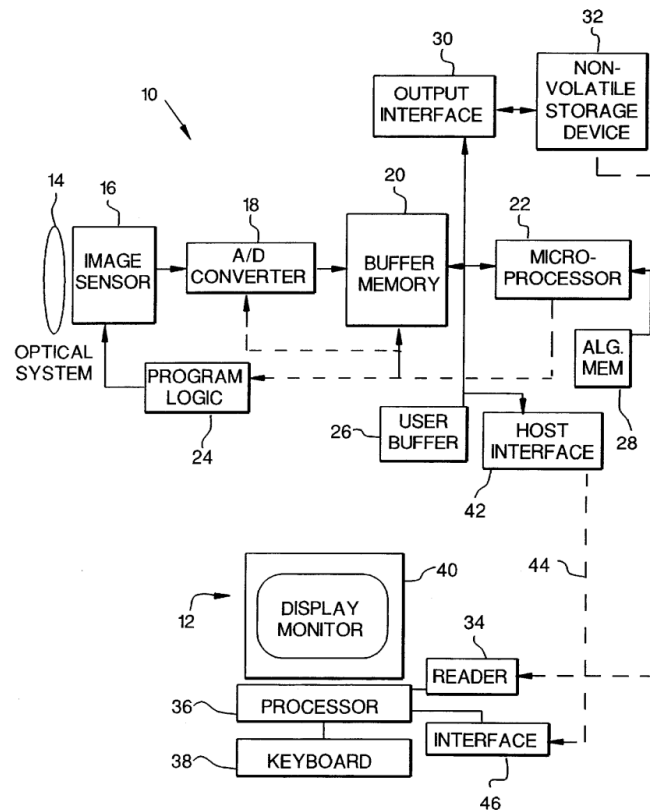
89. Lathrop describes techniques for efficiently creating JPEG files on a digital camera. §VIII.D. In Lathrop, "the image processor incrementally processes the original digital image data such that processed image data of each increment is stored in the non-volatile memory as each increment of processing is completed," and the "incremental processing of the original image data can then be interrupted in order to capture a new image, while the processed image data for the completed increments of the original image is saved in the non-volatile memory." LG-1007, 2:13-24; §VIII.D. Lathrop further explains that files captured by the digital camera are transferred to a computer for further viewing and editing. LG-1007, 4:52-5:3. Lathrop does not, however, describe interacting with the digital camera files on the

computer or techniques for organizing and viewing digital images, so a POSITA would have naturally looked to other references, such as Wang, to better understand how the captured images are then managed on a computer. Wang explains that existing systems allow users to “create elaborate and creative documents,” but were “difficult to understand and/or to use.” LG-1008, 1:11-20. Therefore, to both capture and benefit from digital images, a POSITA would have been motivated to combine the image capture techniques of Lathrop with the image organization and viewing techniques of Wang.

90. The resulting Lathrop-Wang System (“LWS”) includes a digital camera, per Lathrop, enhanced by an apparatus for collection of digital media in a media container, per Wang. §VIII.E; §VIII.D.

91. First, the camera captures sensor data and converts the data to a TIFF image, JPEG image and thumbnail, per Lathrop. §VIII.D. Then, also per Lathrop, the three images are stored on a non-volatile storage device, which “is a non-volatile PCMCIA memory card containing either solid state memory, such as Flash EPROM memory, or a small hard drive (categorized as a PCMCIA-ATA Type III Hard Drive under the PCMCIA card interface standard),” and “non-volatile, storage device 32 (step 110), which in the preferred embodiment incorporates a PCMCIA-ATA type III hard drive.” LG-1007, 3:57-60, 4:9-11, 4:19-22; 5:33-41. Once stored, data are transferred to a computer (per Lathrop), and as noted by

Lathrop, “the computer 12 does not require camera-specific processing capability, and need only handle the conventional JPEG format,” instead of also processing the TIFF data. §VIII.D; LG-1007, 6:62-64.



LG-1007, FIG. 1.

92. Once transferred to the computer, Wang’s digital media system then reads the JPEG images and thumbnails from the non-volatile storage device (which Wang calls “computer readable storage medium”) and presents the thumbnails and images in a user interface that allows users to create electronic albums, e.g., by “defin[ing] at least one parameter or criteria in order to perform [a] search.” LG-1008, 8:3-5, 10:55-60. For example, Lathrop states that “the storage device 32

accordingly is a non-volatile PCMCIA memory card containing either solid state memory, such as Flash EPROM memory, or a small hard drive (categorized as a PCMCIA-ATA Type III Hard Drive under the PCMCIA card interface standard),” and “non-volatile, storage device 32 (step 110), which in the preferred embodiment incorporates a PCMCIA-ATA type III hard drive.” LG-1007, 4:42-46, 5:38-41. Wang further states that the “mass memory 515 is often a magnetic hard disk, an optical disk, or another form of storage for large amounts of data which are often written, by a DMA process, into memory 509 during execution of software in the computer system 501.” LG-1008, 5:1-6. A POSITA would have understood that Latrop’s “PCMCIA-ATA type III hard drive” can serve as Wang’s mass memory “magnetic hard drive.”

93. Then, per Wang, on the computer, the user can identify candidate images to the album using Wang’s search techniques, and include a subset of the results in the album by selecting thumbnails of the desired images. §VIII.B. Also, per Wang, the images in the album are displayed in an album page of the user interface. LG-1008, 12:49-53.

94. A POSITA would have had a reasonable expectation of success in combining the teachings of Lathrop and Wang because both describe complementary functions of an image capture and organization system. Lathrop discloses efficient techniques for capturing images (including thumbnail images)

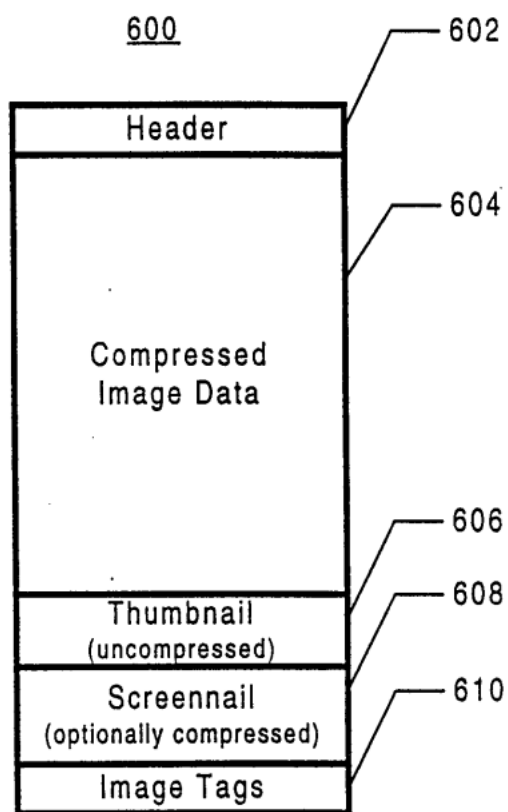
and storing them on a storage device, while Wang discloses reading images and corresponding thumbnail data from a storage device, and organizing the images into albums, all of which would be desirable for managing large amounts of multimedia files.

95. The combination of Lathrop and Wang would have required only routine programming knowledge well within the skill of a POSITA before the Critical Date. Indeed, implementing the combination would have amounted to using known techniques to improve complementary systems (image capture and image organization) and combining prior art elements according to known methods to yield the predictable results described above.

96. Finally, the elements of the resulting LWS would each perform functions they performed prior to combination—Lathrop’s image capture techniques generate images and Wang’s techniques organize those images. A POSITA would have therefore expected success when combining Lathrop’s and Wang’s teachings.

**G. International Publication No. WO1998057294A1 to Anderson³
 (“Anderson”)**

97. Anderson describes an imaging device that captures images and stores the data representing the image “in a single image file that includes a compressed image, a low-resolution image, and a medium-resolution image.” LG-1009, Abstract.



LG-1009, FIG. 6.

³ Citations to Anderson reference the stamped exhibit page number rather than the original page numbers of the PCT publication.

98. The compressed image data “is the actual data comprising the full-sized captured image in compressed form, preferably in JPEG format,” which can be “captured at a resolution of 640x480 pixels.” LG-1009, 12:21-24.

99. The medium resolution image is called a “scrennail image” which “is preferably 288X216,” and can be compressed or uncompressed. LG-1009, 12:33-13-4.

100. The “thumbnail image 606 is a small, uncompressed low-resolution version of the image,” with a pixel size that is “less than the display size of the LCD screen 402 (e.g., 80x60 pixels).” LG-1009, 12:29-31.

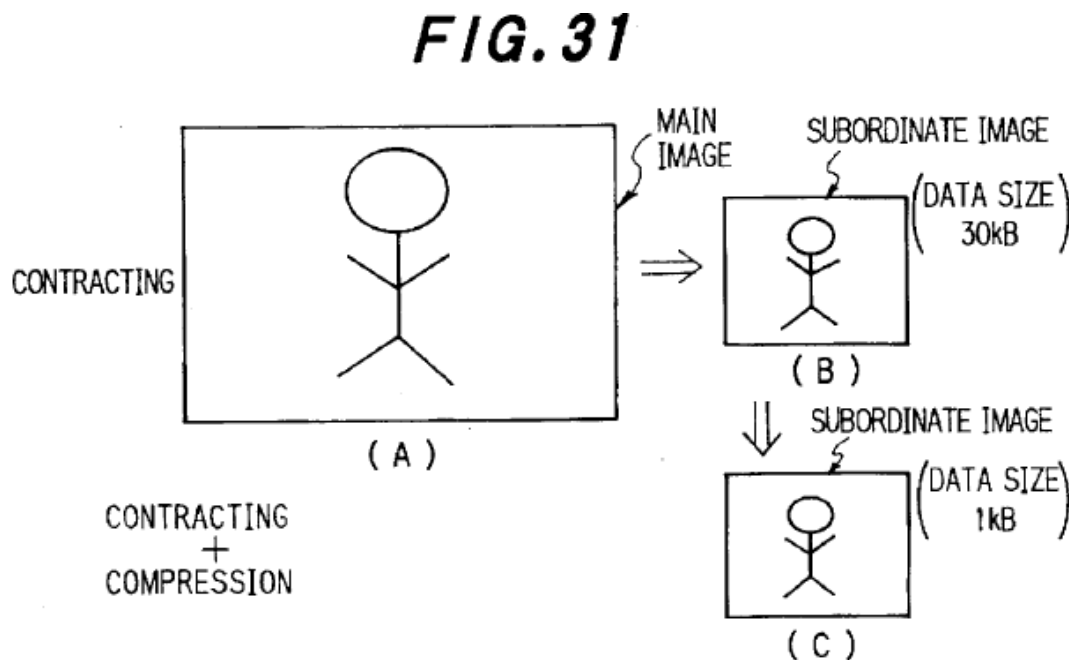
101. Anderson explains that “the image file is used to accelerate the user interface of the image capture unit when the unit is in certain operating modes,” such as “review mode” and “play mode.” LG-1009, 5:13-14, 13:18-20.

H. U.S. Patent No. 5,724,579 to Suzuki (“Suzuki”)

102. Suzuki is directed to an apparatus and method for producing “subordinate images.” LG-1010, Abstract. Suzuki explains that “the subordinate image (e.g., thinned image, contracted image, etc.) is produced by extracting part of the image data of one image frame (hereinafter referred to as the main image), the extracted image being stored in a memory, transmitted to a different image processing apparatus or otherwise being processed.” LG-1010, 9:49-59. “The

recording of the extracted or subordinate image in the memory is made through the operation of system controller 16.” *Id.*

103. For example, Suzuki explains that “the main image in FIG. 31(a) is contracted to obtain the subordinate image of a data size of 30 kB as shown in FIG. 31(B),” which is “further compressed to an image of data size of 1 kB as shown in FIG. 31(C).” LG-1010, 18:20-28, FIG. 31. Suzuki further explains that both the main image and subordinate images are recorded in “IC memory card 15.” LG-1010, 9:21-30, 13:58-64, 13:65-14:8, FIGS. 1, 13.

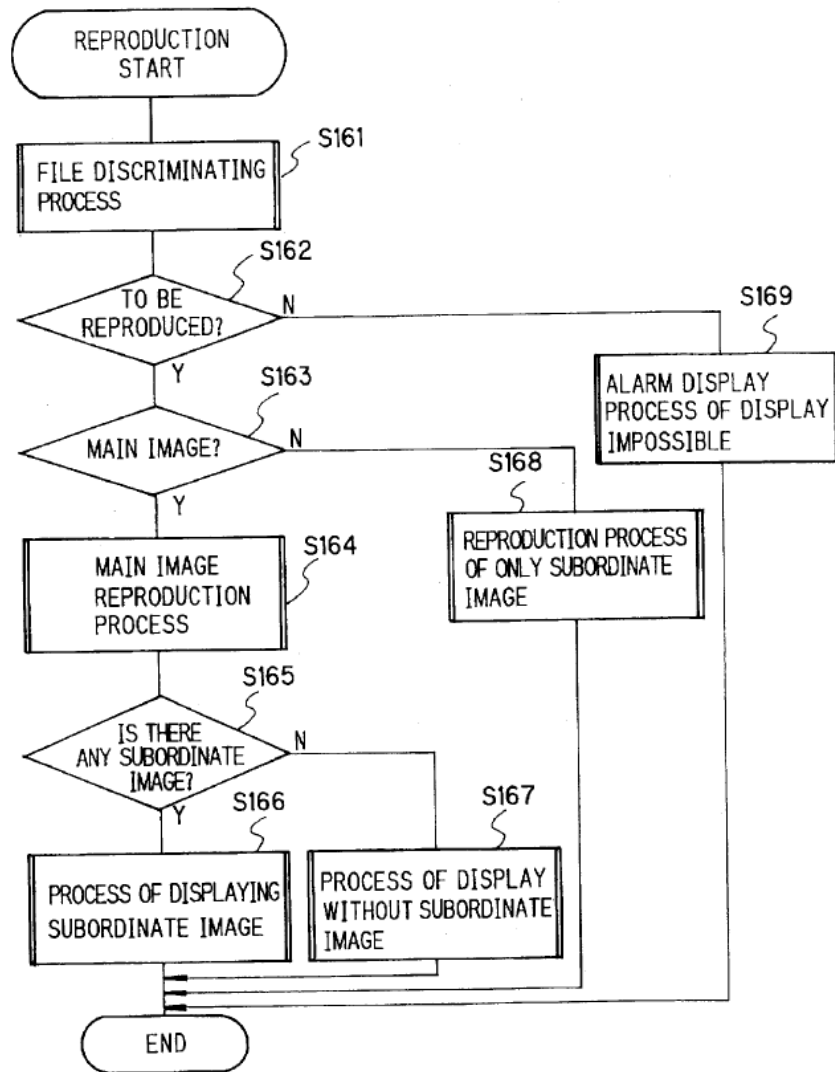


LG-1010, FIG. 31

104. FIG. 32 is a “flow chart illustrating an image reproduction sequence,” which can be used to reproduce “the main image (step S163)” and “the subordinate

image” (step S168). LG-1010, 18:29-55, FIG. 32; *see also id.*, 18:56-19:15, FIG.

33.



LG-1010, FIG. 32

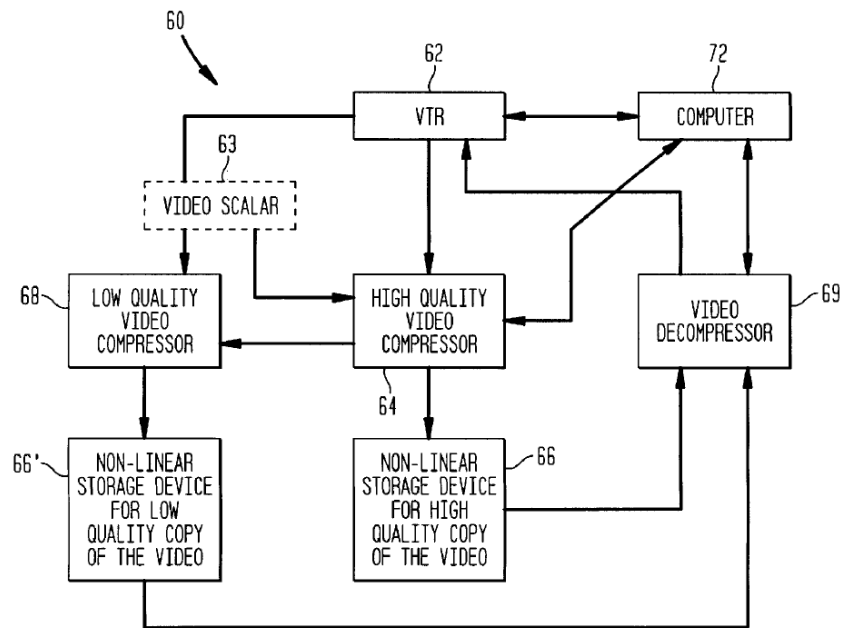
IX. MANNER IN WHICH THE PRIOR ART REFERENCES RENDER THE '760 CLAIMS UNPATENTABLE

A. Ground 1: Linzer-Hirai renders claim 1-9 obvious

[1.1] A machine-readable recording medium comprising:

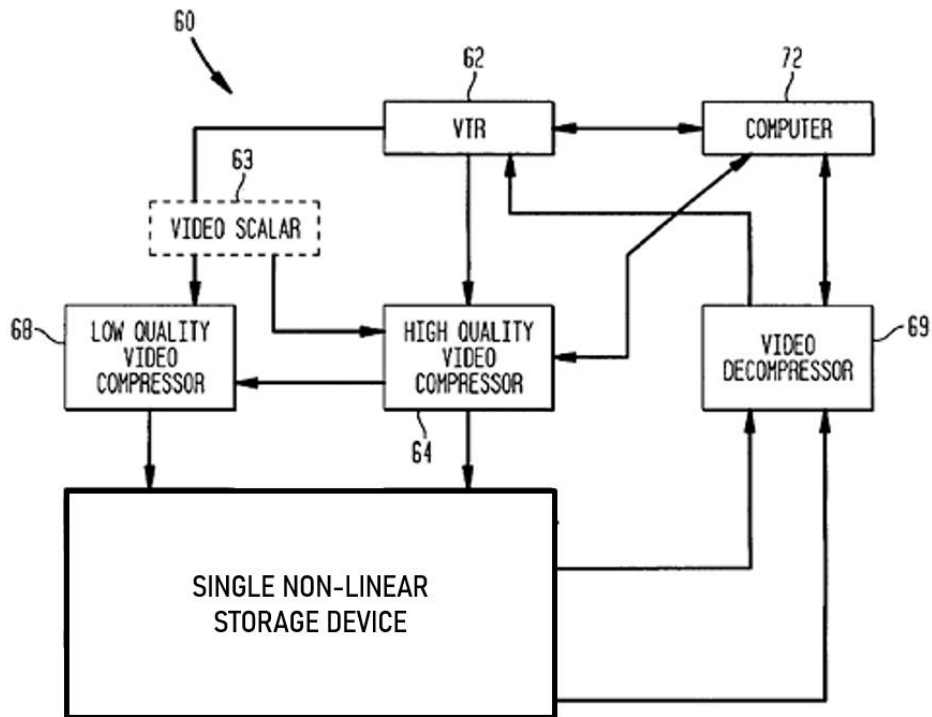
105. LHS renders [1.1] obvious.

106. Linzer explains that a computer is provided “for viewing and editing video signals,” and the computer can be a “general purpose workstation.” LG-1005, 9:1-6. Linzer describes “a non-linear video editor,” with reference to Figure 6, where compressed versions of video bit streams are stored on first non-linear storage device 66 and second non-linear storage device 66'. LG-1005, 5:42-43, 8:1-11:7, FIG. 3.



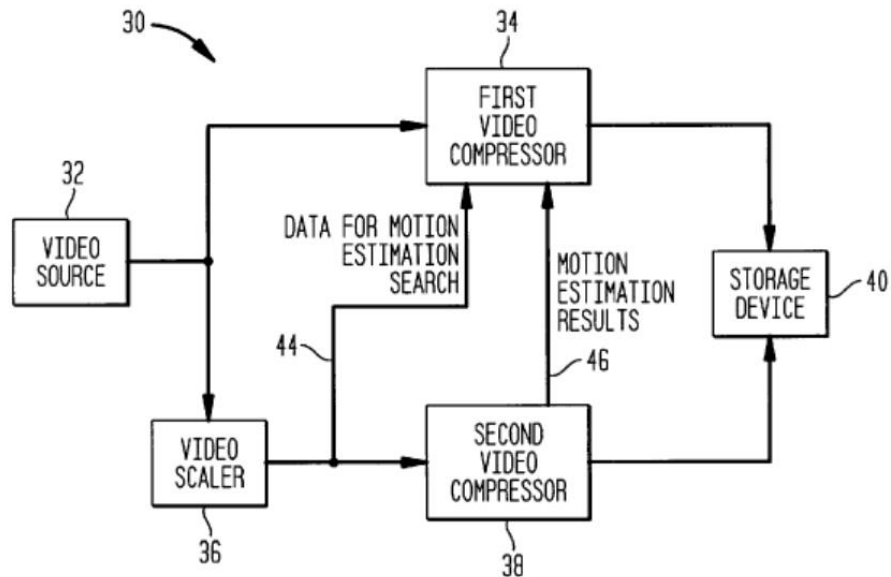
LG-1005, FIG. 6.

107. Linzer further explains that preferably “the first and second non-linear storage devices 66 and 66’ are a single non-linear storage device,” as illustrated below in modified Figure 6. LG-1005, 8:66-9:1.



LG-1005, FIG. 6 (modified).

108. In another embodiment, Linzer describes a “storage device 40” that “stores the resulting compressed video bit stream” of the “first video compressor 34” and “the compressed stream or streams from the second video compressor 38,” where “storage device 40 may be an optical or magnetic disk drive or disk array, an electronic memory or other suitable compressed video storage device.” LG-1005, 6:5-15, FIG. 4.



LG-1005, FIG. 4.

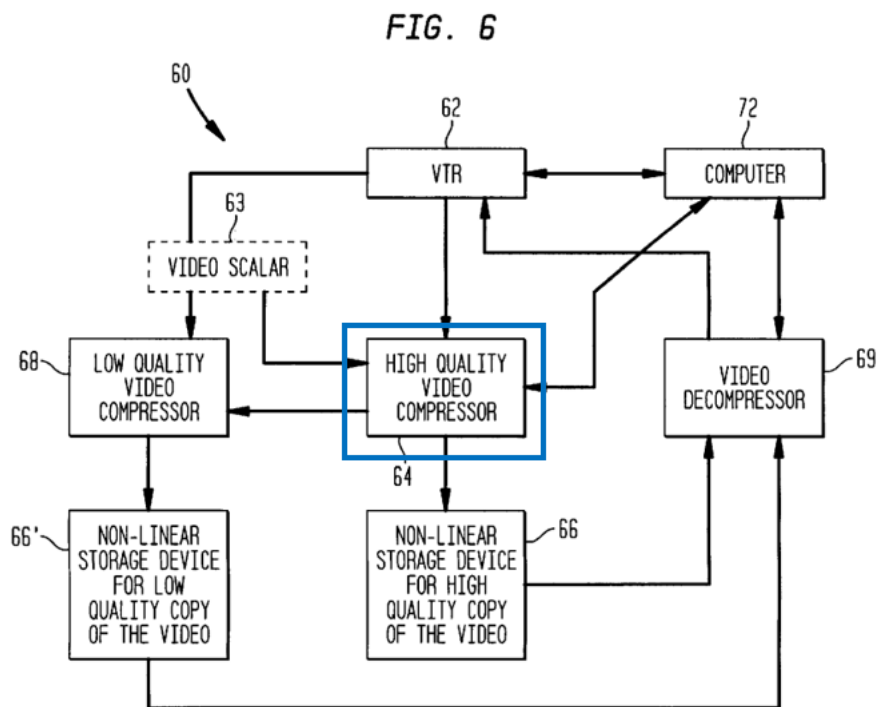
109. A POSITA would have understood that the “single non-linear storage device” Linzer discusses with reference to Figure 6 can similarly be embodied in any of the hardware forms as “storage device 40,” or any similar machine-readable and writeable recording medium. LG-1005, 11:7-17.

[1.2.1] a first still picture recorded thereon encoded by a first encoding methods,

110. LHS renders [1.2.1] obvious.

111. Linzer discloses a machine-readable recording medium with a first still picture recorded thereon encoded by a first encoding method. For example, Linzer explains that the “first video compressor 64 produces a high quality compressed video bitstream.” LG-1005, 8:5-6. Linzer further discloses that the high-quality bitstream can be MPEG-2. LG-1005, 5:15-17, claim 10 (“... wherein

said first compressed bit stream is an MPEG-2 bitstream and said second compressed bit stream is an MPEG-1 bit stream”).



LG-1005, FIG. 6 (annotated)

112. A POSITA would have understood that MPEG-2 video includes I-pictures,⁴ which are individual still pictures. For example, H.262 states that “Intra Coded Pictures (I-Pictures) are coded without reference to other pictures” and “I-pictures are intended to assist random access into the sequence. Applications requiring random access, fast-forward playback, or fast reverse playback may use

⁴ I-pictures are sometimes called “I-frames.”

I-pictures relatively frequently. I-pictures may also be used at scene cuts or other cases where motion compensation is ineffective.” LG-1020, 7, 24.

113. Note that a POSITA would have understood that H.262 is part of the MPEG-2 standard. For example, Boyce explains that “[o]ne version of the MPEG standard, **MPEG-2**, is described in the International Standards Organization--Moving Picture Experts Group, ***Drafts of Recommendation H.262***, ISO/IEC 13818-1 and 13818-2 titled ‘Information Technology--Generic Coding Of Moving Pictures and Associated Audio’ (hereinafter ‘the November 1993 ISO-MPEG Committee draft’) hereby expressly incorporated by reference.” LG-1058, 1:31-38.

114. Specifically, the first still picture is the I-picture at the beginning of the MPEG-2 video file, although it could be any I-picture in the video file or any subsequent Group of Pictures (GOP). As discussed above for [1.1], the compressed video streams (which include individual still images such as the I-picture) can be stored in a “single non-linear storage device.” LG-1005, 8:62-9:1.

115. Therefore, Linzer discloses a first still picture (first I-picture of the MPEG-2 stream, although other pictures can be used, as I explain above) encoded by a first encoding method (MPEG) recorded on a machine-readable recording medium (“single non-linear storage device”). LG-1005, 8:62-9:1.

[1.2.2] wherein the first still picture having descriptive information associated therewith to allow a machine to recognize and decode the first still picture for display;

116. LHS renders [1.2.2] obvious.

117. Linzer explains that “[t]he first video compressor encodes the first resolution version of the video signal to generate a first compressed video bit stream in accordance with **MPEG-2** or another suitable video encoding standard.” LG-1005, 4:20-23. As explained in §IX.A.[1.2.1], the first still picture is the first I-picture in that MPEG-2 video stream (although other I-pictures could be used instead).

118. First, in the ’760 prosecution history, Applicant stated that “[i]t is respectfully submitted that it was well within the purview of those skilled in the art to be able to implement some type of descriptive information (e.g., **header**, filename extension, etc.) associated with the respective pictures so as to allow the machine to recognize and decode the pictures.” LG-1002, 43.

119. A POSITA would have understood that the MPEG-2 video bitstream (including the first still picture) includes descriptive header information that allows a machine to recognize and decode the stream, and therefore to recognize and decode the first still picture (first I-picture). For example, the H.262 component of the MPEG-2 standard includes “start codes [...] that do[es] not otherwise occur in the video stream,” including a “picture_start_code,” and picture header with

picture coding types to indicate, e.g., I-pictures, as illustrated below. LG-1020, 33-35, 40, 60.

picture_header() {	No. of bits	Mnemonic
picture_start_code	32	bslbf
temporal_reference	10	uimsbf
picture_coding_type	3	uimsbf
vbv_delay	16	uimsbf
if (picture_coding_type == 2 picture_coding_type == 3) {		
full_pel_forward_vector	1	bslbf
forward_f_code	3	bslbf
}		
if (picture_coding_type == 3) {		
full_pel_backward_vector	1	bslbf
backward_f_code	3	bslbf
}		
while (nextbits() == '1') {		
extra_bit_picture /* with the value '1' */	1	uimsbf
extra_information_picture	8	uimsbf
}		
extra_bit_picture/* with the value '0' */	1	uimsbf
next_start_code()		
}		

LG-1020, 6.2.3 Picture header

Table 6-12 – picture_coding_type

picture_coding_type	coding method
000	Forbidden
001	intra-coded (I)
010	predictive-coded (P)
011	bidirectionally-predictive-coded (B)
100	Shall not be used (dc intra-coded (D) in ISO/IEC11172-2)
101	Reserved
110	Reserved
111	Reserved

LG-1020, Table 6-12 – picture_coding_type

120. The tables above include descriptive information associated with the I-picture that enables recognition and decoding of the I-picture (first still picture). For example, the “picture_coding_type identifies whether a picture is an intra-coded picture(I), predictive-coded picture(P) or bidirectionally predictive-coded picture(B),” which is information necessary for decoding the picture. LG-1020, 60.

121. Second, Linzer explains that the first video compressor “compresses the full resolution unscaled version of the video signal from source 32 and stores the resulting compressed video bit stream in the storage device 40.” LG-1005, 6:5-8. A POSITA would have understood that an MPEG-2 file would have been stored with a file extension corresponding to the MPEG encoding, e.g., “.mpg.” For example, Pauls states:

The data (or file) is retrieved via a bitstream from the host 22 to the access server 20 to the user 14. The bitstream includes the data and control information. The data has associated a filename with a file extension indicative of a data type (and/or sub-type). The control information includes a user indicator for identifying the user to whom the data is intended, error control information for correcting and/or concealing errors occurring during data transmission, and/or a data type indicator to identify the data type of the associated data. Data types include, but are not limited to, speech/voice,

video/image and text. Each data type has one or more sub-types. Examples of speech/voice sub-types (and file extensions) include audio (.au), wave (.wav) and speech (.sp). Examples of video/image sub-types include tagged image format files (.tif), graphic image format files (.gif), **Moving Picture Experts Group files (.mpg and .mp2)**. Examples of text sub-types include MS Word (.doc) and ASCII (.txt).”). LG-1039, 2:59-3:9 (emphasis added).

122. As described above, the first still picture is an MPEG-2 I-picture, and a POSITA would have understood that the “mpg” file extension is descriptive information that allows a machine to decode the entire stream, including the first still picture (and all other I-pictures in the MPEG-2 bitstream). Further, as I described above, the prosecution history explains that “filename extension” is descriptive information. LG-1002, 43.

[1.3.1] a second still picture recorded thereon encoded by a second encoding method,

123. LHS renders [1.3.1] obvious.

124. Linzer discloses a machine-readable recording medium with a second still picture recorded thereon encoded by a second encoding. For example, Linzer explains that “the video compressor 68 produces a lower quality compressed video signal because the video compressor 68 operates according to a less efficient compression standard (e.g. MPEG-1, ***motion JPEG***, H.261, H.263).” LG-1005, 8:43-48. This video compression is performed in addition to the high-quality

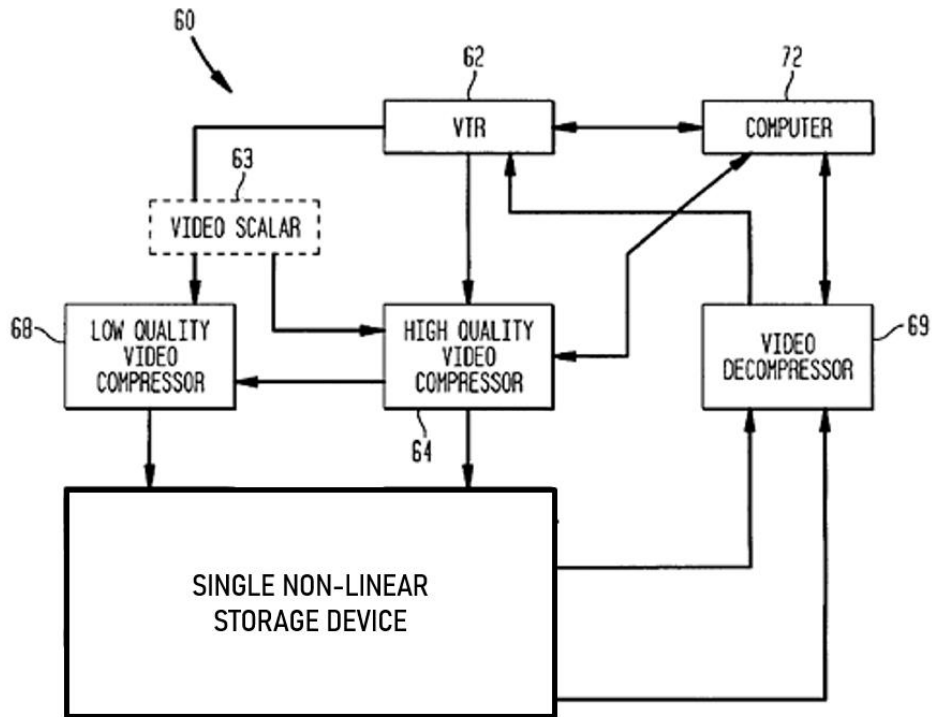
compression, shown in FIG. 6. LG-1005, 8:5-8, 8:42-45, FIG. 6. A POSITA would have understood that motion JPEG (M-JPEG) video consists of a series of still pictures, each encoded as JPEG. For example, Bohoris states that “[i]n Motion JPEG, each frame of a video stream is compressed independently using the JPEG algorithm.”), LG-1021, 9. Conover further states that “In addition to the conventional MPEG compressed video bitstream 42, there also exists another technique for compressing the video signal of a conventional television broadcast frequently identified as motion JPEG. The compressed video bitstream 42 for ***motion JPEG includes only I frames*** 54, and therefore omits both P frames 56 and B frames 58.”. LG-1040, 4:24-29. Laczko writes, “The JPEG coding scheme could be in principal also used for coding of images[sic] sequences, sometimes described as motion JPEG. However, this ***intraframe coding*** is not very efficient because the redundancy between successive frames is not exploited.” LG-1041, 1:27-31.

125. Specifically, the second still picture is the JPEG image at the beginning of the M-JPEG video file, although, similar to my description re: MPEG, other images in the M-JPEG video file could be used.

126. A POSITA would have known that JPEG is an international standard that defines an encoding method, published as CCITT T.81, which notes that “the identical text is also published as ISO/IEC International Standard 10918-1,” such

standards commonly known according to the name of the Joint CCITT and ISO committee that standardized them, Joint Photographic Experts Group (JPEG). The JPEG standard specifies an encoder, a decoder, and the “interchange format,” which “is a compressed image data representation which includes all table specifications” for exchange between application environments. LG-1050, 17.

127. As discussed above for [1.1], the compressed video streams (which include individual still images such as the I-picture) can be stored in a “single non-linear storage device.” LG-1005, 8:62-9:1. Therefore, Linzer discloses a second still picture (JPEG image at the beginning of the M-JPEG stream) encoded by a second encoding method (JPEG) recorded on a machine-readable recording medium (non-linear storage device).



[1.3.2] wherein the second still picture having descriptive information associated therewith to allow the machine to recognize and decode the second still picture for display,

128. LHS renders [1.3.2] obvious.

129. Linzer explains that the second video compressor “produces a lower quality compressed video signal” because it “operates according to a less efficient compression standard,” e.g., “motion JPEG.” LG-1005, 8:44-47. As explained in §IX.A.[1.3.1], the second still picture is the first picture (encoded as JPEG) in that M-JPEG video stream.

130. First, a POSITA would have understood that the JPEG images (which are included in M-JPEG streams), e.g., the second still picture, include descriptive

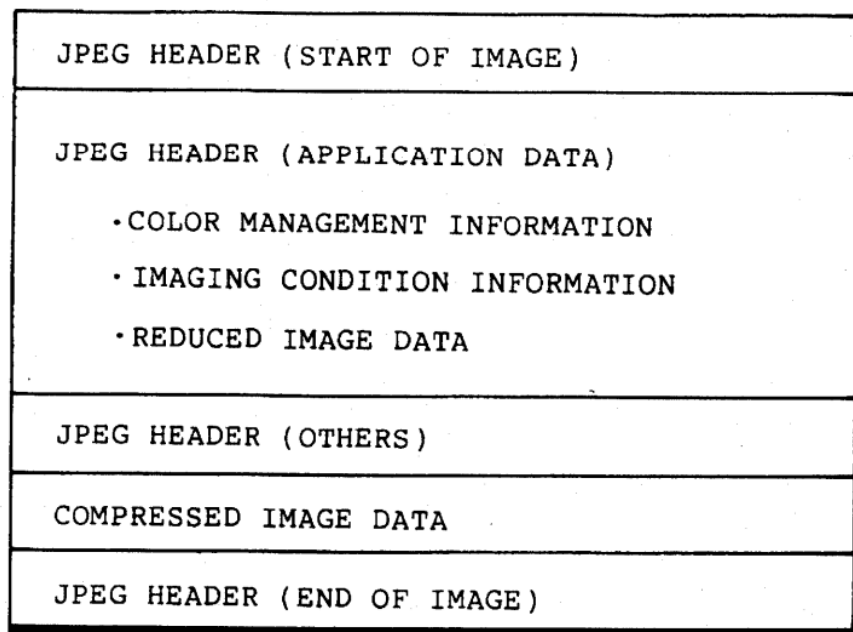
header information that allows a machine to recognize and decode the image, and therefore to recognize and decode the second still picture (first JPEG image in the M-JPEG stream). LG-1002, 43.

131. For example, Watanabe explains that:

The JPEG file comprises a JPEG header conveniently divided into three types, compressed image data, and a final JPEG header. The first JPEG header is a code representing "start of image". The succeeding JPEG header is referred to as application data, which includes individual information of a user. Examples of the user individual information are color management information (for example, the values of parameters used in gamma processing and white balance processing), imaging condition information (for example, the amount of exposure, the focal length, or the presence or absence of strobe flashing), and reduced image data (image data representing a reduced image created by thinning the original image data). This is followed by the other headers conforming to the JPEG system. The headers are followed by the image data obtained by compression processing. Finally, the JPEG header representing "end of image" is arranged.

LG-1049, 5:25-43

132. Watanabe also provides this illustration of the JPEG header:



LG-1049, FIG. 2a.

133. For example, Czyszczonek writes that “Decompression consists of three main components: decoding, dequantization, and inverse Discrete Cosine Transform,” “The data coming into the decoder is decoded using the same Huffman tables described for compression. The *first data of the block will represent the difference magnitude of the DC-coefficient*. The code is looked up in the table to get the SSSS value. This tells the decoder how many additional bits to read to get the value of the difference,” and “Dequantization is only used if the compressed image was quantized. The *same table is used as was in the quantization step of compression*.” LG-1022, 4, 5. Fokker further explains that “What remains to be dealt with, is parsing the JPEG image header in order to collect the various Huffman tables, quantization factors and other parameters,” and

“A JPEG file is partitioned in ‘segments’. Each segment starts with a ‘marker’ (that indicates the type of segment), followed by additional information.)”. LG-1023, 12

134. Second, Linzer explains that the “compressed stream or streams from the second video compressor 38 are also stored in the storage device 40.” LG-1005, 6:12-15. A POSITA would have understood that a M-JPEG file would have been stored with a file extension corresponding to the M-JPEG encoding, e.g., “.M-JPEG.” For example, Pauls writes:

“The data (or file) is retrieved via a bitstream from the host 22 to the access server 20 to the user 14. The bitstream includes the data and control information. ***The data has associated a filename with a file extension indicative of a data type (and/or sub-type).*** The control information includes a user indicator for identifying the user to whom the data is intended, error control information for correcting and/or concealing errors occurring during data transmission, and/or a data type indicator to identify the data type of the associated data. Data types include, but are not limited to, speech/voice, video/image and text. Each data type has one or more sub-types. Examples of speech/voice sub-types (and file extensions) include audio (.au), wave (.wav) and speech (.sp). Examples of video/image sub-types include tagged image format files (.tif), ***graphic image format files (.gif), Moving Picture***

Experts Group files (.mpg and .mp2). Examples of text sub-types include MS Word (.doc) and ASCII (.txt).” LG-1039, 2:59-3:9.

135. A POSITA would have understood that Pauls is generally describing bitstreams, and while not explicitly listed, it would also apply to M-JPEG.

136. Further, as I explained above, the prosecution history lists “filename extension” as descriptive information. LG-1002, 43.

137. Further, a POSITA would know that the JPEG file syntax and semantics, including such SOI, SOS, and EOI, provide the information necessary to locate, recognize, and decode pictures compressed according to the JPEG standard. A POSITA would look to, for example, Pennebaker, which states, “SOI: The SOI (Start Of Image) marker begins the compressed data stream. Note that the SOI marker can be used to detect problems with bit order, bit sense, and bit alignment of the data.” LG-1052, 4. Further, “SOS: The SOS (Start Of Scan) marker begins a scan header. The scan header is always followed immediately by entropy-coded data for the scan. The two-byte length gives the number of bytes of scan parameters.” *Id.* Finally, “EOI: The EOI (End Of Image) marker terminates the JPEG compressed data stream.” *Id.*, 4. A POSITA would further look to the JPEG standard to understand its syntax and semantics. See, e.g., LG-1050” which notes that “the identical text is also published as ISO/IEC International Standard 10918-1,” such standards commonly known according to the name of the Joint

CCITT and ISO committee that standardized them, Joint Photographic Experts Group (JPEG).⁵ The JPEG standard specifies an encoder, a decoder, and the “interchange format,” which “is a compressed image data representation which includes all table specifications” for exchange between application environments. LG-1050, 17.

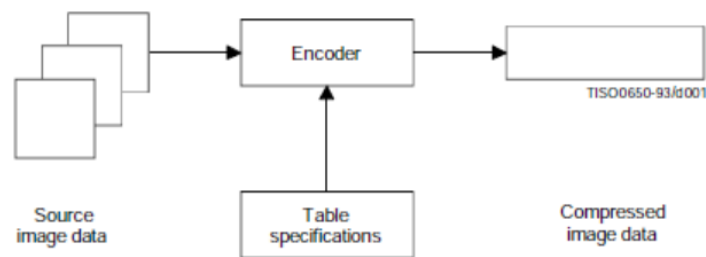


Figure 1 – Encoder

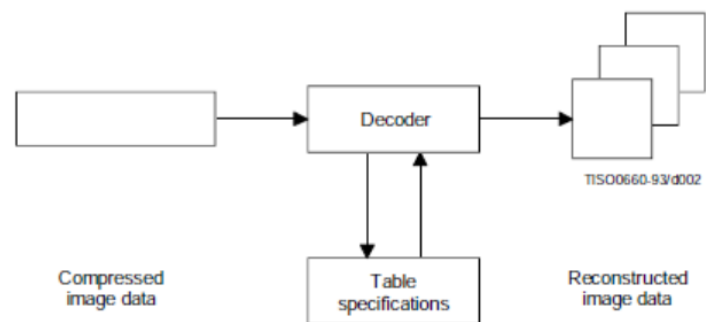


Figure 2 – Decoder

Encoder and Decoder figures, LG-1050, 17.

⁵ I was a member of this committee, representing the U.S. national body (and in that body representing my company), in the early 1990s.

138. The JPEG standard specifies the overall syntax and semantics for JPEG-coded pictures, starting at a high level with the following syntax figure, that includes, e.g., SOI and EOI. “SOI: Start of image marker – Marks the start of a compressed image represented in the interchange format or abbreviated format.” And, “”EOI: End of image marker – Marks the end of a compressed image represented in the interchange format or abbreviated format.” LG-1050, 38.

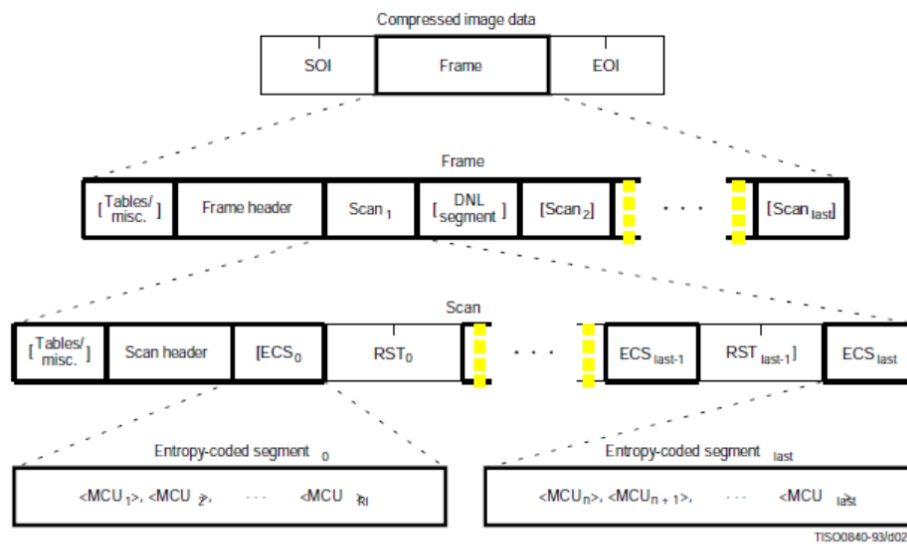


Figure B.2 – Syntax for sequential DCT-based, progressive DCT-based, and lossless modes of operation

Figure B.2. LG-1050, 34.

[1.3.3] wherein the second encoding method is different from the first encoding method; and

139. LHS renders [1.3.3] obvious.

140. In Linzer, the second encoding method (JPEG) is different from the first encoding method (MPEG). See §IX.A.[1.2.1], §IX.A.[1.3.1]. For example, the encoding defined in the H.262 specification (also published as ISO/IEC 13818-

2, more commonly known as MPEG-2 Video) clearly differs from the encoding in the JPEG specification (published as T.81 or alternately ISO/IEC 10918-1, more commonly known as JPEG), which a POSITA would have known. *See, generally*, LG-1020, LG-1024, LG-1050.

[1.4.1] a picture recorded thereon corresponding to said first and second still pictures, which has a smaller number of pixels than said first and second still pictures,

141. LHS renders [1.4.1] obvious.

142. In LHS, a “reduced moving picture (M-icon),” which corresponds to the first and second still pictures and has fewer pixels than the first and second still pictures, is generated and stored. LG-1006, [0006]; §VIII.C.

143. As discussed in §VIII.C, Hirai discloses a “picture compressor 209 [that] compresses digital data of the reproduced moving pictures, e.g., based on a moving picture experts group (MPEG) or motion joint photographic experts group (motion JPEG) system” and a “magnetic memory device 202 stores therein the received video information.” LG-1006, [0006]. Thus, in LHS, a “picture compressor,” per Hirai, can operate on the video (in M-JPEG format) generated by Linzer and containing the second picture. *See* §IX.A.[1.3.1].

144. Hirai additionally explains that a “picture size reducer 214 generates a reduced moving picture (M-icon) by thinning out data of each frame into video or moving picture data of 80×60 pixels on the basis of an analysis result of the scene

change point detector 201.” LG-1006, [0006]. An M-icon is “a miniature image (for example, of 80×60 pixels)” that is “stored in the magnetic memory device.” LG-1006, [0060].

145. As described in §VIII.C, the Linzer-Hirai combination includes picture compressors, as both Linzer and Hirai discuss, and a picture size reducer that “generates a reduced moving picture (M-icon) by thinning out data of each frame into video or moving picture data of 80×60 pixels on the basis of an analysis result of the scene change point detector.” LG-1006, [0006]; §VIII.C. The M-icon for the first frame of the M-JPEG video generated by the Linzer-Hirai system is a picture (M-icon) with a smaller number of pixels (80×60) than the first and second still pictures.

146. Further, a POSITA would have found obvious that LHS further stores the M-icons on the non-linear storage device, per Linzer and Hirai. LG-1005, FIG. 6; LG-1006, [0060], FIG. 11; §VIII.C. By storing the M-icon in this manner, “the need for the decoding time can be eliminated, the processing time can be shortened, and the contents of the image can be quickly confirmed,” per Hirai. LG-1006, [0060].

[1.4.2] wherein the picture having descriptive information associated therewith to allow the machine to recognize and decode the picture for display,

147. LHS renders [1.4.2] obvious.

148. First, Hirai explains that the “generated M-icon is sent to the magnetic memory device 202 and stored therein.” LG-1006, [0006]. In addition, “[m]oving picture analysis information (including frame numbers for scene change points or cut change points) indicative of a relationship between the M-icon and the detection result of the scene change point detector 201 is also sent to the magnetic memory 202 and saved therein,” and the “monitor 203 displays the moving pictures stored in the magnetic memory device 202 ***on the basis of analysis information*** thereof to offer a graphical user interface (GUI) to the operator.” LG-1006, [0006]. A POSITA would have understood that the moving picture analysis information is descriptive information (which as Applicant states should be construed broadly in the ’760 prosecution history) associated with the M-icon to allow the machine to recognize and decode the picture for display since the monitor displays the pictures on the basis of the analysis information. LG-1002, 43; LG-1006, [0006].

149. Second, since the M-Icon is “stored in the magnetic memory device” (LHS’s non-linear storage device), a POSITA would have understood that the M-icon is stored as a file with a file extension indicating the type of a file, e.g., at least from the Pauls quotation listed in ¶121. LG-1006, [0060]; LG-1039, 2:59-3:9. The M-icon’s file extension is “descriptive information associated therewith to

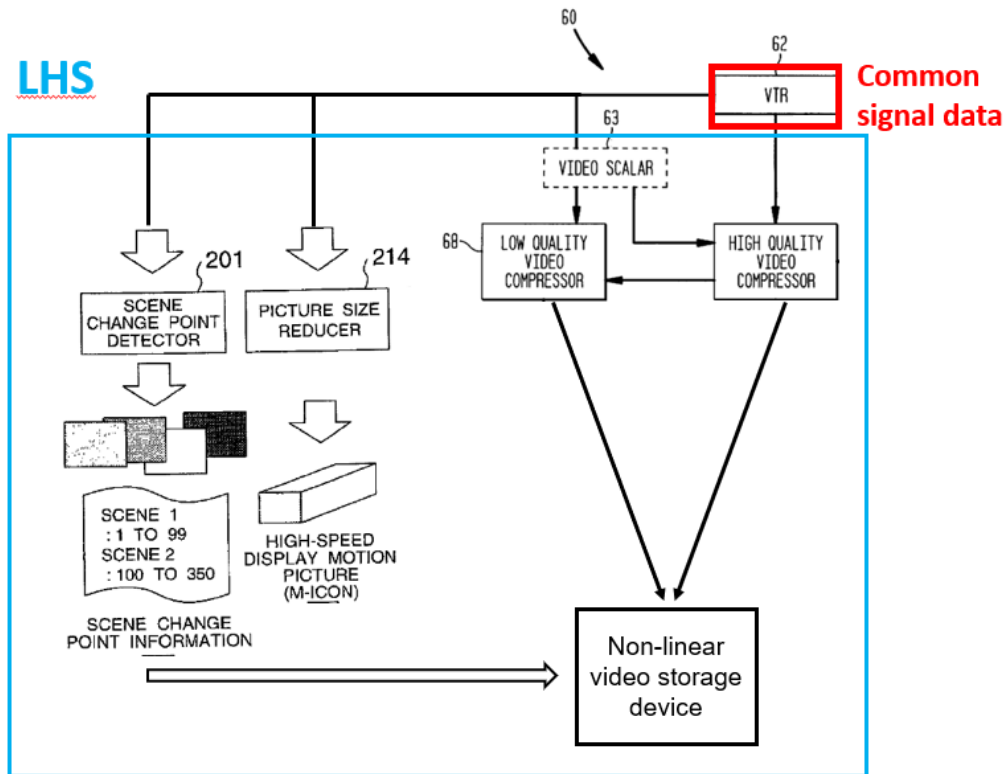
allow the machine to recognize and decode the picture for display.” LG-1002, 43 (“filename extension” as descriptive information, as described above).

[1.5] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data.

150. LHS renders [1.5] obvious.

151. Linzer discloses that the first and second still pictures are derived from common signal data (from the VTR). For example, Linzer explains that “***a linear-video source*** 62 outputs an original video signal to a first video compressor 64 and a second video compressor 68” so the first and second still pictures are derived from common signal data (from the VTR). LG-1005, 8:3-5.

152. Further, since, per Hirai, the M-icon is generated from the first frame of the M-JPEG, picture is also derived from the common signal data.



LG-1005, FIG. 6 (annotated).

[2] A recording medium in accordance with claim 1, wherein said first still picture is encoded by the MPEG standard as the first encoding method, and said second still picture is encoded by the JPEG standard as the second encoding method.

153. LHS renders [2] obvious.

154. In Linzer, the first still picture is encoded by the MPEG standard and the second still picture is encoded by the JPEG standard. See §IX.A.[1.2.1], §IX.A.[1.3.1]; LG-1021, 9; LG-1040, 4:24-29; LG-1041, 1:27-31; LG-1022, 4; LG-1023, 12; LG-1024; LG-1050; LG-1020.

[3] A recording medium in accordance with claim 1, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

155. LHS renders [3] obvious. See §IX.A.[2].

156. In Linzer, the first still picture is encoded by the MPEG standard and the second still picture is encoded by the JPEG standard. See §IX.A.[1.2.1], §IX.A.[1.3.1]; LG-1021, 9; LG-1040, 4:24-29; LG-1041, 1:27-31; LG-1022, 4; LG-1023, 12; LG-1024; LG-1050; LG-1020.

157. A POSITA would have understood that a standard is a “specification for hardware or software that is either widely used and accepted (de facto) or is sanctioned by a standards organization (de jure),” as defined by Freeman. LG-1037, 3. Margolis provides a similar definition, writing that a standard is a “definition or format that has been approved by a recognized standards organization or is accepted as a de facto standard by the industry. Standards exist for programming languages, operating systems, data formats, communications protocols, and electrical interfaces. From a user’s standpoint, standards are extremely important in the computer industry because they allow the combination of products from different manufacturers to create a customized system. Without standards, only hardware and software from the same company could be used together. In addition, standard user interfaces can make it much easier to learn how to use new applications.” LG-1038, 4.

158. Thus, at least from those definitions, a POSITA would have understood that MPEG and JPEG are encoding standards.

159. Specifically, a POSITA would know that MPEG comprises the encoding defined in ITU-T H.262 specification (also published as ISO/IEC 13818-2), a first encoding standard. *See*, LG-1020. Further, a POSITA would know that JPEG comprises the encoding defined in CCITT (now ITU-T) T.81 (also published as ISO/IEC 10918-1), a second encoding standard. *See*, LG-1050.

[4.1] A video reproducing method, comprising:

160. LHS renders [4.1] obvious.

161. For example, Linzer describes a “method for compressing multiple resolution versions of a video signal,” where the “method may be used in a non-linear video editor, a video server or other video processing system.” LG-1005, Abstract. Hirai describes techniques for “editing moving picture.” LG-1006, Abstract. As described in [4.2.1], the method performed by the LHS includes reproducing video.

162. Moreover, as the Board previously noted in IPR2018-00905:

In the ’760 patent, the term “video encompasses both moving and still pictures. *See* Ex. 1001, 2:50-51 (referring to “a video recording apparatus that can record both moving and still pictures on a recording medium”).

LG-1031, 4 n.2.

163. Thus, to the extent the preamble is limiting, according to the Board and in this context, LHS discloses a moving picture and/or still picture reproducing method.

[4.2.1] reproducing at least a first still picture, a second still picture and a picture from a recording medium,

164. LHS renders [4.2.1] obvious.

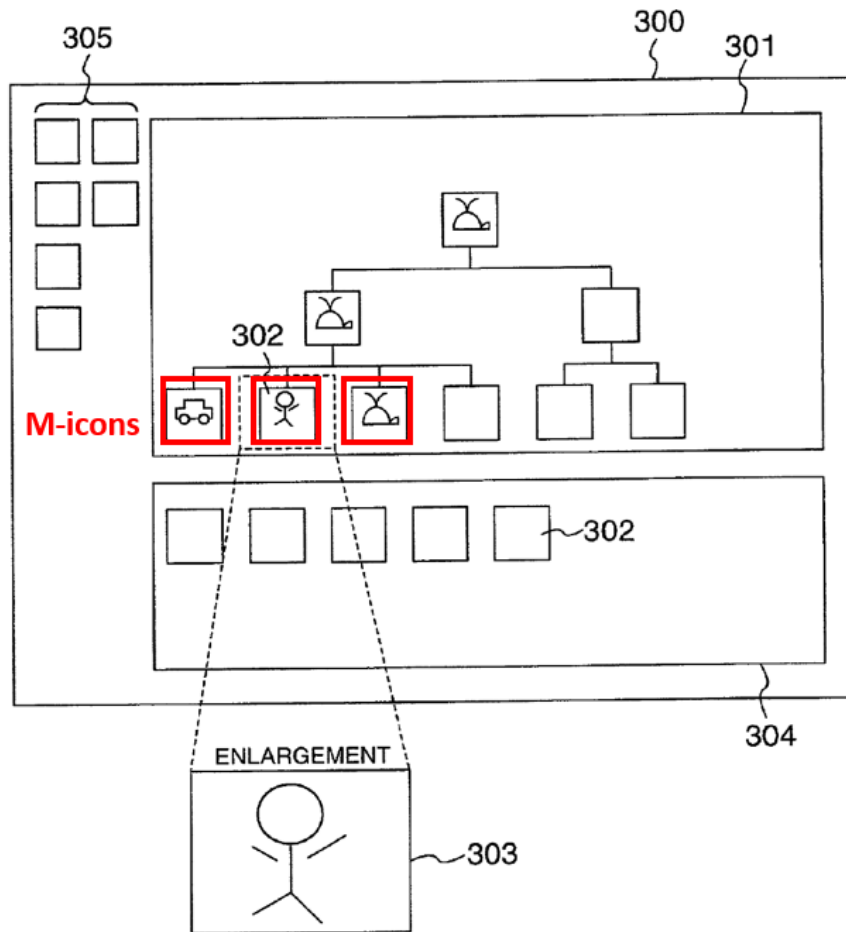
165. See discussion of [1.2.1]-[1.4.2].

166. Hirai discloses reproducing a second still picture from a recording medium. For example, Hirai explains that the “moving picture (compressed moving picture) is used, for example, when it is desired to see a final edited result in detail.” LG-1006, [0061]. Since LHS, including Hirai’s non-linear editor runs on the computer, a POSITA would have recognized that when the edited result (in M-JPEG) was viewed, the second picture (JPEG image in the M-JPEG) would be reproduced. Per Linzer, the low-quality video (M-JPEG containing the second picture) is stored on LHS’s non-linear storage device. LG-1005, 8:62-9:1.

167. Hirai discloses reproducing a picture (M-icon). For example, in Hirai, an “operator instructs ***reading of an M-icon*** registered in the magnetic memory device 202 with use of such an input device 206 as a mouse or a keyboard.” LG-1006, [0062]. Additionally, in FIG. 3, Hirai illustrates “an example of the editing display screen” where “[e]diting is carried out by constructing M-icons into such a hierarchical structure,” and “[i]n the tree (in the hierarchical structure area 301),

M-icons (for example M-icon 302) of a lowest layer are cuts which are composed a plurality of frame images, M-icons of a upper layer of said lowest layer are scenes which are composed a plurality of cuts, and a M-icon of a uppermost layer are moving pictures which are composed a plurality of scenes.” LG-1006, [0009].

168. A POSITA would have found obvious that LHS further stores the M-icons on the non-linear storage device, per Linzer and Hirai. LG-1005, FIG. 6; LG-1006, [0060], FIG. 11; §VIII.C. Hirai explains that, by storing the M-icons, “the need for the decoding time can be eliminated, the processing time can be shortened.” LG-1006, [0060]. Since the M-icons are stored on the non-linear storage device, a POSITA would have found obvious that LHS reproduces the M-icons from the storage device when used by the non-linear video editor.

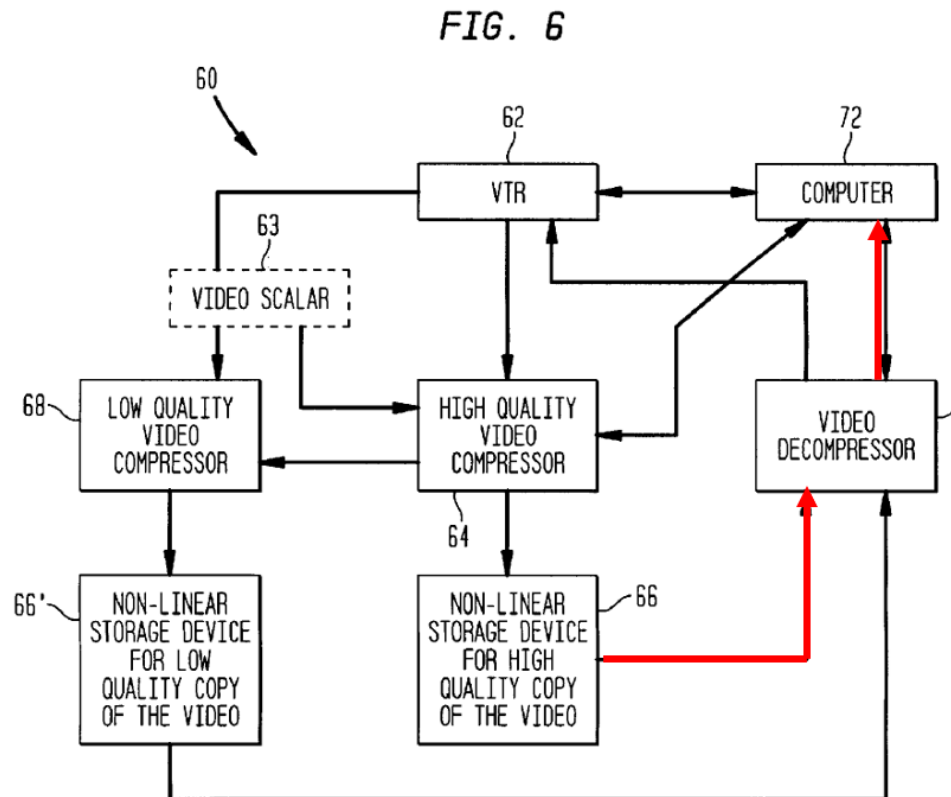


LG-1006, FIG. 3 (annotated).

169. Linzer discloses reproducing a first still picture from a recording medium.⁶ Linzer discloses that the high-quality video, which contains the first still picture (I-picture in MPEG-2), is stored on the non-linear storage device. LG-

⁶ The '760 Patent provides only non-limiting examples of a “recording medium,” explaining that “[n]umeral 114 is **such a** recording medium as an optical disk, **etc.**” and “the like.” LG-1001, 6:23-24, 11:32-34.

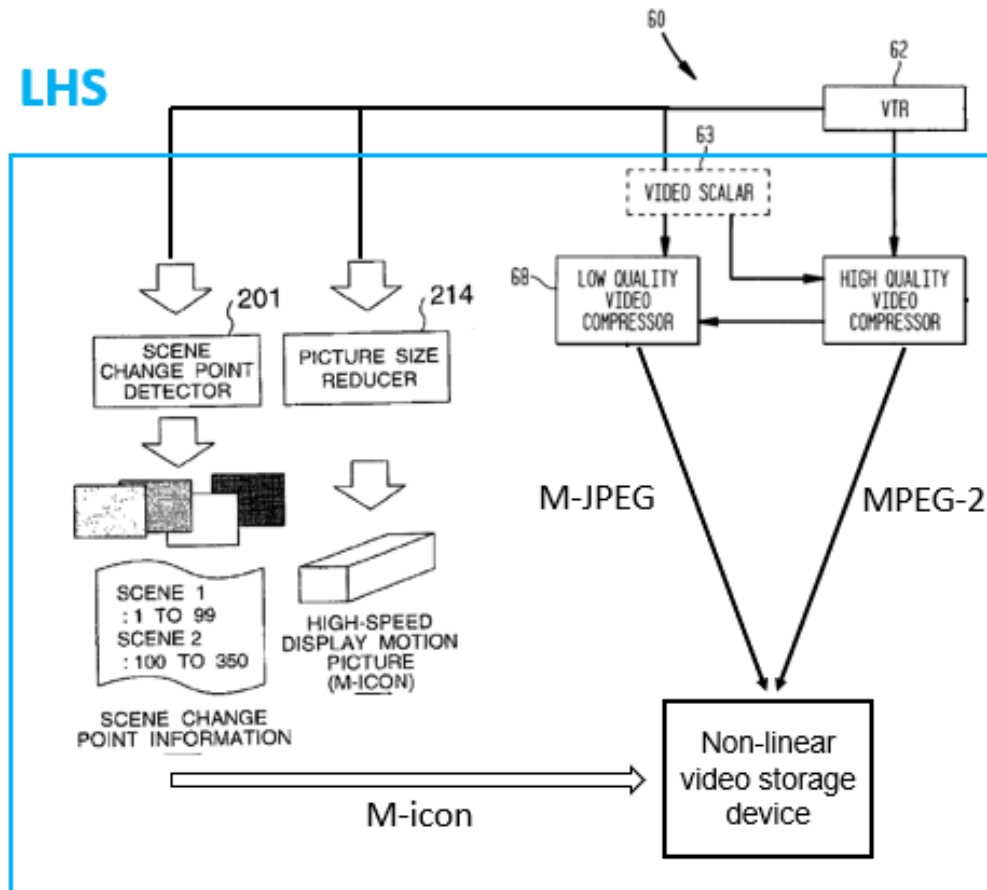
1005, 8:62-64. Linzer further explains that the computer is provided “for **viewing** and editing video signals.” LG-1005, 9:1-2. From Linzer FIG. 6, a POSITA would have understood that viewing the video signal on the computer includes reproducing it from the non-linear storage device.



LG-1006, FIG. 6 (annotated).

170. Since first picture (I-picture in MPEG-2), second picture (JPEG image in M-JPEG) and picture (M-icon) are, as described above and shown in the modified figure below, all stored on LHS's non-linear storage device, which can be a magnetic disk (per Linzer), a POSITA would have understood each of the three

pictures, when needed by LHS (for the uses described above), are reproduced from the non-linear storage device. LG-1005, 1:19-20.



LG-1005, FIG. 6 (modified); LG-1006, FIG. 11 (modified).

171. For example, a POSITA would have understood that the magnetic disk of Linzer necessarily includes a circuitry, e.g., a hard disk controller, between the CPU and the physical storage platter of the magnetic disk that serves as an intermediary providing buffering, error correction, servo control, etc., when reading and writing data from the hard 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. LG-1025, 5:34-40 (“A hard disk controller 14 (HDC) is connected to the head controller 6, the buffer memory 13, a servo controller 15 and a microcontroller 22,” and “contains an interface controller 14a, a first buffer memory controller 14b [] a second buffer memory controller 14e.”), 5:51-53 (“The first buffer memory controller 14b prepares read/write control signals and controls buffer addresses for data access to the buffer memory 13.”). Since the LHS’s non-linear storage device (hard drive) includes a controller that provides buffering when reading data, a POSITA would have understood that LHS necessarily reproduces each of the first picture, second picture and picture from the hard drive platter (where those pictures are stored) to the hard drive controller’s buffers when the pictures are used by LHS.

[4.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

172. LHS renders [4.2.2] obvious.

173. Linzer discloses a first still picture encoded by a first encoding method (MPEG). See §IX.A.[1.2.1]-[1.2.3],

174. Linzer discloses a second still picture encoded by a different encoding method (JPEG). See §IX.A.[1.3.1]-[1.3.3].

[4.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

175. LHS renders [4.2.3] obvious.

176. Hirai discloses a picture corresponding to the first and second pictures and having a smaller number of pixels. See §IX.A.[1.4.1].

[4.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

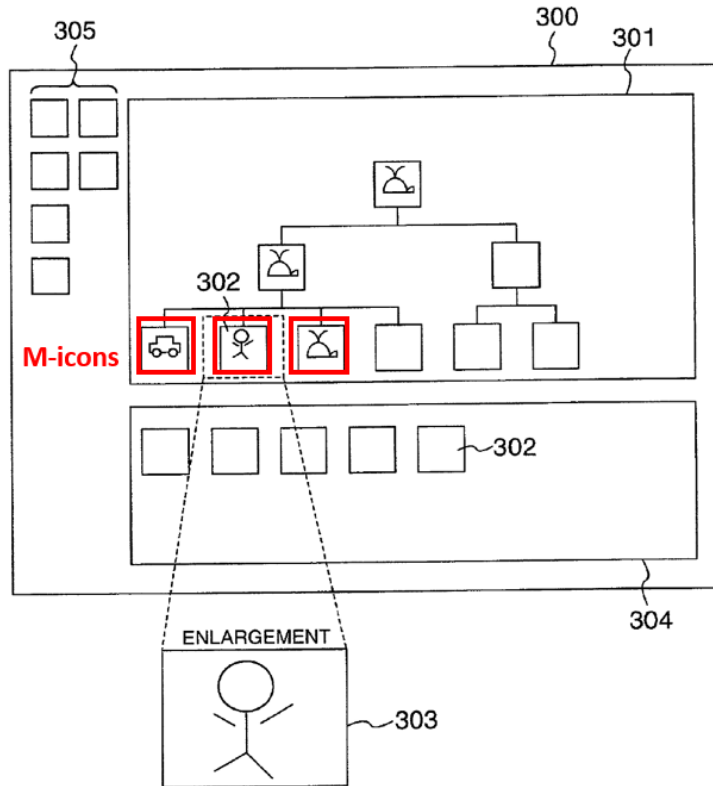
177. LHS renders [4.2.4] obvious.

178. In LHS, the first still picture, second still picture and picture are related pictures derived from common signal data. See §IX.A.[1.5].

[4.3] outputting a plurality of pictures from the reproducing operation; and

179. LHS renders [4.3] obvious.

180. First, per Hirai, LHS reproduces M-icons (pictures from the reproducing operation). For example, Hirai explains that the “editing display screen displayed on the monitor 203,” and “numeral 302 denotes an M-icon.” LG-1006, [0009]. “Editing is carried out by constructing M-icons into such a hierarchical structure as shown in the hierarchical structure area 301 of an editing screen 300.” LG-1006, [0009], FIG. 3. A POSITA would have known that LHS outputs an M-icon from the reproducing operation to generate an editing screen display of, e.g., a non-linear editing (NLE) apparatus.



LG-1006, FIG. 3 (annotated).

181. Second, per Hirai, LHS outputs the second still picture (JPEG picture in M-JPEG), which (as described in §VIII.C) was produced by a high quality video compressor (per Linzer) and stored on the non-linear storage device for use by a non-linear editor (per Hirai). §VIII.C. For example, Hirai explains that the “moving picture (compressed moving picture) is used, for example, when it is desired to see a final edited result in detail.” LG-1006, [0061].

182. Third, per Linzer, LHS outputs the first still picture (I-picture in MPEG-2). For example, Linzer explains that the computer is provided “for

viewing and editing video signals.”⁷ LG-1005, 9:1-2. A POSITA would have recognized that viewing the signal includes outputting it.

[4.4] outputting said first still picture corresponding to a selected picture.

183. LHS renders [4.4] obvious.

184. As a preliminary matter, a POSITA would have understood “output” and “outputting” broadly. For example, Margolis provides this definition:

“Anything that comes out of a computer. Output can be meaningful information or gibberish, and it can appear in a variety of forms -as binary numbers, as characters, ***as pictures***, and as printed pages.

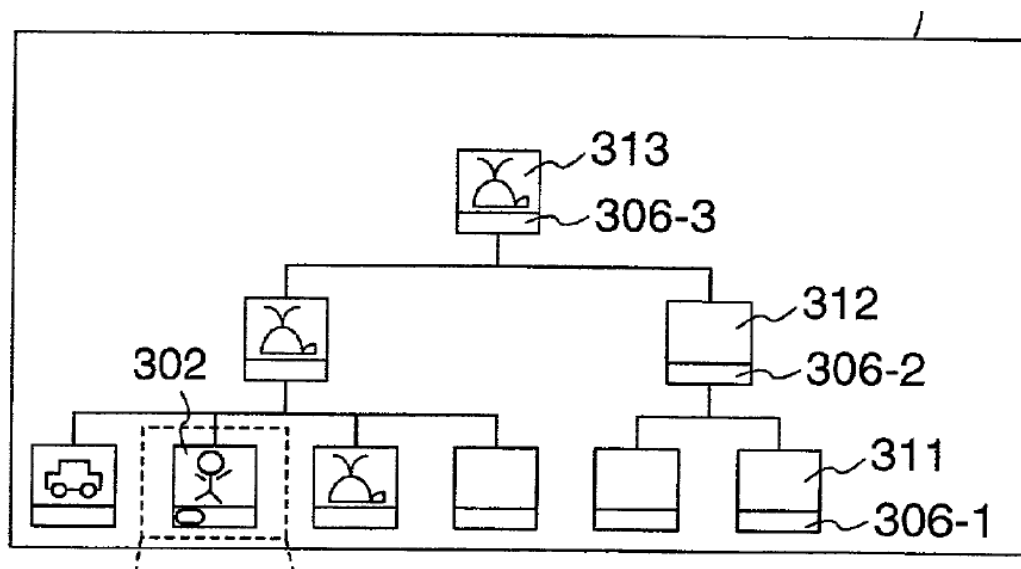
Output devices include display screens, loudspeakers, and printers. -v

2. To give out. For example, ***display screens output images***, printers output print, and loudspeakers output sounds.” LG-1038, 3 (Emphasis added).

185. Hirai discloses selecting a picture (M-icon) for inclusion in a story. For example, Hirai explains that “the operator organizes the M-icons 302 into such a hierarchical structure as shown in a hierarchical structure display window 301 to thereby make a story.” LG-1006, [0064]. A POSITA would have understood that

⁷ Linzer further discloses that such video signals can comprise both the “low and high quality compressed video signals.” LG-1005, 9:2-4.

“organizing the M-icons” includes selecting an icon (picture), e.g., M-icon 302 in FIG. 1.



LG-1006, FIG 1 (excerpt).

186. Per Hirai, the selected M-icons, including the picture, are included in the final story. LG-1006, [0009].

187. Per Linzer, the high-quality video (MPEG-2, including I-picture that is the first still picture) is used for the final edited video event. LG-1005, 3:62-64 (“One compressed version of the video signal may be used to determine how to edit the video to produce a final edited video event. A second compressed version of the video signal may be used to create the final edited video event.”). Linzer further explains that a computer is provided “for **viewing** and editing video signals.” LG-1005, 9:1-2. A POSITA would have recognized that viewing the signal includes displaying the video signals.

188. Since the final video signal (in MPEG) includes the first still picture (I-picture in the MPEG-2 video signal) and since first still picture is included based on selection of the corresponding M-icon during the editing process, the first still picture is output (as part of the MPEG-2 video) and corresponds to the selected picture (M-icon).

[5] A video reproducing method in accordance with claim 4, wherein said first encoding method is the MPEG standard and said second encoding method is the JPEG standard.

189. LHS renders [5] obvious. See §IX.A.[1.2.1], §IX.A.[1.3.1], §IX.A.[2].

[6] A video reproducing method in accordance with claim 4, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

190. LHS renders [6] obvious. See §IX.A.[1.2.1], §IX.A.[1.3.1], §IX.A.[3].

[7.1] A video reproducing method, comprising:

191. LHS renders [7.1] obvious. See §IX.A.[4.1].

[7.2.1] reproducing at least a first still picture, a second still picture and a picture recorded on a recording medium,

192. LHS renders [7.2.1] obvious. See §IX.A.[4.2.1].

[7.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

193. LHS renders [7.2.2] obvious. See §IX.A.[4.2.2].

[7.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

194. LHS renders [7.2.3] obvious. See §IX.A.[4.2.3]

[7.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

195. LHS renders [7.2.4] obvious. See §IX.A.[4.2.4]

[7.3] displaying a plurality of pictures from the reproducing operation; and

196. LHS renders [7.3] obvious. See §IX.A.[4.3].⁸

[7.4] displaying said first still picture corresponding to a selected picture.

197. LHS renders [7.4] obvious. See §IX.A.[4.4].

[8] A video reproducing method in accordance with claim 7, wherein said first encoding method is the MPEG standard and said second encoding method is the JPEG standard.

198. LHS renders [8] obvious. See §IX.A.[2].

⁸ A POSITA would have understood that displaying is one form of outputting. For example, Margolis states that output is “Anything that comes out of a computer. Output can be meaningful information or gibberish, and it can appear in a variety of forms--as binary numbers, as characters, ***as pictures***, and as printed pages. ***Output devices include display screens***, loudspeakers, and printers. -v 2. To give out. For example, ***display screens output images***, printers output print, and loudspeakers output sounds.” LG-1038, 3. Downing similarly say that output is “the information that a computer generates as a result of its calculations. Computer output may be either printed on paper, ***displayed on a monitor screen***, or stored on magnetic tapes or disks.” LG-1042, 3

[9] A video reproducing method in accordance with claim 7, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

LHS renders [9] obvious. See §IX.A.[3].

[1.2.1] a first still picture recorded thereon encoded by a first encoding methods,

201. Lathrop renders [1.2.1] obvious.

202. Lathrop discloses a first still picture (JPEG formatted) recorded on a machine-readable recording medium. LG-1007, FIGS. 2-3.

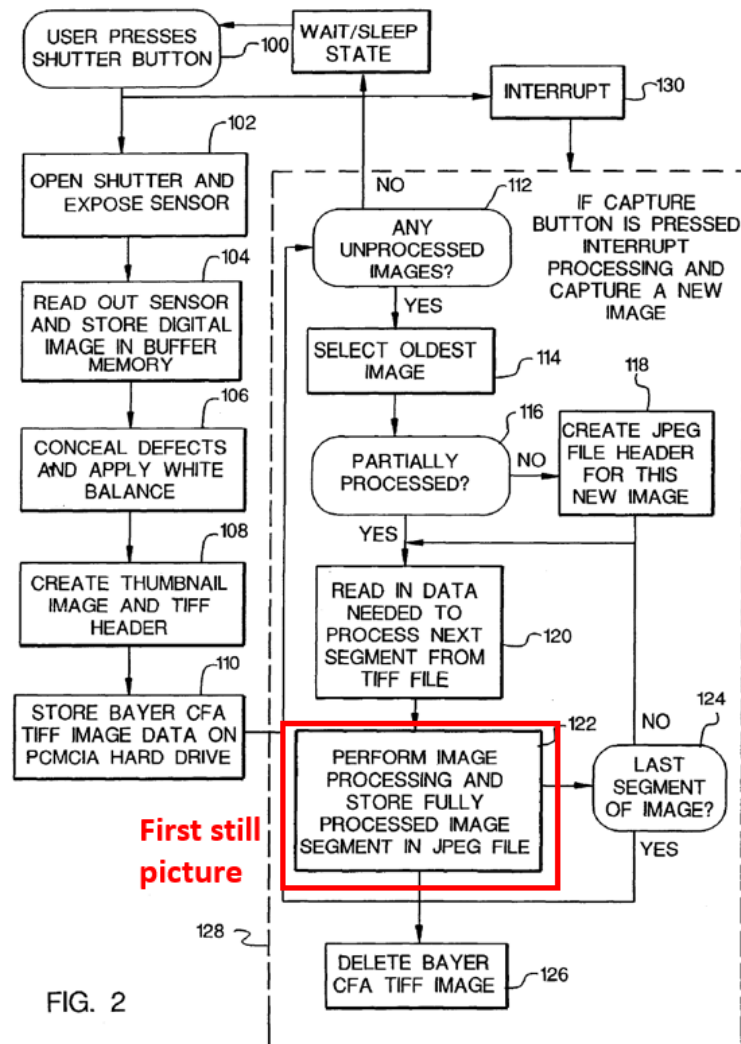


FIG. 2

LG-1007, FIG. 2 (annotated).

203. For example, Lathrop explains that “stored image data is retrieved in incremental stages by the digital processor 22 and processed according to more

comprehensive time-intensive image processing algorithms,” e.g., “color filter array (CFA) interpolation, color correction, tone scale correction, edge enhancement, and compression.” LG-1007, 4:2-9. “The processed image data is then transferred via the output interface 30 to the ***non-volatile storage device*** 32 in a second file format,” which can be the “***JPEG file format.***” LG-1007, 4:9-16. Regarding the first still picture annotated in FIG. 2 above, “microprocessor 22 then processes each image segment (step 122) using the processing steps shown in FIG. 3. Exemplary steps include ... JPEG compression 208” and “is complete after the last segment of the image has been processed” into a file according to the “JPEG interchange format...” LG-1007, 6:13-39.

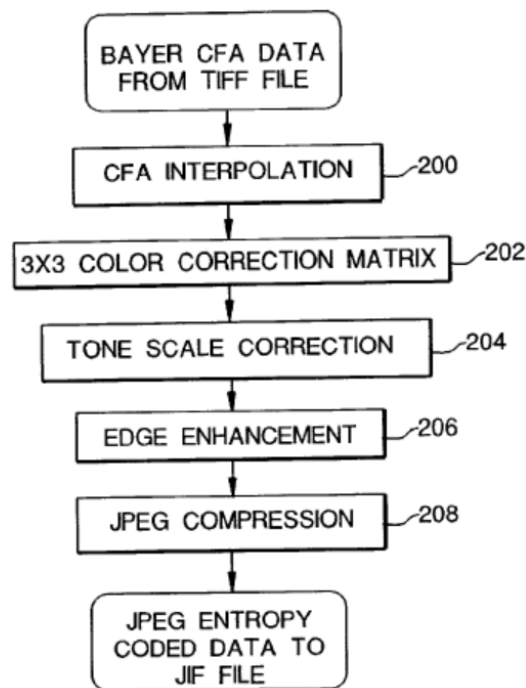


FIG. 3

LG-1007, FIG 3.

204. A POSITA would have looked to the JPEG standard to understand the syntax and semantics of the “JPEG interchange format” recited by Lathrop. See, e.g., LG-1050 for CCITT T.81, which notes that “the identical text is also published as ISO/IEC International Standard 10918-1,” such standards commonly known according to the name of the Joint CCITT and ISO committee that standardized them, Joint Photographic Experts Group (JPEG). The JPEG standard specifies an encoder, a decoder, and the “interchange format,” which “is a compressed image data representation which includes all table specifications” for exchange between application environments. LG-1050, 17.

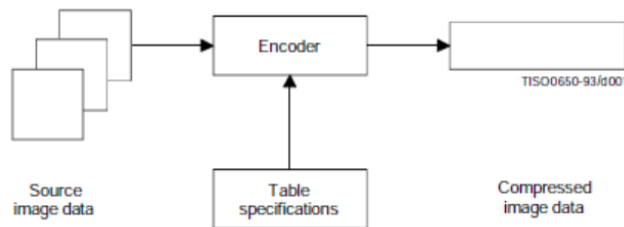


Figure 1 – Encoder

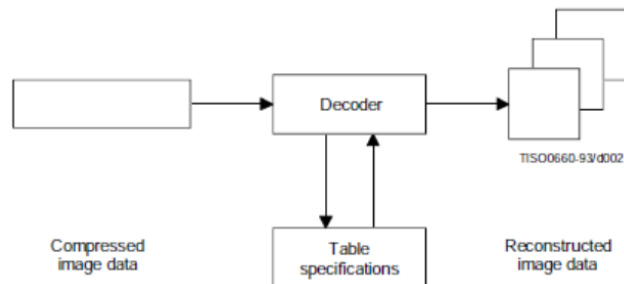


Figure 2 – Decoder

Encoder and Decoder figures. LG-1050, 17.

205. The JPEG standard specifies the overall syntax and semantics for JPEG-coded pictures, starting at a high level with the following syntax figure, that includes, e.g., SOI and EOI. “SOI: Start of image marker – Marks the start of a compressed image represented in the interchange format or abbreviated format.” And, “”EOI: End of image marker – Marks the end of a compressed image represented in the interchange format or abbreviated format.” LG-1050, 38.

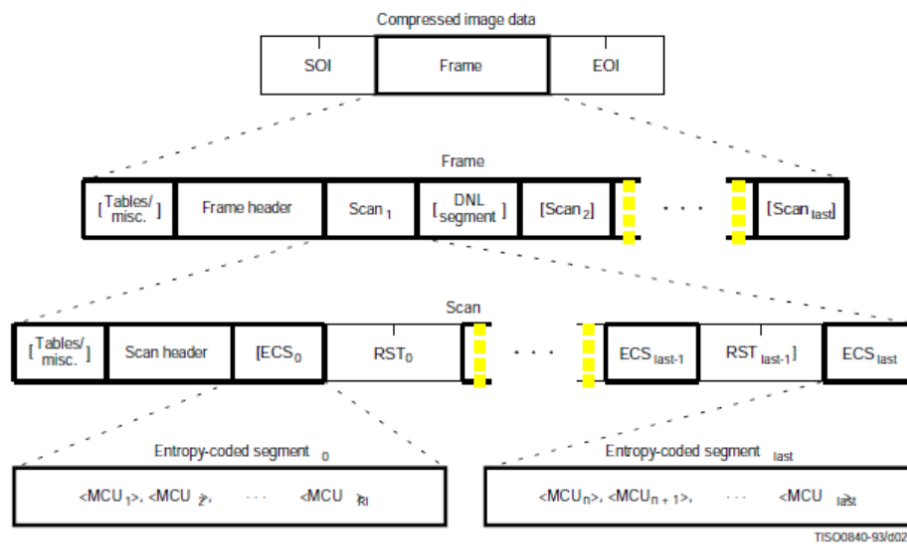


Figure B.2 – Syntax for sequential DCT-based, progressive DCT-based, and lossless modes of operation

Figure B.2. LG-1050, 38.

206. Thus, Lathrop discloses a first still picture encoded by a first encoding method (JPEG) stored on a machine-readable recording medium (non-volatile storage device 32).

[1.2.2] wherein the first still picture having descriptive information associated therewith to allow a machine to recognize and decode the first still picture for display;

207. As described in [1.2.1], Lathrop's first still picture is encoded as JPEG. A POSITA would have understood that the JPEG images include descriptive header information that allows a machine to recognize and decode the image, and therefore to recognize decode the first still picture.

208. First, in the prosecution history, Applicant states that "[i]t is respectfully submitted that it was well within the purview of those skilled in the art to be able to implement some type of descriptive information (*e.g.*, **header**, filename extension, etc.) associated with the respective picture so as to allow the machine to recognize and decode the pictures." LG-1002, 43, emphasis added.

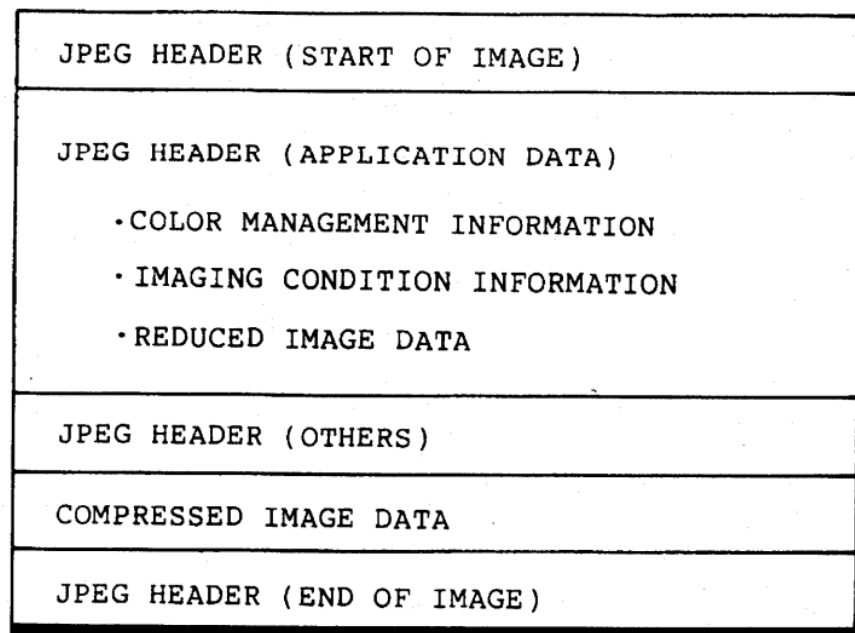
209. Such headers are present in JPEG. For example, as I explained in §IX.A.[1.3.2], Watanabe explains that:

The JPEG file comprises a JPEG header conveniently divided into three types, compressed image data, and a final JPEG header. The first JPEG header is a code representing "start of image". The succeeding JPEG header is referred to as application data, which includes individual information of a user. Examples of the user individual information are color management information (for example, the values of parameters used in gamma processing and white balance

processing), imaging condition information (for example, the amount of exposure, the focal length, or the presence or absence of strobe flashing), and reduced image data (image data representing a reduced image created by thinning the original image data). This is followed by the other headers conforming to the JPEG system. The headers are followed by the image data obtained by compression processing. Finally, the JPEG header representing "end of image" is arranged.

LG-1049, 5:25-43

210. Watanabe also provides this illustration of the JPEG header:



LG-1049, FIG. 2a.

211. Additionally, Czyszczonek explains that "Decompression consists of three main components: decoding, dequantization, and inverse Discrete Cosine

Transform.”, “The data coming into the decoder is decoded using the same Huffman tables described for compression. The ***first data of the block will represent the difference magnitude of the DC-coefficient***. The code is looked up in the table to get the SSSS value. This tells the decoder how many additional bits to read to get the value of the difference.”, and “Dequantization is only used if the compressed image was quantized. The ***same table is used as was in the quantization step of compression***.” LG-1022, 4-5. Fokker also describes the “JPEG Header structure.” LG-1023, 12).

212. Moreover, because the first still picture is a JPEG image, a POSITA would have understood it would have a JPEG file extension, which further provides descriptive information to allow a computer to recognize and decode the image, e.g., as described by Pauls. See, e.g., ¶121 describing LG-1039 (Pauls), 2:59-3:9; LG-1002, 43 (applicant listing “filename extension” as an example of descriptive information).

213. The JPEG standard further provides descriptive information to allow a computer to recognize and decode the image, for reasons described my discussion of the T.81 JPEG standard in [1.2.1] above.

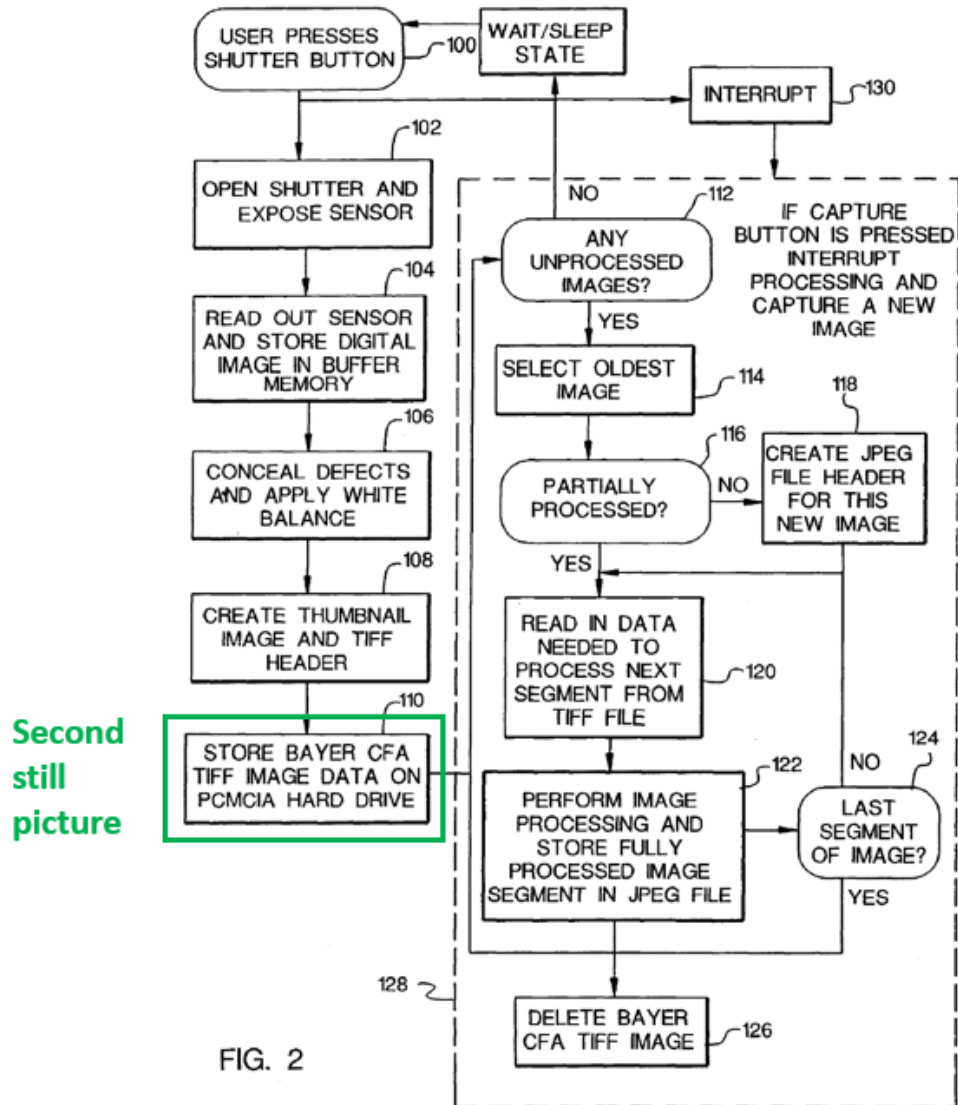
[1.3.1] a second still picture recorded thereon encoded by a second encoding method,

214. Lathrop renders [1.3.1] obvious.

215. For example, Lathrop discloses a second still picture (TIFF formatted) recorded on the storage medium.

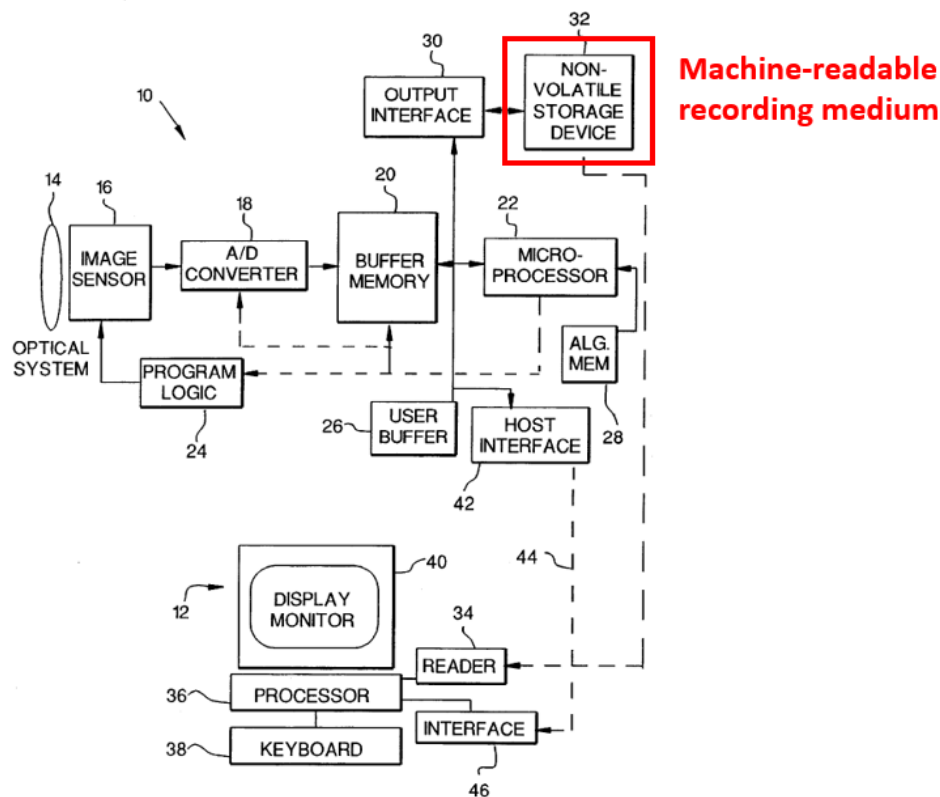
216. For example, Lathrop explains that “the storage device 32 stores the “finished” file data in the second file format and at least ***temporarily stores the “raw” file data in the first file format,***” which in “the preferred embodiment,” “is a TIFF file format.” LG-1007, 4:13-18.

217. A POSITA would have understood that TIFF is an encoding method. For example, RFC 2302 explains that “[t]his document describes the registration of the MIME sub-type image/tiff. The ***baseline encoding is defined by [TIFF]***” and “[t]his document re-defines the original image/tiff definition to refer to all of the profiles and extensions that build on ***TIFF 6.0 [TIFF] encoded image data,*** consistent with existing practice for TIFF aware Internet applications.”, LG-1043, 1, 3. RFC 2306 similarly explains that “[t]his document describes the encoding for TIFF-F, which is a profile of ***the TIFF encoding*** for facsimile.” LG-1044, 23



LG-1007, FIG. 2 (annotated).

218. Thus, Lathrop discloses a second still picture (image in TIFF format) recorded on a machine-readable (storage device 32), as depicted in annotated FIG. 2 above and FIG. 1 below.



LG-1007, FIG. 1 (annotated).

[1.3.2] wherein the second still picture having descriptive information associated therewith to allow the machine to recognize and decode the second still picture for display,

219. Lathrop renders [1.3.2] obvious.

220. As described in [1.3.1], the second still picture is encoded in TIFF. A POSITA would have understood that TIFF files have descriptive information associated therewith to allow the machine to recognize and decode the second still picture. For example, RFC 2301 states that, “A TIFF file begins with an 8-byte image file header. The first two bytes describe the byte order used within the file.

Legal values are ‘II’ (0x4949) when bytes are ordered from least to most significant (little- endian), and ‘MM’ (0x4D4D), when bytes are ordered from most to least significant (big-endian) within a 16- or 32-bit integer. Either byte order can be used, except in the case of the minimal black-and-white mode, which SHALL use value ‘II’. The next two bytes contain the value 42 that identifies the file as a TIFF file and is ordered according to the value in the first two bytes of the header. The last four bytes give the offset that points to the first image file directory (IFD). This and all other offsets in a TIFF file are with respect to the beginning of the TIFF file. An IFD can be at any location in the file after the header but must begin on a word boundary.” LG-1028, 7-8. Further, as I described above, applicant lists “header” as an example of descriptive information. LG-1002, 43.

221. Moreover, because the second still picture is a TIFF image, a POSITA would have understood it would have a TIFF file extension, which further provides descriptive information to allow a computer to recognize and decode the image. As I describe above, applicant lists “filename extension” as an example of descriptive information and Pauls describes file extensions as they relate to image types, including TIFF (“tagged image format (.tif)”). LG-1039, 2:59-3:9; LG-1002, 43.

[1.3.3] wherein the second encoding method is different from the first encoding method; and

222. Lathrop renders [1.3.3] obvious.

223. A POSITA would have understood that the second encoding method (TIFF) is different from the first encoding method (JPEG). LG-1021; LG-1040, 4:24-29; LG-1041, 1:27-31; LG-1022; LG-1023; LG-1024; LG-1028.

224. For example, “the TIFF image format [is] described in ‘TIFF revision 6.0, Jun. 3, 1992’ available from Adobe Corporation” [LG-1051] per Lathrop and a POSITA would have known that JPEG is described in CCITT T.81, also published as ISO/IEC 10918-1, which are different.⁹ LG-1007, 41-43, LG-1051 (TIFF 6.0 specification) and LG-1050 (JPEG standard).

[1.4.1] a picture recorded thereon corresponding to said first and second still pictures, which has a smaller number of pixels than said first and second still pictures,

225. Lathrop renders [1.4.1] obvious.

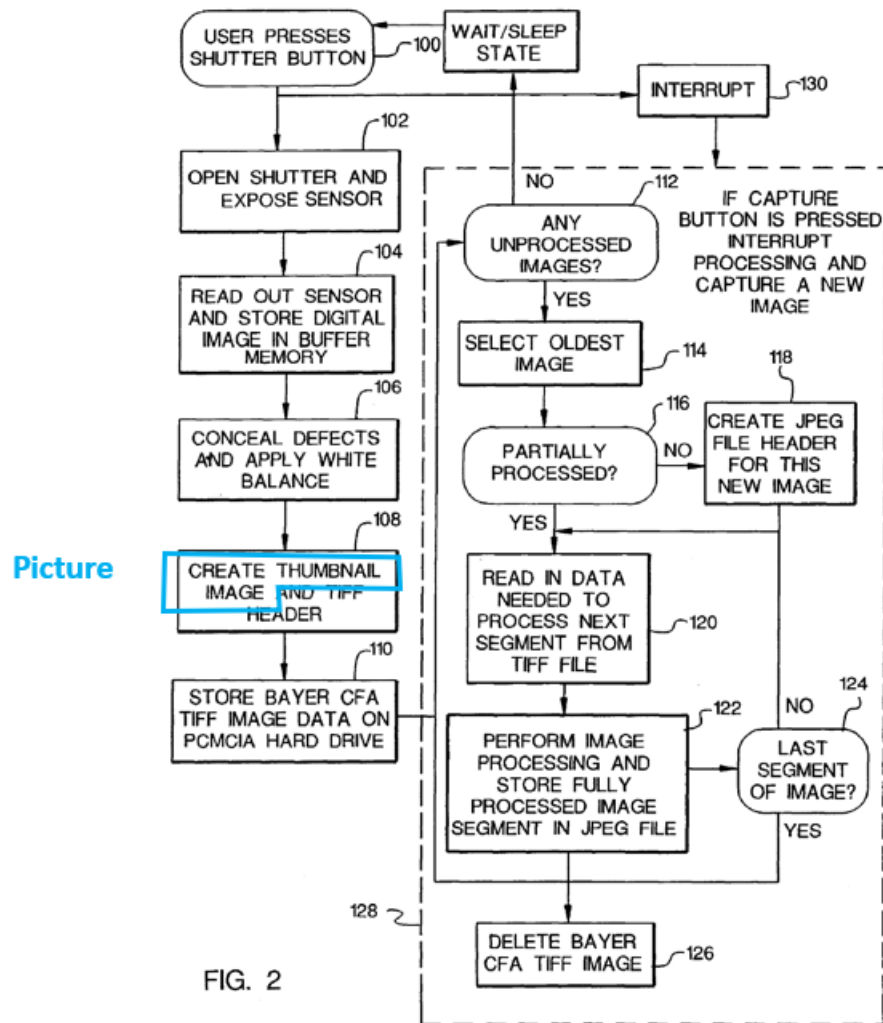
226. For example, Lathrop explains that “[a] ***reduced resolution thumbnail image*** is generated along with a TIFF header (step 108) and ***stored***

⁹ Though TIFF version 6.0 added an option to use JPEG compression, TIFF is not the same encoding method as JPEG. Further, Lathrop describes using TIFF to store raw images, not JPEG compressed images. LG-1007, 6:38-44.

together with the essentially ‘raw’ image data *in the non-volatile, storage device 32.*” (step 110). 5:36-39.

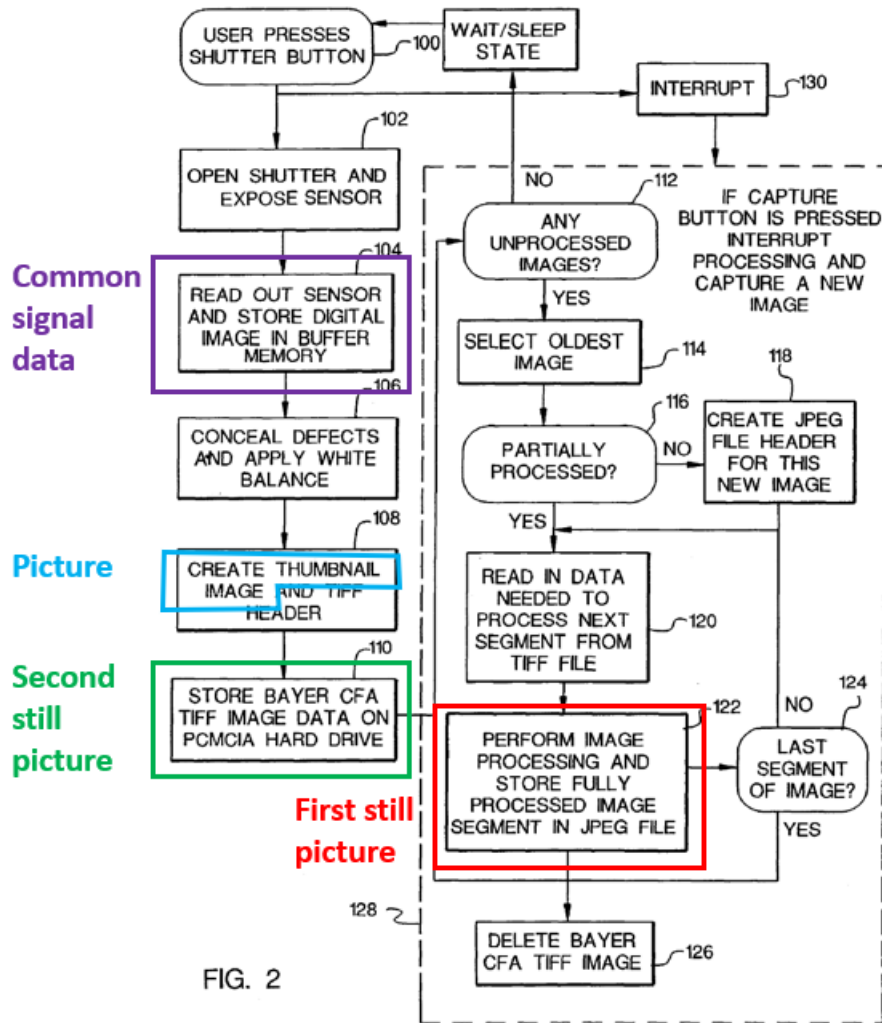
227. Since the thumbnail has a “reduced resolution” image, a POSITA would have understood that it has fewer pixels than the first and second still pictures. LG-1007, 3:55, 5:36-37. For example, Hensen defines resolution as “[t]he **number of pixels** per a unit of area on a monitor screen or the dots per inch (dpi) in a printed graphic.” LG-1029, 3. Botto provides a similar definition in which resolution is “[a] measurement of the concentration of dots or **pixels** in a digital image. In display technology, resolution is specified in terms of screen dimensions expressed in pixels and the dot pitch expressed as the distance between displayable pixels.” LG-1030, 3.

228. Lathrop further explains that “[t]his image data is stored using the TIFF image format,” and “[t]hese ‘raw’ Bayer pattern TIFF images can, according to the prior art, be downloaded to the host computer.” LG-1007, 5:41-45. Since Lathrop refers to the plural “these” when referring to the TIFF images, a POSITA would have understood that both the second still picture and the thumbnail are encoded in TIFF.



LG-1007, FIG. 2 (annotated).

229. Since, as illustrated in FIG. 2, the first still picture (JPEG), second still picture (TIFF) and picture (thumbnail) derive from a common signal (camera sensor data), the picture corresponds to the first and second picture. LG-1007, 4:1-18, 5:9-50, FIG. 2.



LG-1007, FIG. 2 (annotated).

[1.4.2] wherein the picture having descriptive information associated therewith to allow the machine to recognize and decode the picture for display,

230. Lathrop renders [1.4.2] obvious.

231. As explained in [1.4.1], the thumbnail is encoded as TIFF, and as explained in [1.3.2], the TIFF format has descriptive information that allows a machine to recognize and decode a TIFF-encoded picture. Therefore, the picture

has descriptive information that allows the machine to recognize and decode the picture.

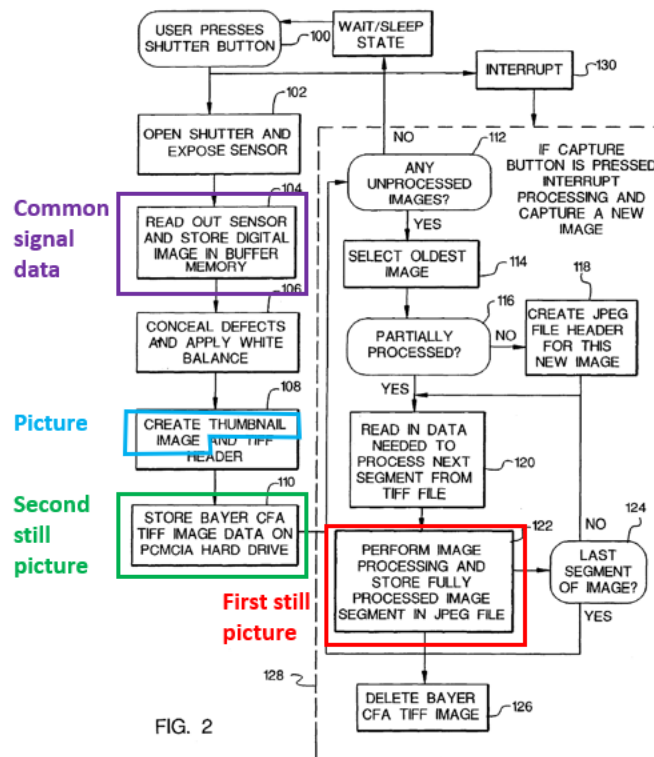
[1.5] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data.

232. Lathrop renders [1.5] obvious.

233. For example, Lathrop explains that the camera's image sensor "is a conventional charge-coupled device (CCD) using, e.g., either well-known interline transfer, progressive scan, or frame transfer techniques" such that when "the sensor 16 is exposed to image light to capture a particular image, analog image information corresponding to the particular image is generated in respective photosites of the sensor 16." 3:17-32. Next, the "**analog image signals** are applied to an A/D converter 18, which generates **digital image data** from the analog input signals for each picture element." LG-1007, 3:33-35.

234. Once the digital image data is created, the microprocessor generates "a reduced resolution **thumbnail** image." LG-1007, 3:51-55. In addition, the "preliminarily processed data is then ... **stored in the first file format.**" LG-1007, 3:59-63. Next, the "processed image data is then transferred via the output interface 30 to the non-volatile storage device 32 in a **second file format,**" where "the second file format is the aforementioned JPEG file format and the first file format is a TIFF file format." LG-1007, 4:9-16.

235. Therefore, digital image data is produced from the analog image signals, and the second still picture (digital image data converted to the TIFF format), the first still picture (digital image data converted to the JPEG format) and the “reduced resolution thumbnail” are all related to the common (analog image) signal data (via the digital image data) from the camera’s image sensor. LG-1007, 3:7-31, FIG. 2.



LG-1007, FIG. 2 (annotated).

[3] A recording medium in accordance with claim 1, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

236. LHS renders [3] obvious.

237. As described in [1.2.1], the first picture is encoded according to JPEG, which is a first encoding standard.

238. As described in [1.3.1], the second picture is encoded according to TIFF, which is a second encoding standard.

C. Ground 2B: Lathrop-Wang renders claims 4, 6, 7, and 9 obvious

[4.1] A video reproducing method, comprising:

239. To the extent the preamble is limiting, LWS renders [4.1] obvious.

240. For example, Wang’s describes reproduction of digital images, while further indicating that “it will be appreciated that digital media or media objects refers generally to audio digital media, **video digital media** and software files, such as a word processing file created by a word processing computer program.” LG-1008, 8:18-22; §VIII.F. Thus, to the extent the preamble is limiting, the LWS offers a method of reproducing both video and images.¹⁰

[4.2.1] reproducing at least a first still picture, a second still picture and a picture from a recording medium,

241. LWS renders [4.2.1] obvious.

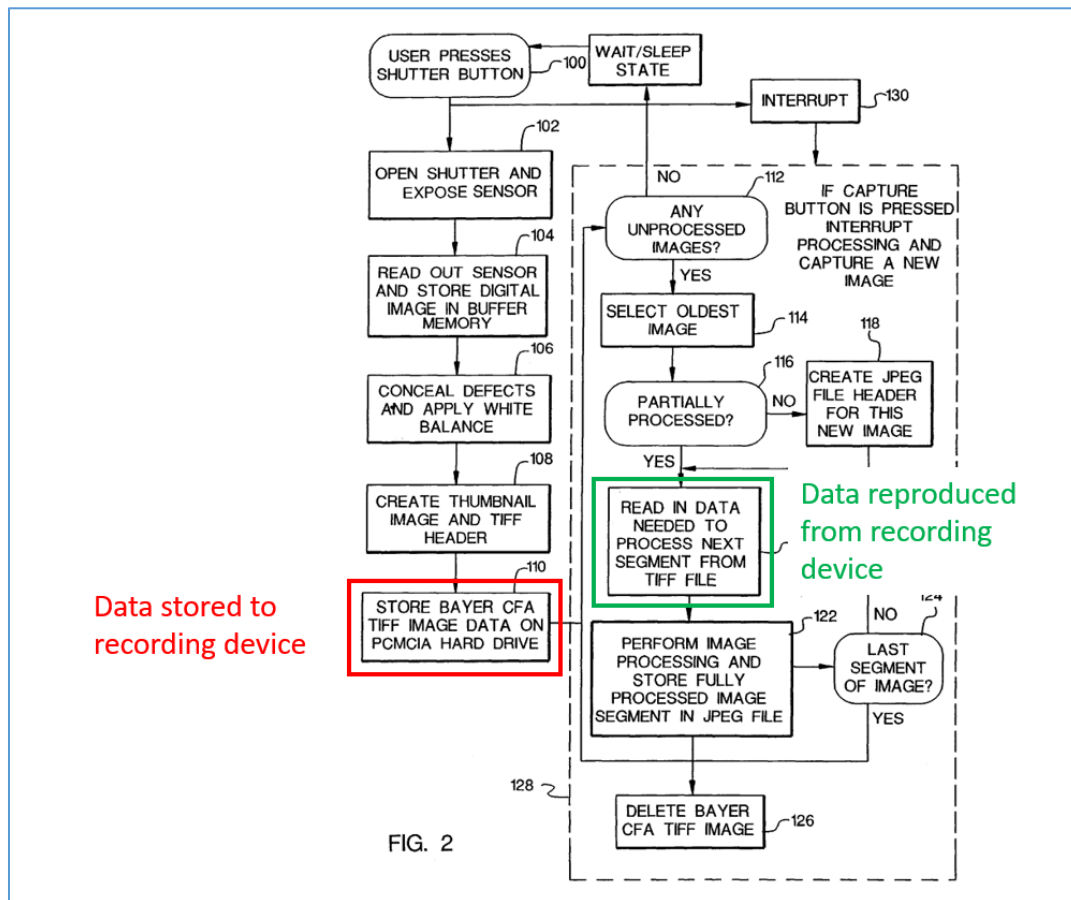
242. Lathrop discloses reproducing a first still picture (JPEG), a second still picture (TIFF), and a picture (thumbnail) from a recording medium. §VIII.F.

243. First, Lathrop explains that “the microprocessor 22 in the camera begins to perform image processing of the stored ‘raw’ Bayer pattern TIFF image, in order to create a ‘finished’ JPEG inter-change format image file format as described in ISO/IEC 10918-1:1994,” where the TIFF image is a **second still picture**. LG-1007, 5:58-62. To display the picture, “[t]he processor begins by

¹⁰ See §IX.A.[4.1] (discussion of LG-1031, 4 n.2).

reading from the TIFF file the data needed to process the next segment (step 120).”

LG-1007, 6:28-29. A POSITA would have understood that, to “perform image processing of the stored ‘raw’ Bayer pattern TIFF image,” LWS reads (reproduces) the stored data from LWS’s recording medium, e.g., memory card. LG-1007, 3:58-63; §VIII.F.



LG-1007, FIG. 2 (annotated).

244. To the extent Lathrop does not expressly disclose reproducing the second still picture for direct output to a display, Lathrop inherently discloses or renders obvious the prior art system whereby raw images, such as the second still

image are processed using camera specific functions in a computer, not the camera. For example, “[c]onsequently the computer 12 does not require camera-specific processing capability....” LG-1007, 4:62-63. Further, Lathrop does not require the deletion of the second still picture after completion of the first still picture, disclosing instead “the TIFF file ... can be deleted.” LG-1007, 42-44. A POSITA would have understood or found obvious that the benefit of Lathrop’s invention is eliminating the necessity to retain the second still picture (raw TIFF) after the first still picture (JPEG) is created and not requiring computers to be able to process the raw TIFF pictures. In so doing, Lathrop also inherently discloses or renders obvious these prior art systems. A POSITA would have known of such systems and would have found it obvious to retain the second still image for display and processing options available on such a computer. A POSITA would have known that multiple prior art systems existed for such operations. For example, for Photoshop, “[i]f your scanner does not have an Adobe Photoshop-compatible scanner driver, use the manufacturer’s software to scan your images, and save the images as **TIFF**, BMP, or PCT files,” then “open the files in Adobe Photoshop.” LG-1045, 60. Similarly, Kylander explains that in GIMP (an open source image editing program) one can “[f]amiliarize yourself with the interface by opening some images in common formats like GIF, JPEG and **TIFF**.” LG-1046, 21. A POSITA would have known that these systems necessarily include reproducing the

second still picture for direct output to a display, i.e., the display of the computer on which Adobe Photoshop or GIMP is running, or it would have been obvious.

245. Second, Lathrop explains that “the **digital processor 22 generates JPEG** (Joint Photographic Experts Group) interchange format image files that are stored on the removable storage device 32,” so “the computer 12 does not require camera-specific processing capability, and need only handle the conventional JPEG format,” where a generated JPEG image is a **first still picture**. LG-1007, 4:59-64. Lathrop further explains that “[t]he digital image data captured and processed by the digital still camera 10 is conveyed to the host computer 12 preferably by removing the storage device 32 from the camera 10 and then inserting the device 32 into a reader 34, e.g., a PCMCIA memory card reader, associated with the computer 12.” LG-1007, 4:52-57. A POSITA would have understood that conveying the data to the host computer includes reproducing the data (e.g., JPEG image).

246. Third, Lathrop states a “reduced resolution thumbnail image,” which is a **picture**, “is generated along with a TIFF header (step 108) and stored together with the essentially “raw” image data in the non-volatile, storage device 32.” LG-1007, 5:36-39. Lathrop further explains that “the microprocessor 22 begins to create a new JPEG file (step 118) by writing the JPEG header information, which includes the start of image and start of image JPEG segments, as well as an

application segment, such as the Exif application segment,” including “the TIFF thumbnail data and other TIFF tags, for example the DateTime tag and the Fnumber tag.” LG-1007, 6:3-12. Once the “digital image data [is] captured and processed by the digital still camera,” it “is conveyed to the host computer 12 preferably by removing the storage device 32 from the camera 10 and then inserting the device 32 into a reader 34, e.g., a PCMCIA memory card reader, associated with the computer 12.” LG-1007, 4:52-57. A POSITA would have understood that conveying the data to the host computer includes reproducing the data (e.g., picture).

[4.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

247. LWS renders [4.2.2] obvious.

248. Lathrop discloses a first still picture encoded by a first encoding method (JPEG). See §IX.B.[1.2.1]. Lathrop discloses a second still picture is encoded by a second encoding method (TIFF). See §IX.B.[1.3.1]. JPEG is different from TIFF. See IX.B.[1.3.3].

[4.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

249. LWS renders [4.2.3] obvious. See §IX.B.[1.4.1].

[4.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

250. LWS renders [4.2.4] obvious. See §IX.B.[1.5].

[4.3] outputting a plurality of pictures from the reproducing operation; and

251. LWS renders [4.3] obvious.

252. For example, Wang's FIG. 12B "shows a window created by one embodiment of the album authoring software." LG-1008, 13:4-5. In the figure, the currently selected view shown "is the thumbnail and album page view which may be invoked by clicking on the icon 1233," which "causes the album authoring software to ***display thumbnails*** 809 in the thumbnail region for all the pictures in the picture database since the opened shoebox icon 803 has been selected." LG-1008, 13:7-13. A POSITA would have further found obvious that the other thumbnails would have also been reproduced by the reproducing operation (e.g., such that they could be displayed/output). Thus, a plurality of pictures from the reproducing operation are output for display in the thumbnail region of FIG. 12B. *Id.* See §IX.C.[4.2.1].

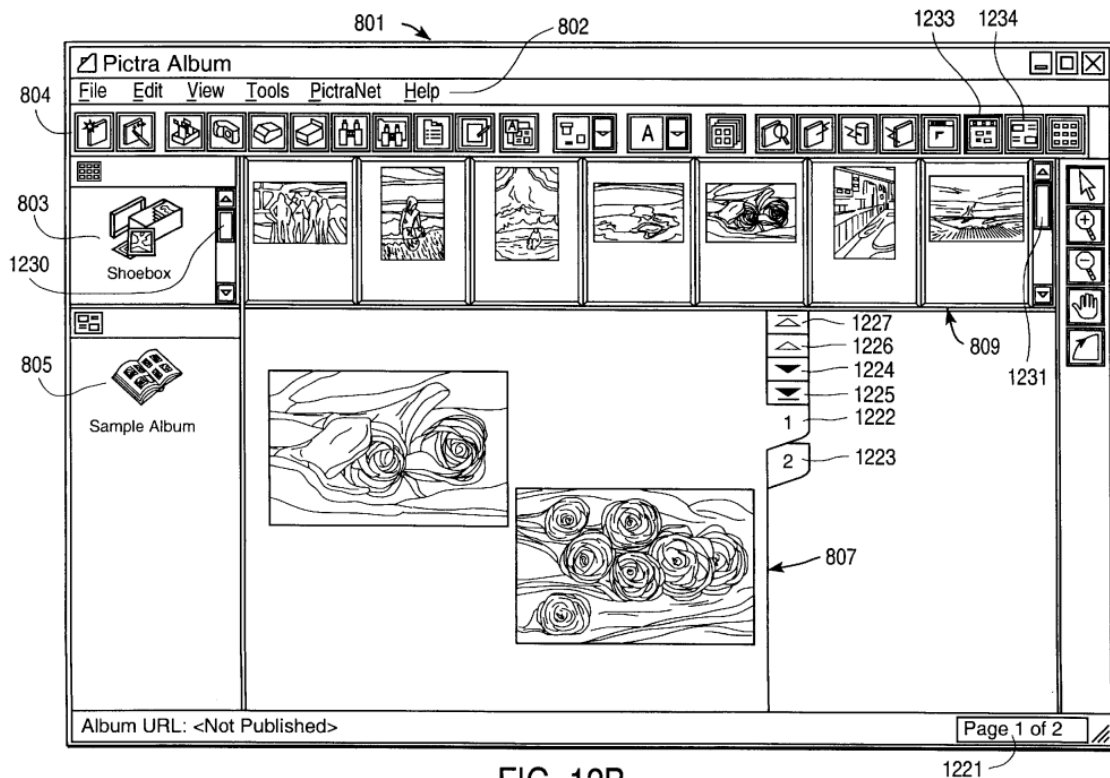


FIG. 12B

LG-1008, FIG 12B.

253. Moreover, in this example, “the user is *viewing the first page* of two pages of this sample album.” LG-1008, 13:21-23. Using the editor, “the user may add a picture to a picture album by selecting a thumbnail representation in the thumbnail region and dragging this representation onto a slot of a page displayed in the album page region.” LG-1008, 13:61-63. The JPEG (first still picture) was produced by the reproducing operation. *See* §IX.C.[4.2.1]. Since the thumbnail and JPEG were reproduced and output, a plurality of pictures from the reproducing operation are output. §VIII.F.

[4.4] outputting said first still picture corresponding to a selected picture.

254. LWS renders [4.4] obvious. §VIII.F.

255. For example, in Wang’s example in FIG. 12B, using the editor, “the user may add a picture to a picture album by ***selecting a thumbnail*** representation in the thumbnail region and dragging this representation onto a slot of a page displayed in the album page region.” LG-1008, 13:61-63. The added picture is the first still picture (JPEG) and is added in response to selecting a picture (the corresponding thumbnail). In this example, “the user is viewing the first page of two pages of this sample album,” which includes the outputted first still picture, which was added by the selecting operation. LG-1008, 13:22-23.

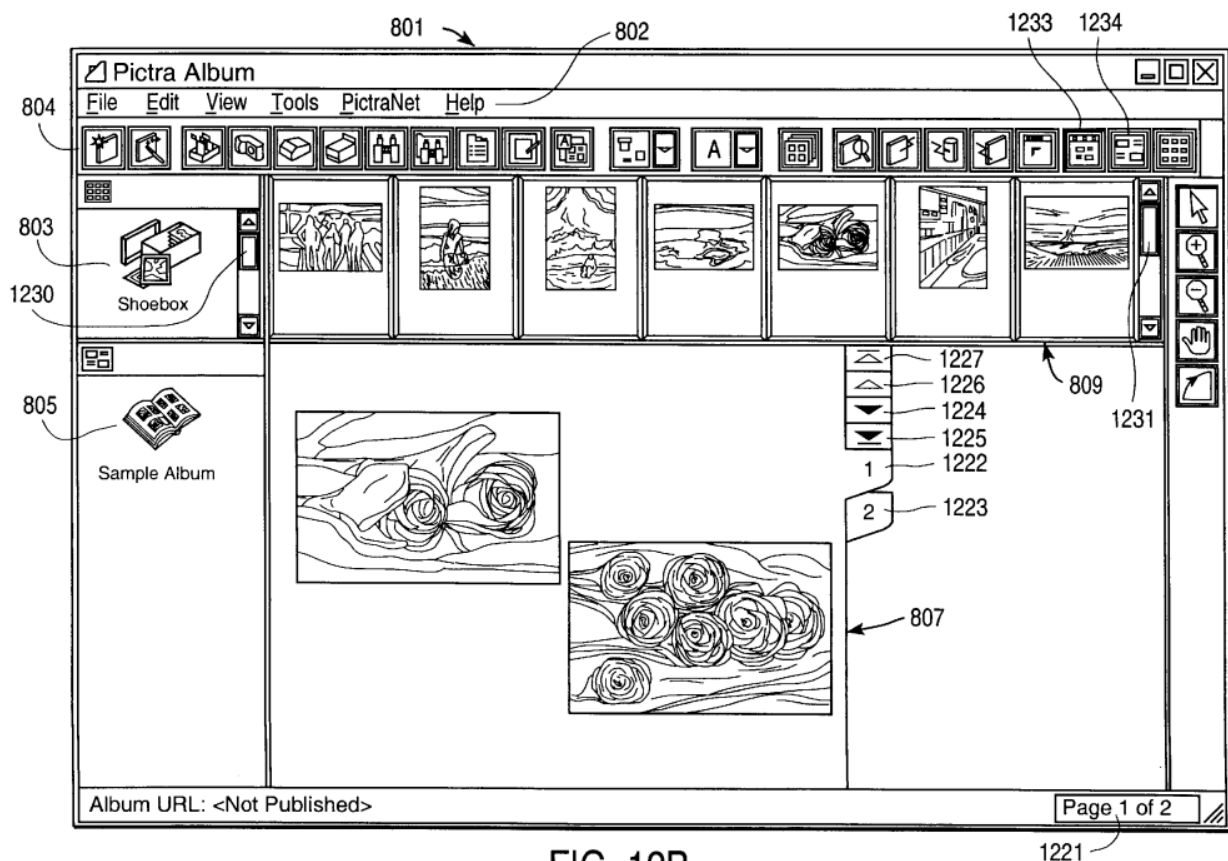


FIG. 12B

LG-1008, FIG 12B.

[6] A video reproducing method in accordance with claim 4, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

256. LWS renders [6] obvious. See §IX.B.[3].

257. Lathrop explains that, in preferred embodiment, “the second file format,” which encodes the first still picture, “is the aforementioned JPEG file format and the first file format,” which encodes the second still picture, “is a TIFF file format.” LG-1007, 4:13-17. Thus, the first still picture is encoded by a first encoding method according to a first encoding standard (JPEG), the second still

picture is encoded according to a second encoding standard (TIFF), for at least the reasons set forth in [1.2.1] and [1.3.1] above. A POSITA would have recognized JPEG and TIFF as different encoding standards for the reasons set forth in [1.2.1], [1.3.1], and [1.3.3] above.

[7.1] A video reproducing method, comprising:

258. LWS renders [7.1] obvious. See §IX.C.[4.1].

[7.2.1] reproducing at least a first still picture, a second still picture and a picture recorded on a recording medium,

259. LWS renders [7.2.1] obvious. See §IX.C.[4.2.1].

[7.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

260. LWS renders [7.2.2] obvious. See §IX.C.[4.2.2].

[7.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

261. LWS renders [7.2.3] obvious. See §IX.C.[4.2.3].

[7.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

262. LWS renders [7.2.4] obvious. See §IX.C.[4.2.4]

[7.3] displaying a plurality of pictures from the reproducing operation; and

263. LWS renders [7.3] obvious. See §IX.C.[4.3]. As described in §IX.C.[4.3], one or more thumbnails (pictures) and at least one JPEG (first still

picture) are displayed, and therefore a plurality of pictures from the reproducing operation are displayed.

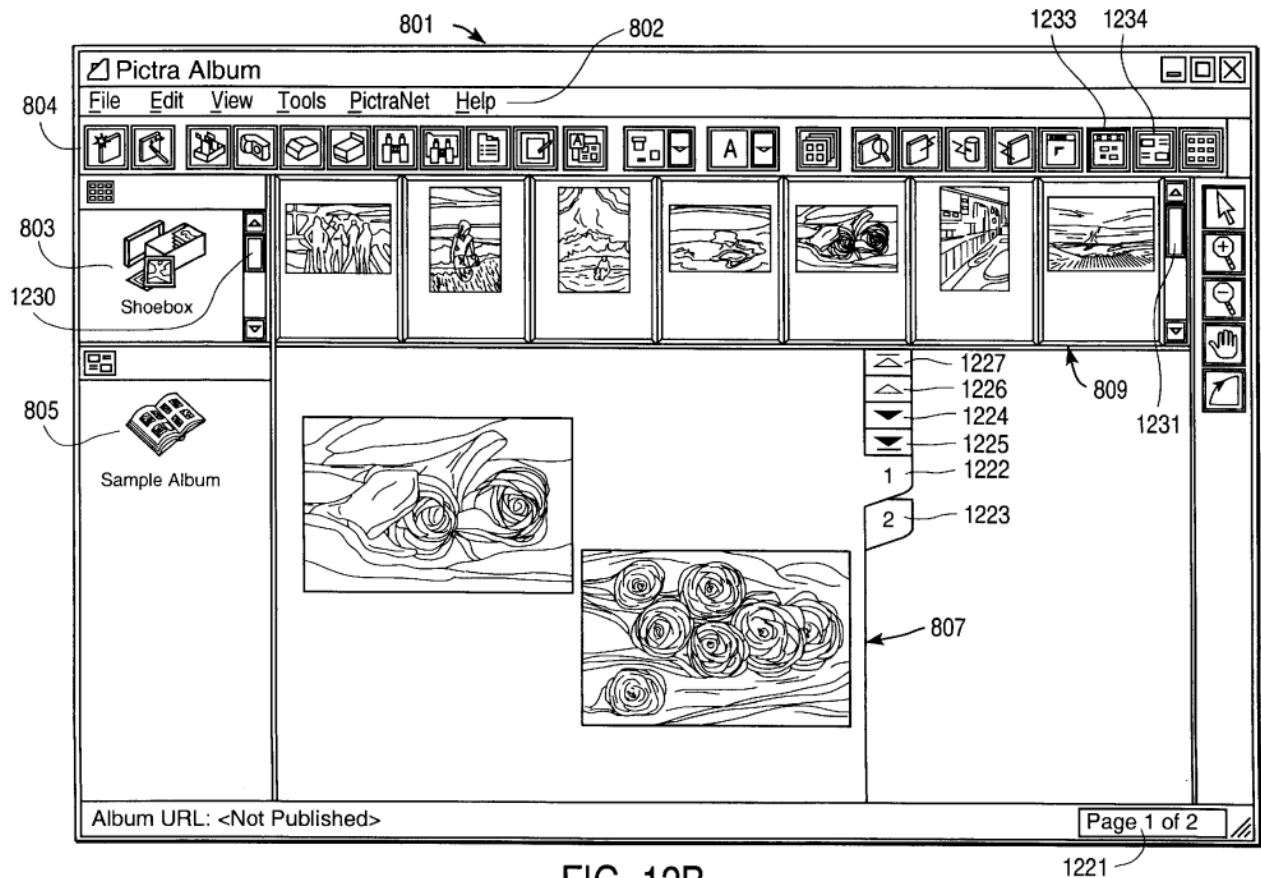


FIG. 12B

LG-1008, FIG 12B.

[7.4] displaying said first still picture corresponding to a selected picture.

264. LWS renders [7.4] obvious. See §IX.C.[4.4]. As described in [4.4], a JPEG picture (first still picture) is displayed in response to selecting the corresponding thumbnail (picture).

[9] A video reproducing method in accordance with claim 7, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

265. LWS renders [9] obvious. See §IX.B.[3].

D. GROUND 3 – Anderson renders claims 4, 6-7, and 9 obvious

[4.1] A video reproducing method, comprising:

266. To the extent the preamble is limiting, Anderson renders it obvious.

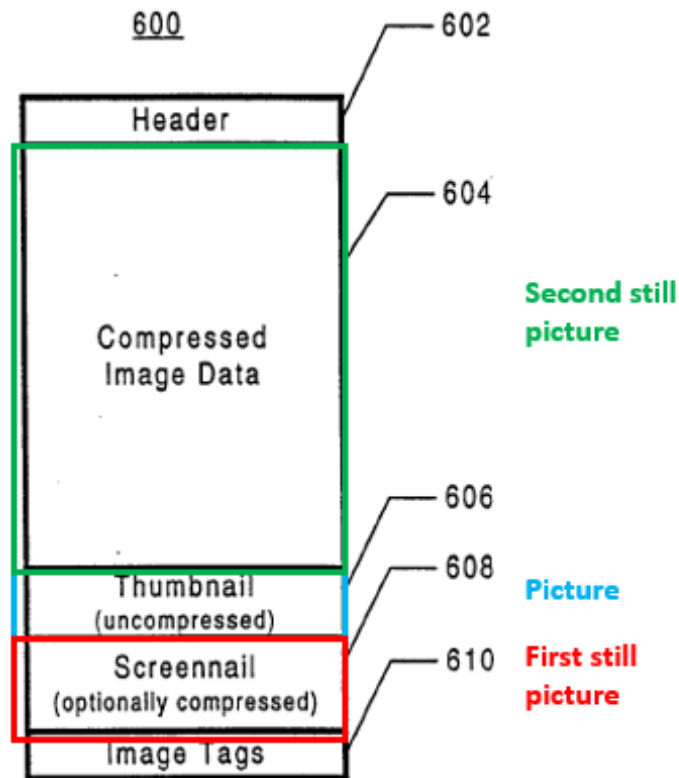
267. Anderson explains that “the camera can be programmed to monitor whether it is attached to a higher resolution device, such as a PC monitor or television, via the camera's **video jack**,” and if so, “the compressed image data 608 is also decompressed and displayed on higher resolution device.” LG-1009, 21:6-10. Anderson further explains that “[u]sers can also play back various media types, such as time lapse, bursts and slide show images according to either default or user defined play back rates.” LG-1009, 19:3-5. Since the images are reproduced over the video jack, and displayed, for example, as burst or time lapse, a POSITA would have understood or found obvious that, in the context of the ’760 patent, such images are a form of video.¹¹ For example, the ’760 patent states that “the recording method of the present invention used for a video recording apparatus that can record both moving and still pictures on a recording medium.” LG-1001, 2:49-58.

[4.2.1] reproducing at least a first still picture, a second still picture and a picture from a recording medium,

268. Anderson renders [4.2.1] obvious.

¹¹ See §IX.A.[4.1] (discussion of LG-1031, 4 n.2).

269. Anderson discloses reproducing a first still picture, second still picture and picture from a recording medium.



LG-1009, FIG. 6 (annotated).

270. An uncompressed scrennail image is an example of a first still picture. For example, Anderson explains that the “**scrennail image** 608 is a medium-resolution version of the image” and can optionally be uncompressed. LG-1009, 12:33-13:1.

271. The compressed full-sized image is an example of a second still picture. For example, Anderson explains that “[t]he image data 604 is the actual

data comprising the **full-sized captured image** [first still picture] in compressed form, preferably in JPEG format,” which can be “captured at a resolution of 640x480 pixels.” LG-1009, 12:21-24.

272. A thumbnail image is an example of a picture. For example, Anderson explains that the “thumbnail image 606 is a small, uncompressed low-resolution version of the image,” with a pixel size that is “less than the display size of the LCD screen 402 (e.g., 80x60 pixels).” LG-1009, 12:29-31.

273. Anderson discloses reproducing the first still picture, second still picture and picture from a recording medium. For example, Anderson describes a “process of accelerating the user interface of the digital camera when in play mode,” such that, “after play mode is invoked, the **screenail image** 608 corresponding to the selected image is **fetched** from the image data file 600 stored on the removable memory,” and “is decompressed and displayed in the LCD screen.” LG-1009, 20:6-13.

274. Anderson further explains that “if the user presses and holds down the left/right buttons,” “then a series of screenail images 608 are continually decompressed and displayed in the LCD screen.” LG-1009, 20:17-19. Then, “[a]fter the button is released, whichever image is currently being displayed becomes the selected image, and the **compressed image data 604** corresponding to

the selected image is ***fetched*** from the image file 600 and decompressed and resized to fit the display.” LG-1009, 20:20-23.

275. Additionally, Anderson explains that “after review mode is invoked, each of the ***thumbnail images*** 606 to be displayed in the current screen are ***fetched*** from the corresponding image data files 600 stored on the removable memory 354.” LG-1009, 17:31-33.

276. A POSITA would have understood that fetching and displaying the scrennail (first still picture), compressed image data (second still picture) and thumbnail (picture) includes reproducing those pictures from a recording medium (removable memory).

[4.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

277. Anderson renders [4.2.2] obvious.

278. Anderson explains that “previously processed YCC data in the frame buffers 536 is used to generate the thumbnail 606 and scrennail 608,” and “the YCC data in the frame buffers 536 is converted from YCC 222 format into YCC 422 format,” where “compressing the scrennail 608 is optional.” LG-1009, 14:22-23, 14:23-26, 12:34-13:1, FIG. 6. Therefore, a POSITA would have understood that the scrennail (first still picture) is encoded according to a first encoding method, e.g., an uncompressed YCC 422 format.

279. Further, a POSITA would have understood that YCC 422 refers to YCC 4:2:2 format and YCC 222 refers to YCC 2:2:2 format. For example, Pavley explains that “The DSP 116 performs image processing on the raw CCD data to convert the frame of data Into YCC color format, typically **YCC 2:2:2** format (YCC is an abbreviation for Luminance, Chrominance-red and Chrominance-blue). Alternatively, the data could be converted into RGB format (Red, Green, Blue).” LG-1047, 6:38-42. Additionally, Anderson ’276 explains that “during capture mode, when the user presses the shutter button to capture an image, the imaged data is captured at a resolution set by user, transformed into **YCC 4:2:2** color space, compressed (e.g. JPEG), and stored as an image file.” LG-1048, 4:36-41. Further, a POSITA would look to standards, such as the International Telecommunications Union’s Rec. ITU-R BT.601-5 (1995) and Rec. ITU-R BT.709-3 (1998), which set forth international standards for standard definition and high definition digital television, respectively, and provide the “[d]efinition of the digital signal Y, Cr, Cb” (LG-1055, 2; LG-1056, 3) and color subsampling mode 4:2:2 (LG-1055, 4-6, 12, 16; LG-1056, 12).

280. Anderson further explains that “image data 604 [second still picture] is the actual data comprising the full-sized captured image in **compressed form**, preferably in **JPEG format**.” LG-1009, 12:22-24.

281. Since the image data 604 (second still picture) is compressed JPEG, and the scrennail (first still picture) is uncompressed YCC, Anderson discloses or renders obvious a second encoding method different from the first encoding method.

[4.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

282. Anderson renders [4.2.3] obvious.

283. The first still picture is an uncompressed scrennail, which “is preferably 288X216.” LG-1009, 12:3-4.

284. The second still picture is the full resolution image, which “is captured at a resolution of 640x480 pixels.” LG-1009, 12:27.

285. The picture is a thumbnail where “the pixel size of thumbnail image 606 is less than the display size of the LCD screen 402 (e.g., 80x60 pixels).” LG-1009, 12:29-31.

286. Therefore, the picture (thumbnail) has fewer pixels than the first still image and second still picture.

287. Additionally, since the picture, first still picture and second still picture are all derived from common signal data, as explained in reference to [4.2.4], the picture (thumbnail) corresponds to the first and second still pictures. §IX.D.[4.2.4].

[4.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

288. Anderson renders [4.2.4] obvious.

289. The first still picture, second still picture, and picture are related pictures derived from common signal data.

290. For example, Anderson explains that “[o]nce the user presses the shutter button 418 to capture an image, the raw image data is captured by the image device 114 at a resolution set by the user and the raw image data is stored into an appropriate number of input buffers 538.” LG-1009, 14:11-13. “The raw image data is then used to generate an enhanced image file 600 for the captured image including the ***compressed image data 604, the thumbnail 606, and the screennail 608.***” LG-1009, 14:13-16.

291. Since the raw image data is used to generate the compressed image data (second still picture), the thumbnail (picture), and the screennail (first still picture), the first still picture, second still picture and picture are related pictures derived from common signal data (the raw image data captured by the image device).

[4.3] outputting a plurality of pictures from the reproducing operation; and

292. Anderson renders [4.3] obvious.

293. First, Anderson explains that after “[r]eferring now to FIGs. 3, 6, 8, and 9, after review mode is invoked, each of the ***thumbnail images 606*** [plurality

of pictures] to be displayed in the current screen are fetched from the corresponding image data files 600 stored on the removable memory 354.” LG-1009, 17:31-33. Anderson further explains that “[w]hen displaying a given review mode screen, all the screen elements are first drawn in the draw buffer and then moved to the display buffer where the ***data is then output to the LCD 402*** for display.” LG-1009, 18:3-6. A POSITA would have further found obvious that the other thumbnails would have also been reproduced by the reproducing operation (e.g., such that they could be displayed/output). Therefore, Anderson discloses outputting (displaying) a plurality of pictures including the thumbnail (picture).

294. With reference to FIG. 8, “[i]n a preferred embodiment, the review screen layout displays four small thumbnails 700 at a time and is based on a filmstrip metaphor which allows users to quickly move forward and backward among pictures chronologically according to date and time.” LG-1009, 16:3-33, FIG. 8. As such, the four thumbnails (plurality of pictures) are output from the reproducing operation.

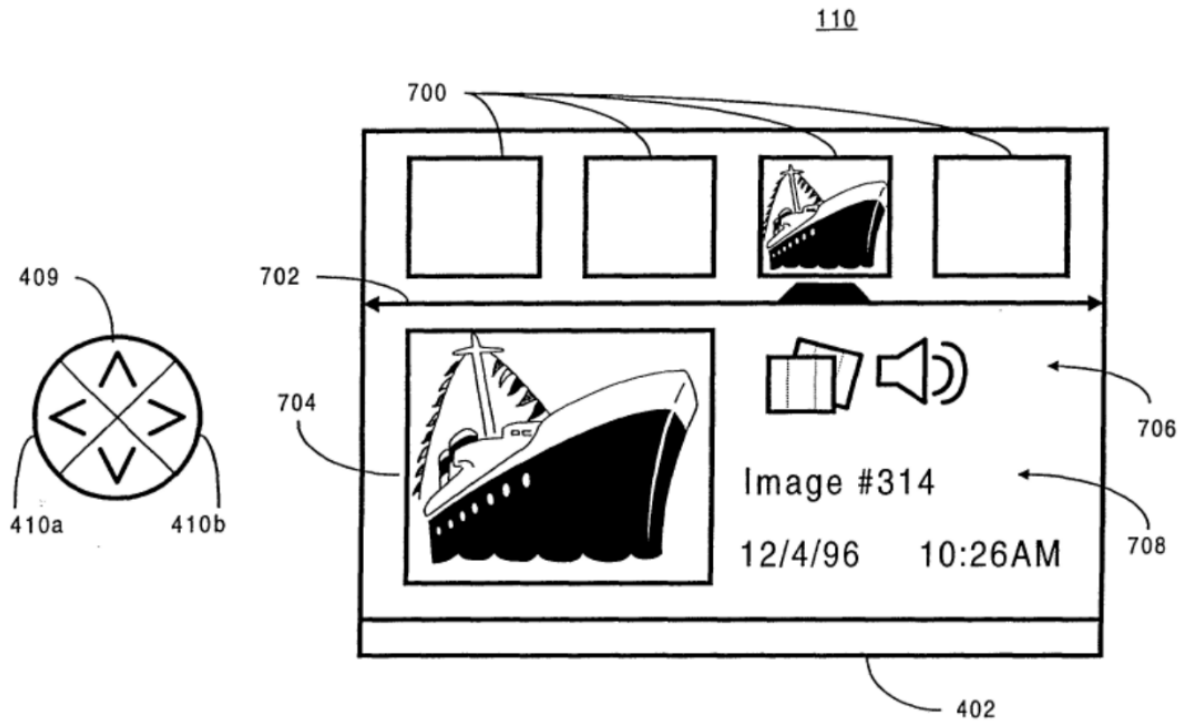


FIG. 8

LG-1009, FIG. 8.

295. Second, Anderson explains that “after play mode is invoked, the *screenrail* image 608 [first still picture] corresponding to the selected image is fetched from the image data file 600 stored on the removable memory 354 (or a host computer if connected) in step 802,” then “decompressed¹² and *displayed in the LCD* screen 402 in step 804.” LG-1009, 20:9-12; §IX.D.[4.2.1]. Therefore, Anderson discloses outputting (displaying) the screenrail (first still picture). Thus,

¹² A POSITA would have understood that when the screenrail (first still image) is uncompressed, the decompression step would be omitted.

Anderson discloses outputting a plurality of pictures (thumbnails/pictures and scrennail/first still picture).

296. As described in [4.2.1], the reproducing operation results in the scrennail (first still picture), full-size image (second still picture), and thumbnail (picture) being stored on the removable memory 354. §IX.D.[4.2.1]. Since the both the scrennail and thumbnails are “fetched from the image data file 600 stored on the removable memory 354,” the scrennail (first still picture) and thumbnails (pictures) are output from the reproducing operation. LG-1009, 19:1-3, 20:10-11.

[4.4] outputting said first still picture corresponding to a selected picture.

297. Anderson renders [4.4] obvious.

298. For example, Anderson explains that “[r]eferring now to FIGS. 3, 6, and 10, after play mode is invoked, the scrennail image 608 [first still picture] ***corresponding to the selected image*** is fetched from the image data file 600 stored on the removable memory 354 (or a host computer if connected) in step 802,” then “decompressed and displayed in the LCD screen 402 in step 804.”¹³ LG-1009, 20:12-13; §IX.D.[4.2.1].

¹³ See n.12.

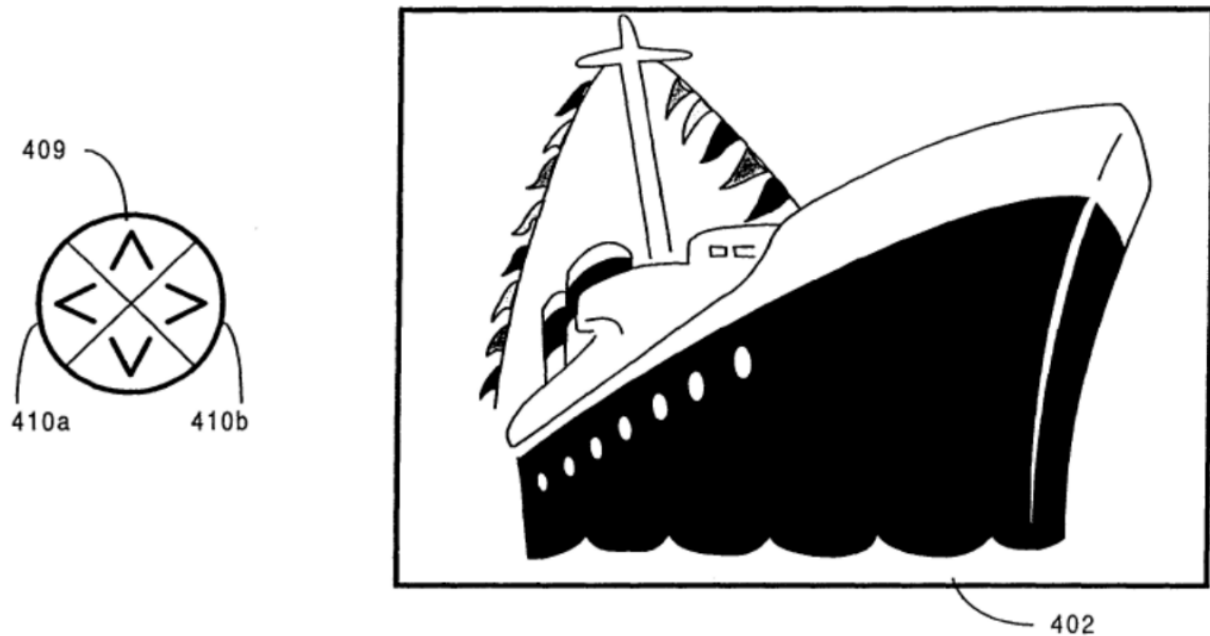


FIG. 10

LG-1009, FIG. 10.

[6] A video reproducing method in accordance with claim 4, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

299. Anderson renders [6] obvious.

300. As described in [4.2.2], the scrennail (first still picture) is encoded according to a first encoding method, the YCC standard (uncompressed). LG-1009, 13:35-14:1,14:23-26, FIG. 6; §IX.D.[4.2.2]. As described above, a POSITA would look to standards, such as the International Telecommunications Union's Rec. ITU-R BT.601-5 (1995) and Rec. ITU-R BT.709-3 (1998), which set forth international standards for standard definition and high definition digital television, respectively, and provide the "[d]efinition of the digital signal Y, Cr, Cb" (LG-

1055, 2; LG-1056, 3) and color subsampling mode 4:2:2 (LG-1055, 4-6, 12, 16; LG-1056, 12).

301. A POSITA would have recognized that YCC is a standard. For example, Williams states that “[t]hough the red, green, and blue records are considered nominal separation standards for storage of color information, other **similar standards such as Ycc**, Lab, or Luv can also be stored in a similar fashion as in FIG. 1.” LG-1032, 3:22-26. A POSITA would have known that a standard is “a specification for hardware or software that is either widely used and accepted (de facto) or is sanctioned by a standards organization (de jure).” LG-1037, 3.

302. Margolis further explains that a standard is a “definition or format that has been approved by a recognized standards organization **or is accepted as a de facto standard by the industry**. Standards exist for programming languages, operating systems, data formats, communications protocols, and electrical interfaces. From a user’s standpoint, standards are extremely important in the computer industry because they allow the combination of products from different manufacturers to create a customized system. Without standards, only hardware and software from the same company could be used together.” LG-1038, 4.

303. Also as described in [4.2.2], the image data (second still picture) is encoded according to a second encoding method, JPEG. LG-1009, 12:22-24; §IX.D.[4.2.2]. Therefore, the first encoding method is according to a first

encoding standard (YCC) and said second encoding method is according to a second encoding standard (JPEG). (See also my discussion of the YCC standard in ¶279.)

[7.1] A video reproducing method, comprising:

304. See §IX.D.[4.1].

[7.2.1] reproducing at least a first still picture, a second still picture and a picture recorded on a recording medium,

305. See §IX.D.[4.2.1].

[7.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

306. See §IX.D.[4.2.2].

[7.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

307. See §IX.D.[4.2.3].

[7.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

308. See §IX.D.[4.2.4].

[7.3] displaying a plurality of pictures from the reproducing operation; and

309. See §IX.D.[4.3].

[7.4] displaying said first still picture corresponding to a selected picture.

310. See §IX.D.[4.4].

[9] A video reproducing method in accordance with claim 7, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

311. See §IX.D.[6].

E. GROUND 4 – Suzuki renders claims 1, 3-4, 6-7, and 9 obvious

[1.1] 1. A machine-readable recording medium comprising:

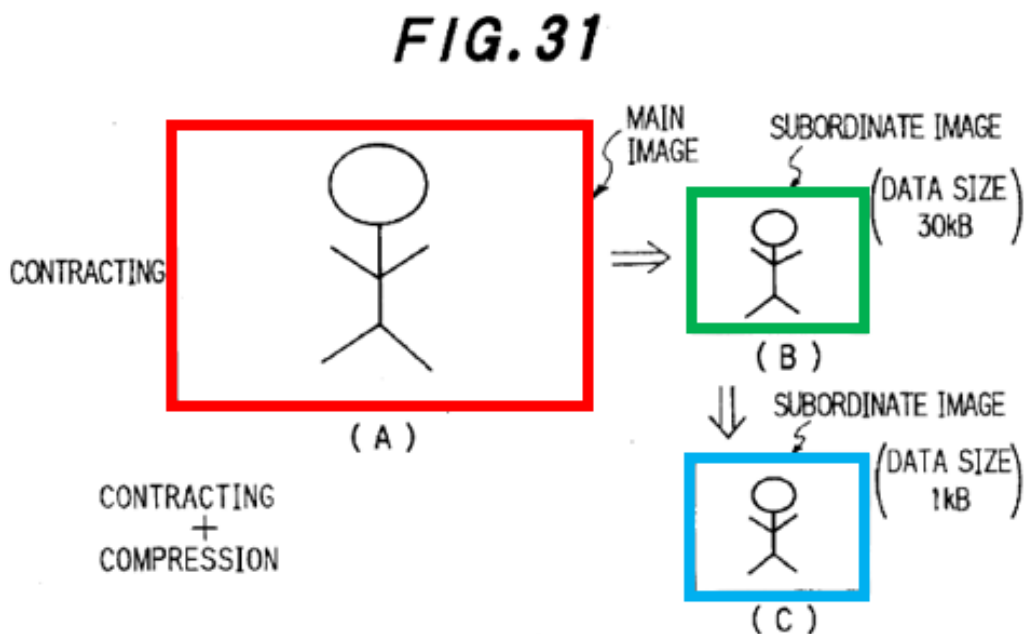
312. To the extent the preamble is limiting, Suzuki renders [1.1] obvious. In particular, Suzuki discloses “IC memory card 15 which is used as a storage means” on which “compressed image data is recorded” and can be read out. LG-1010, 9:27-38, 13:58-60, FIG. 1. Suzuki explains that the main image and subordinate images are recorded in “IC memory card 15,” which “is used as a storage means.” LG-1010, 9:21-30, 13:58-64 (“the compressed main image data is recorded in IC memory card 15”), 13:65-14:8 (“recording process of recording subordinate image in IC memory card”), FIGS. 1, 13 (steps S23, S26). Suzuki further explains that “Digital still cameras are capable of recording, as files, image data, voice data, control data, etc. on such recording media as IC memory cards, magnetic media (hard disks or floppy disks), opto-magnetic media, etc.” LG-1010, 1:10-13. In the ’760 patent, the background art is described, “Recently, along with tendency toward large scale in capacity of recording medium such as rewritable optical disks, etc. and with improvement in techniques for compressing moving pictures, the techniques for digital cameras and recordable players, etc. that have the function of recording moving pictures on optical disks have been reviewed. See Ex. 1001, 1:17-23. A POSITA would have known that Suzuki’s IC memory

cards, magnetic media (hard disks or floppy disks), opto-magnetic media are the '760 patent's machine-readable recording medium.

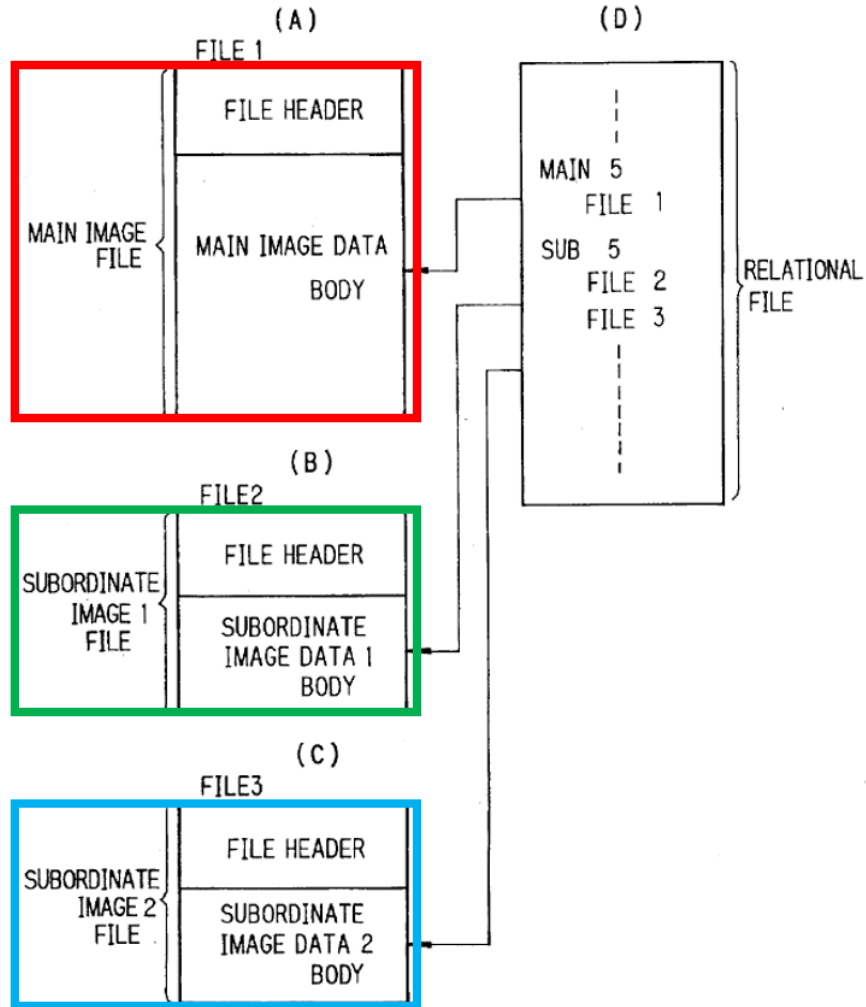
[1.2.1] a first still picture recorded thereon encoded by a first encoding methods,

313. Suzuki renders [1.2.1] obvious. See *infra* §IX.E.[4.2.1]-[4.2.2].

314. As discussed in [1.1], Suzuki discloses a main image (first still picture) recorded on the IC memory card. A “main image” is shown, for example, in FIG. 31 (red box), with “an example of recording the subordinate image data in separate files from that of the main image data” shown in FIG. 6 (red box). LG-1010, 11:15-27, 18:20-28, FIGS. 6, 31.



LG-1010, FIG. 31(annotated).



LG-1010, FIG. 6 (annotated).

315. The main image is “coded in coder/decoder 13 and subjected to a compression process in a compression system conforming to the *JPEG* system” (first encoding method). “The compressed image data is recorded in IC memory card 15 which is used as a storage means” (machine readable storage medium). “IC memory card 15 may be detachably provided to the apparatus body, or it may be equipped therein.” LG-1010, 9:21-30 (emphasis added), 10:60-63, 11:55-64.

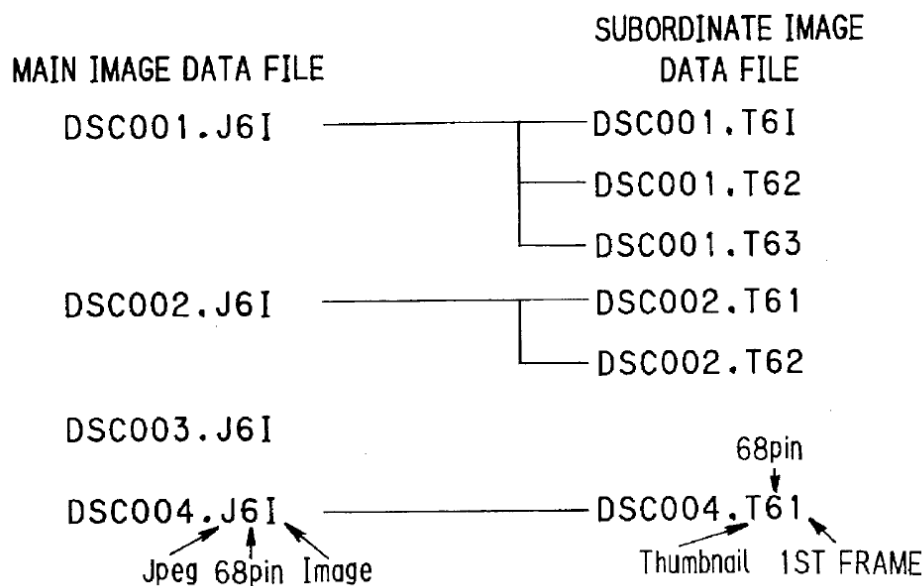
316. Suzuki therefore discloses a first still picture recorded on a machine-readable storage medium encoded by a first encoding method. *See also infra* §IX.E.[4.2.1]-[4.2.2].

[1.2.2] wherein the first still picture having descriptive information associated therewith to allow a machine to recognize and decode the first still picture for display;

317. Suzuki discloses or renders obvious [1.2.2]. As described in [1.2.1], Suzuki's first still picture is encoded as JPEG. Suzuki discloses certain JPEG headers and markers (*see infra*). Further, a POSITA would have understood that the JPEG images include descriptive header information that allows a machine to recognize and decode the image, and therefore to recognize decode the first still picture. See my analysis in §IX.B.[1.2.2], and my discussion of Czyszczoń and Fokker in ¶133. LG-1022, 4, 5; LG-1023, 12.

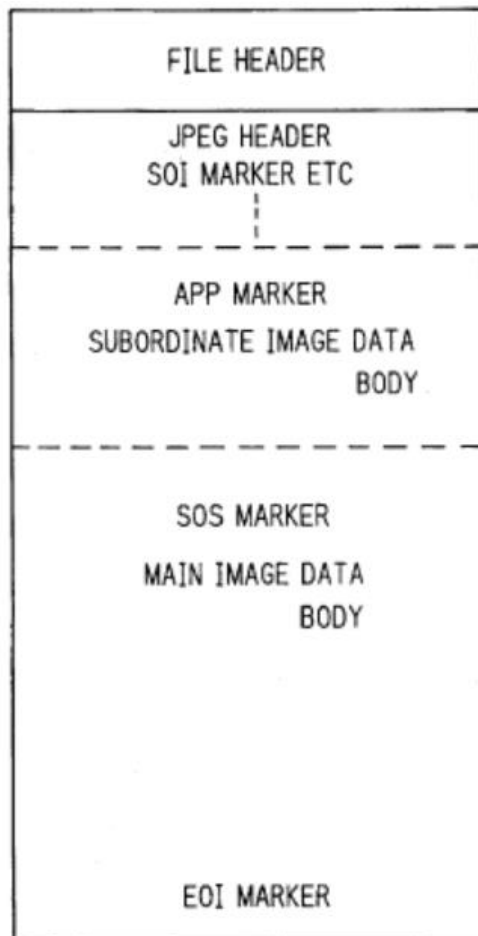
318. Moreover, because the first still picture is a JPEG image, a POSITA would have understood it would have a JPEG file extension, which further provides descriptive information to allow a computer to recognize and decode the image, e.g., as explained in ¶134 with reference to Pauls's quotation. LG-1039, 2:59-3:9. Further, applicant lists "filename extension" as descriptive information. LG-1002, 43. For instance, FIG. 8 shows "the main and subordinate image data [] recorded in separate files for discriminating and relating of data on the basis of file names." LG-1010, 7:42-44. "[E]xtenders are used to discriminate the main and

subordinate image data files.” *Id.*, 11:46-55. The main image has an “extender” (i.e., file extension) “J6I,” where “J” represents JPEG as the compression system, ‘6’ 68-pin, and ‘I’ image.” *Id.*, 11:56-59. A POSITA would have understood that this “extender” would allow the computer to recognize the main image (e.g., as a JPEG image) and decode the image (e.g., decompress the image) for display. *Id.*



LG-1010, FIG. 8.

319. Further, Suzuki’s Fig. 5 shows a JPEG file at a high level, which includes a header, SIO marker, and an SOS marker, along with additional information about how to include a subordinate image.



LG-1010, FIG. 5.

320. Suzuki states, “after a file header, data of SOI (Start of Image), etc. is recorded in a JPEG header, then the body of the Subordinate image data in an XPP (Application Marker) and the body of main image data in a SOS marker up to an EOI (End of Image) marker are recorded.” LG-1010, 10:64-11:1.

321. A POSITA would have known that the JPEG file syntax and semantics, including such SOI, SOS, and EOI, provide the information necessary to locate, recognize, and decode pictures compressed according to the JPEG standard. A POSITA would have looked to, for example, “JPEG Still Image

Compression Standard,” Pennebaker and Mitchell, 1993. (“Pennebaker” or LG-1052) This book states, “SOI: The SOI (Start Of Image) marker begins the compressed data stream. Note that the SOI marker can be used to detect problems with bit order, bit sense, and bit alignment of the data.” LG-1052, 4. Further, “SOS: The SOS (Start Of Scan) marker begins a scan header. The scan header is always followed immediately by entropy-coded data for the scan. The two-byte length gives the number of bytes of scan parameters.” *Ibid.* Finally, “EOI: The EOI (End Of Image) marker terminates the JPEG compressed data stream.” *Id.*, 4. A POSITA would have further looked to the JPEG standard to understand its syntax and semantics. *See, e.g.*, LG-1050, i.e., CCITT T.81 (09/92) “Information Technology – Digital Compression and Coding of Continuous-Tone Still Images – Requirements and Guidelines,” which notes that “the identical text is also published as ISO/IEC International Standard 10918-1,” such standards commonly known according to the name of the Joint CCITT and ISO committee that standardized them, Joint Photographic Experts Group (JPEG). The JPEG standard specifies an encoder, a decoder, and the “interchange format,” which “is a compressed image data representation which includes all table specifications” for exchange between application environments. LG-1050, 17.

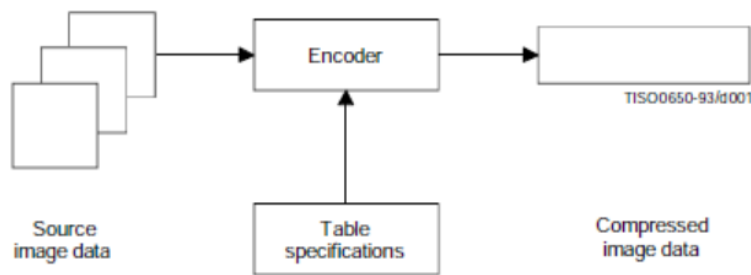


Figure 1 – Encoder

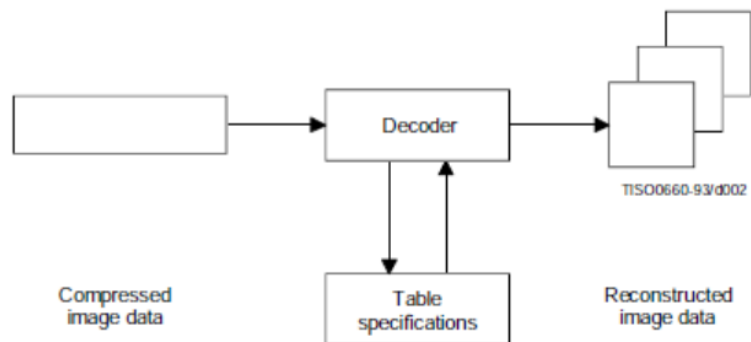


Figure 2 – Decoder

Encoder and Decoder figures, LG-1050, 13.

322. The JPEG standard specifies the overall syntax and semantics for JPEG-coded pictures, starting at a high level with the following syntax figure, that includes, e.g., SOI and EOI. “SOI: Start of image marker – Marks the start of a compressed image represented in the interchange format or abbreviated format.” And, “”EOI: End of image marker – Marks the end of a compressed image represented in the interchange format or abbreviated format.” LG-1050, 38.

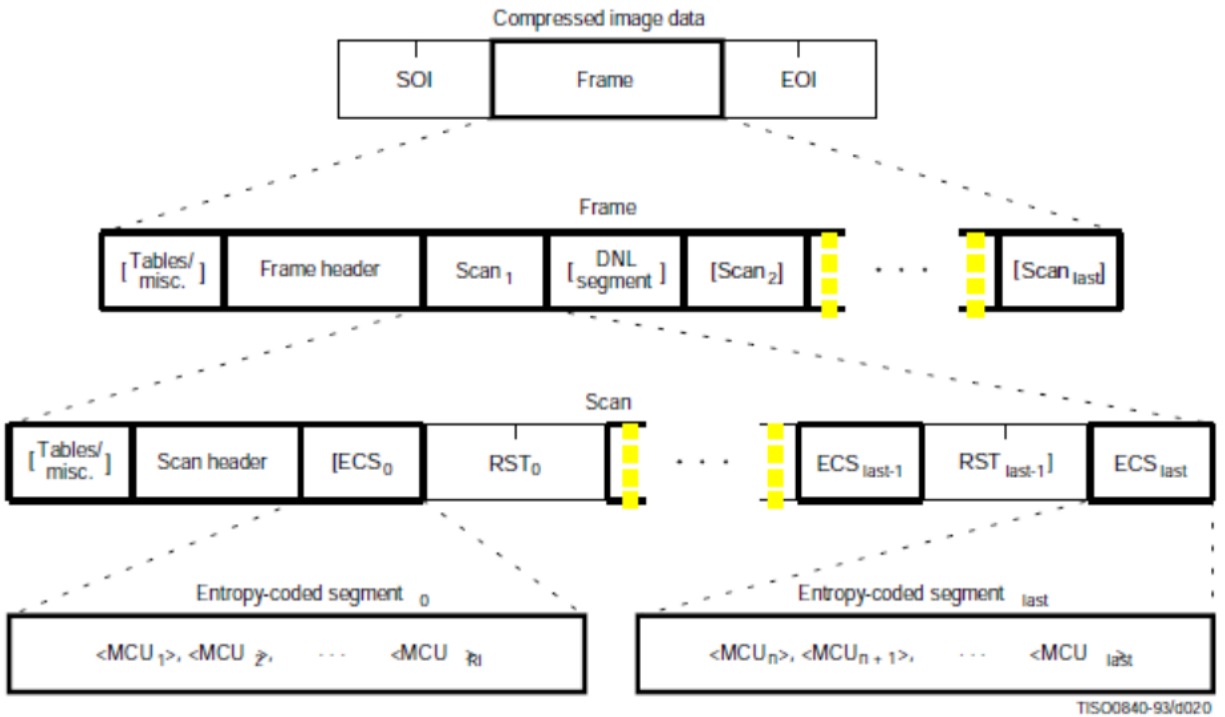


Figure B.2 – Syntax for sequential DCT-based, progressive DCT-based, and lossless modes of operation

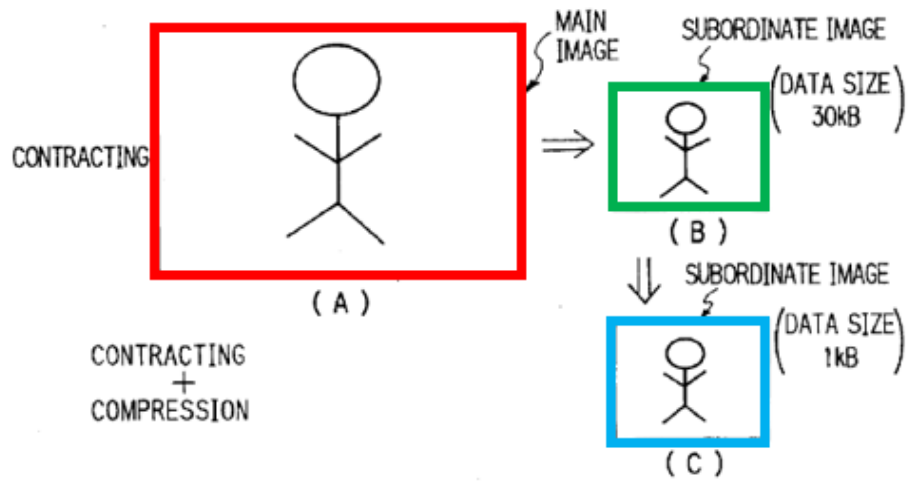
LG-1050, Figure B.2, 34.

[1.3.1] a second still picture recorded thereon encoded by a second encoding method,

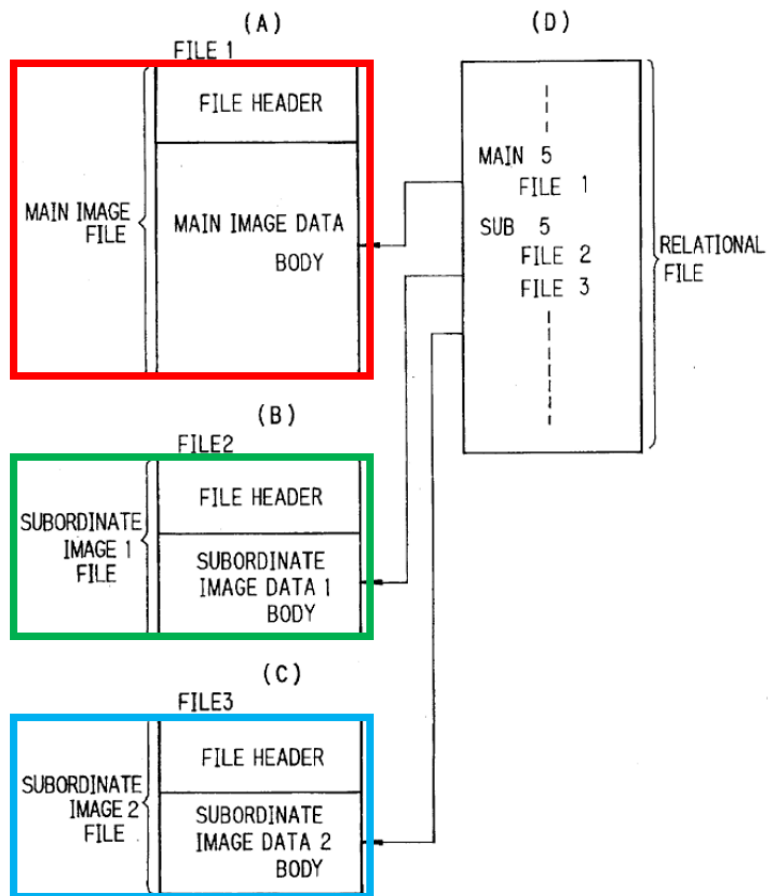
323. Suzuki discloses or renders obvious [1.3.1]. *See infra* §IX.E.[4.2.1]-[4.2.2].

324. As discussed in [1.1], Suzuki discloses subordinate image (B) (second still picture) recorded on the IC memory card. Subordinate image (B) is shown, for example, in FIG. 31 (green box), with “an example of recording the subordinate image data in separate files from that of the main image data” shown in FIG. 6 (green box). LG-1010, 11:15-27, 18:20-28, FIGS. 6, 31.

FIG. 31



LG-1010, FIG. 31(annotated).



LG-1010, FIG. 6 (annotated).

325. Suzuki describes a subordinate image production process that includes “a conversion conforming to a format necessary for personal computer processing.” LG-1010, 14:9-54, FIG. 14. “Image data formats available for personal computers include TIFF, PICT, BMP, etc. as well as JPEG, and the present invention is applicable to those systems as well.” LG-1010, 11:3-6. Thus, a POSITA would have understood that the subordinate images of Suzuki, including subordinate image (B), can be any such format, including, formats different from JPEG, for example TIFF, PICT, BMP. *Id.* The TIFF format is described in LG-1052. The PICT format is described in LG-1053, The BMP format is described in LG-1054.

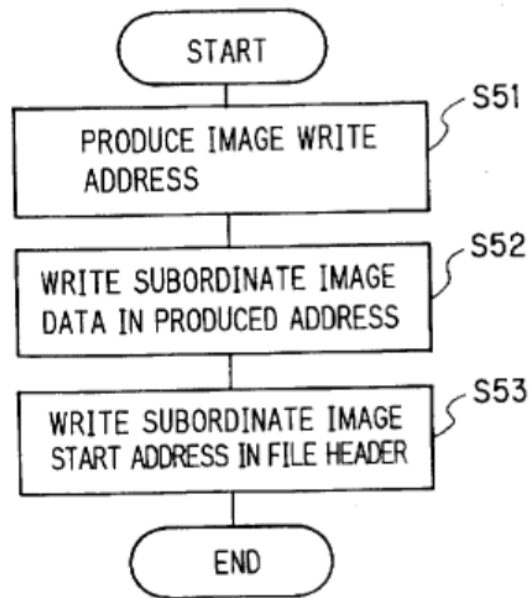
326. Suzuki’s FIG. 8 further illustrates the different encoding methods of the first and second encoding methods, where the main image data file (for the first still picture) has a file name (e.g., DSC004.JPI) having an “extender” that indicates it is encoded using a JPEG method (“J” represents JPEG as the compression system”). LG-1010, 11:56-64, FIG. 8. Further, the subordinate image in FIG. 8 does not have a “J” indicating “JPEG” and instead has a “T” indicating “thumbnail.” While indication of thumbnail does not preclude JPEG compression, a POSITA would have known that the reduced resolutions associated with thumbnails allowed more simple encodings that did not perform complex compression like JPEG, e.g., an uncompressed bitmap data file (BMP). Suzuki

expressly discloses such encodings different from JPEG for the subordinate image (second still picture), including TIFF, PICT, and BMP (*see supra*). As a further example, “The parameters of the subordinate image data may be the subordinate image data start address or the ***subordinate image data type*** (such as compressed or ***non-compressed information***, pixel size, etc.).” LG-1010, 10:37-40. A POSITA would have known that non-compressed information would include, e.g., an uncompressed bitmap data file (BMP).

[1.3.2] wherein the second still picture having descriptive information associated therewith to allow the machine to recognize and decode the second still picture for display,

327. Suzuki discloses or renders obvious [1.3.2].

328. Suzuki discloses the following regarding writing a subordinate image (second still picture) in a manner that allows recognition and decoding, “In this instance, the image write address is produced (step S51), then the subordinate image data is written in the produced address (step S52), and then the subordinate image start address is written in the file header (step S53). In this way, quick data reproduction can be obtained.” LG-1010, 15:21-26, regarding Fig 16 below.

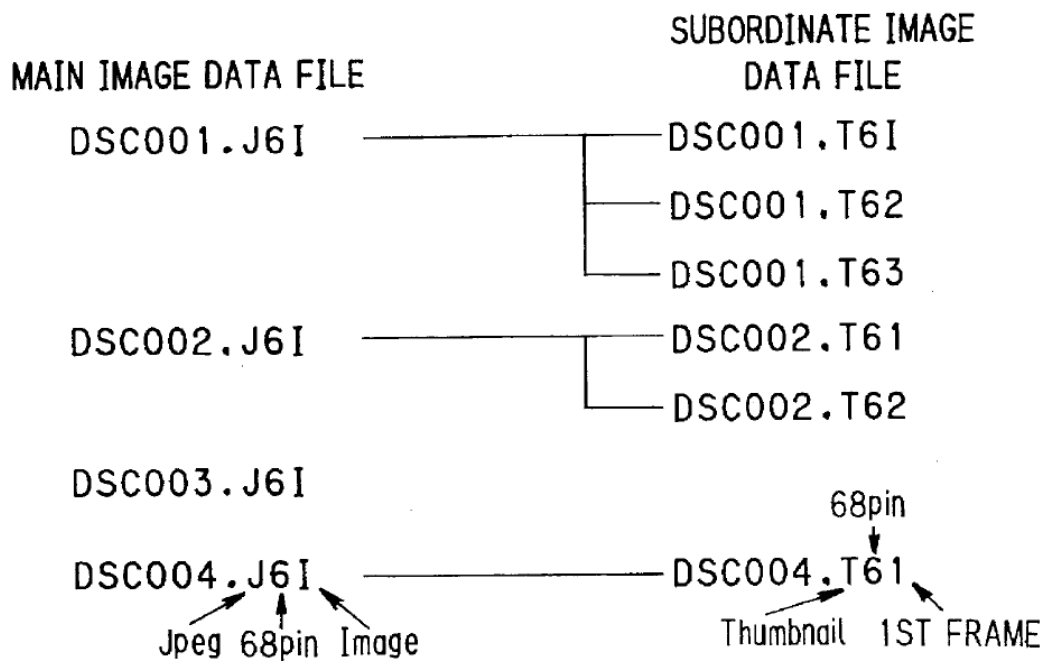


LG-1010, FIG. 16.

329. As described in [1.3.1], the second still picture is encoded in TIFF, PICT, or BMP. A POSITA would have understood that files in each of these formats have descriptive information associated therewith to allow the machine to recognize and decode the second still picture. For example, see my discussion of TIFF headers in ¶220. LG-1028, 7-8; LG-1002, 43 (applicant listing “header” as an example of descriptive information). As another example, PICT is described in “Apple’s Inside Macintosh Imaging with QuickDraw” documentation from 1994, where “the File Manager function ... takes a four-character file type—such as ‘PICT’—as a parameter. The data fork of a ‘PICT’ file begins with a 512-byte header A Picture record follows this header...” and it continues defining the format. LG-1053, 501. As still another example, BMP is described in a Dr. Dobb’s “The BMP File Format, Part 1” as the “standard format for storing bitmap

images in Windows application” and “becoming a common format for software on other operating systems as well,” continuing to describe the structures of the encoding: BITMAPFILEHEADER, BITMAPARRAYHEADER, BITMAPHEADER, and RGB structures. LG-1054. Moreover, because the second still picture is one of a TIFF, PICT, or BMP image, a POSITA would have understood it would have an appropriate file extension, which further provides descriptive information to allow a computer to recognize and decode the image. As noted above, applicant lists “filename extension” as an example of descriptive information. LG-1002, 43. As I explain above, e.g., in ¶121, Pauls describes such filename extensions for media files: “The data (or file) is retrieved via a bitstream [...]. The bitstream includes the data and control information. The data has associated a filename with a file extension indicative of a data type (and/or sub-type). The control information includes [...] a data type indicator to identify the data type of the associated data. Data types include, but are not limited to, speech/voice, video/image and text. Each data type has one or more sub-types. Examples of speech/voice sub-types (and file extensions) include audio (.au), wave (.wav) and speech (.sp). Examples of video/image sub-types include tagged image format files (.tif), graphic image format files (.gif), Moving Picture Experts Group files (.mpg and .mp2). Examples of text sub-types include MS Word (.doc) and ASCII (.txt).” LG-1039, 2:59-3:9.

330. In addition, Suzuki's FIG. 8 shows "the main and subordinate image data [] recorded in separate files for discriminating and relating of data on the basis of file name." LG-1010, 7:42-55. The subordinate image has an "extender" (i.e., file extension) "T6N," where "'T' represents subordinate image data called 'Thumbnail', '6' 68-pin, and 'N' subordinate image data frame No." *Id.*, 11:56-59. A POSITA would have understood that this "extender" would allow the computer to recognize and decode the image for display. *Id.*



LG-1010, FIG. 8.

[1.3.3] wherein the second encoding method is different from the first encoding method; and

331. Suzuki discloses or renders obvious [1.3.3].

332. A POSITA would have known that the second encoding method (TIFF, PICT, or BMP) is different from the first encoding method (JPEG).¹⁴ LG-1021; LG-1040, 4:24-29; LG-1041, 1:27-31; LG-1022; LG-1023; LG-1024; LG-1028; LG-1050; LG-1051; LG-1052; LG-1053; LG-1054.

333. Regarding the first still picture, Suzuki explains that the main image is “coded in coder/decoder 13 and subjected to a compression process in a compression system conforming to the *JPEG* system.” LG-1010, 9:21-30 (emphasis added), 10:60-63, 11:55-64.

334. Regarding the second still picture, Suzuki teaches or suggests that the subordinate images are TIFF, PICT, or BMP. LG-1010, 11:3-6, 11:56-64, 14:9-54, FIG. 14. Suzuki describes a subordinate image production process that includes “a conversion conforming to a format necessary for personal computer processing.” LG-1010, 14:9-54, FIG. 14. “Image data formats available for personal computers include TIFF, PICT, BMP, etc.” LG-1010, 11:3-6, 11:56-64, FIG. 8. Moreover, Suzuki teaches subordinate images can be uncompressed, which a POSITA would understand as BMP, TIFF, or PICT format and not JPEG (which is a compressed

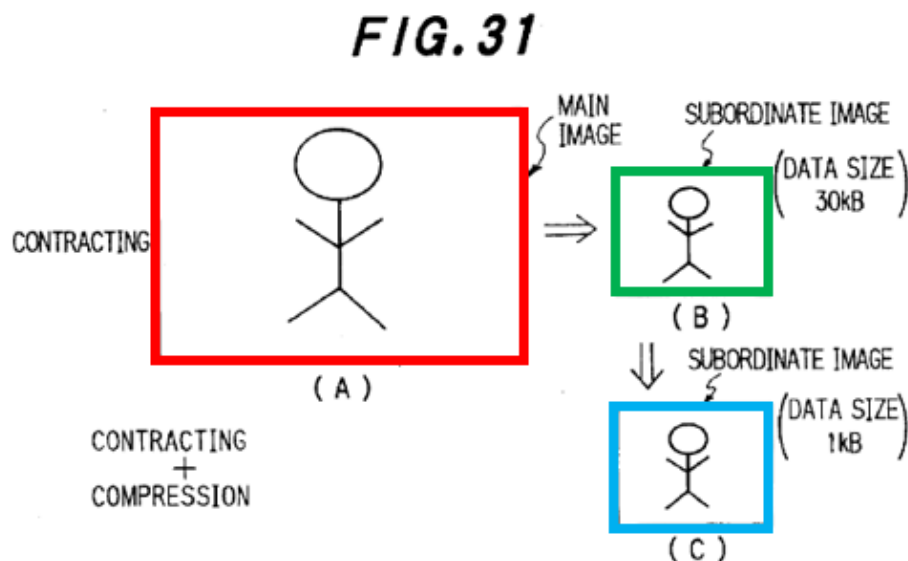
¹⁴ A POSITA would have known that while later versions of TIFF and PCT could contain JPEG images the encoding method of the file remains different. Further, a POSITA would have known that an uncompressed image encoded in TIFF or PCT would not use JPEG compression.

format). LG-1010, 14:31-54. The BMP, TIFF, or PICT subordinate image (second still picture) is then be encoded by an encoding method that is different than the encoding method of the main image (first still picture)—JPEG. *Id.*

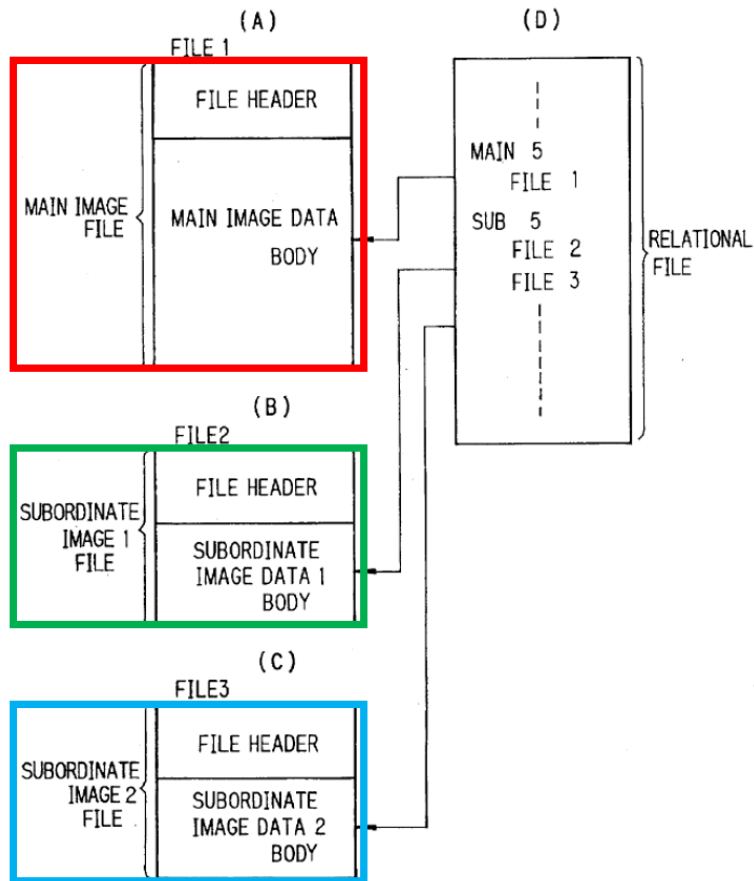
[1.4.1] a picture recorded thereon corresponding to said first and second still pictures, which has a smaller number of pixels than said first and second still pictures,

335. Suzuki discloses or renders obvious [1.4.1]. *See infra* §IX.E.[4.2.1]-[4.2.3].

336. As discussed in [1.1], Suzuki discloses subordinate image (C) (picture) recorded on the IC memory card. Subordinate image (C) is shown, for example, in FIG. 31 (blue box), with “an example of recording the subordinate image data in separate files from that of the main image data” shown in FIG. 6 (blue box). LG-1010, 11:15-27, 18:20-28, FIGS. 6, 31.

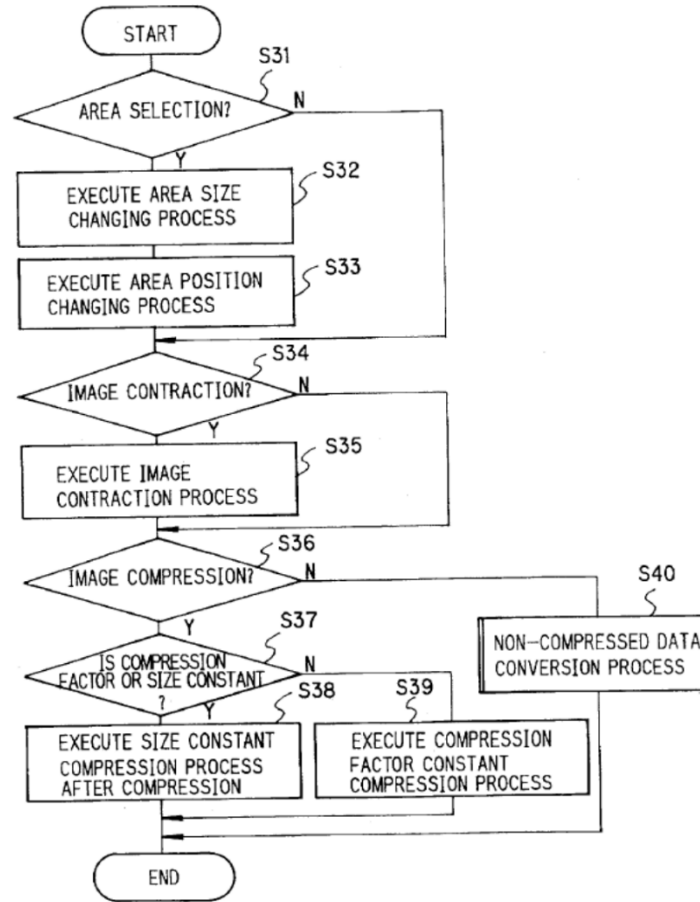


LG-1010, FIG. 31(annotated).



LG-1010, FIG. 6 (annotated).

337. Regarding the picture corresponding to said first and second still pictures and having a smaller number of pixels than said first and second still pictures, Suzuki discloses three alternatives in the “subordinate image production process” Fig. 14 that can be invoked alone or in combination: area selection (or cropping), image contraction (or resolution reduction), and/or image compression. LG-1010, 7:58-60, FIG. 14.



LG-1010, FIG. 14.

338. Further, Suzuki discloses making a second subordinate image from a first subordinate image in Fig. 31 (*see supra*), where compression is used, and also in claim 4, where contraction is used (“4. The image processing apparatus of claim 1, said first and second subordinate image producing means each including image contracting means for contracting the main image data and first subordinate image date part of the image data, respectively.” LG-1010, 21:11-15.) Thus, it would have been obvious for subordinate image (B) to be further contracted by the “second image contracting means” of the “second subordinate image producing

means” to produce subordinate image (C) and would have a reasonable expectation of success in doing so, because Suzuki already teaches contracting the same image twice. *Id.* Suzuki provides a motivation for such contraction: “When a contracted subordinate image is produced, it is simpler and requires less data to record the contraction factor alone than to record the pixel size as the parameters.” LG-1010, 10:41-47. Where subordinate image (C) (picture) is generated by contracting subordinate image (B) (second still picture), as Suzuki teaches or suggests, subordinate image (C) has fewer pixels than subordinate image (B).

339. Regarding the method of contraction, Suzuki discloses “the usual thinning process” (*id.*, 14:52) which a POSITA would have understood to mean, e.g., decimation, or taking one pixel and then skipping over another number of pixels in both the horizontal and vertical dimensions. Taking every other pixel in each dimension would reduce by 2 in each dimension or by 4 total. For example 640 x 480 pixels would be thinned to 320 x 240 pixels. Suzuki discloses another way “by recording only the DC components of the orthogonal coefficient data output from the DCT/IDCT circuit 12.” (*Id.*, 14:47-49.) A POSITA would have known that JPEG includes an 8x8 DCT transform that produces a single DC coefficient that is analogous to an average of all 64 pixels in the block. A POSITA would have known other ways (e.g., various image processing techniques) to

perform Suzuki's contraction that produce a smaller number of pixels on the subordinate image than on the input image (main or another subordinate image).

340. See also discussion of [4.2.3] *infra*.

[1.4.2] wherein the picture having descriptive information associated therewith to allow the machine to recognize and decode the picture for display,

341. Suzuki renders [1.4.2] obvious.

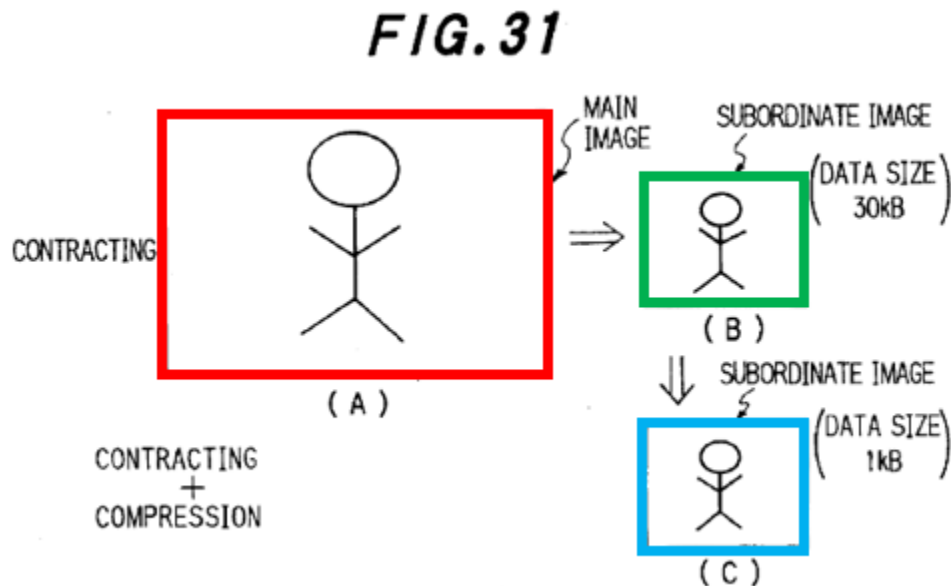
342. As explained in [1.4.1], like the second still picture, the picture is a subordinate image. As explained in [1.3.2], subordinate images, like subordinate image (C), have descriptive information that allows the machine to recognize and decode the picture.

[1.5] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data.

343. Suzuki discloses or renders obvious [1.5].

344. The first still picture, second still picture, and picture are related pictures derived from common signal data—namely, “image data read out from frame memory 11.” LG-1010, 9:4-20. Suzuki discloses that that image data is used to generate the main image (first still picture), which is then used to generate subordinate images (second still picture, picture). LG-1010, 2:55-67, 9:49-59 (describing “the subordinate image [...] is produced by extracting part of the image data of one image frame (hereinafter referred to as the main image), the extracted image being [...] or otherwise being processed....”), 13:46-14:8 (describing “an

image data recording sequence in the case of recording the subordinate image data after the recording of the main image data”), 14:55-67, 18:20-28, FIG. 31 (annotated, depicting the red main image (first still picture) used as the source for the green subordinate image (second still picture) which is then used as the source for the blue subordinate image (picture)).



LG-1010, FIG. 31(annotated).

345. See also *infra* Ground 4 [4.2.4].

[3] A recording medium in accordance with claim 1, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

346. Suzuki discloses or renders obvious [3].

347. As described in [1.2.1], the first picture is encoded according to JPEG, which is a first encoding standard. The JPEG format is described in LG-1050 and LG-1052.

348. As described in [1.3.1], the second picture is encoded according to TIFF, PICT, or BMP which is a second encoding standard. The TIFF format is described in LG-1052. The PICT format is described in LG-1053, The BMP format is described in LG-1054.

[4.1] A video reproducing method, comprising:

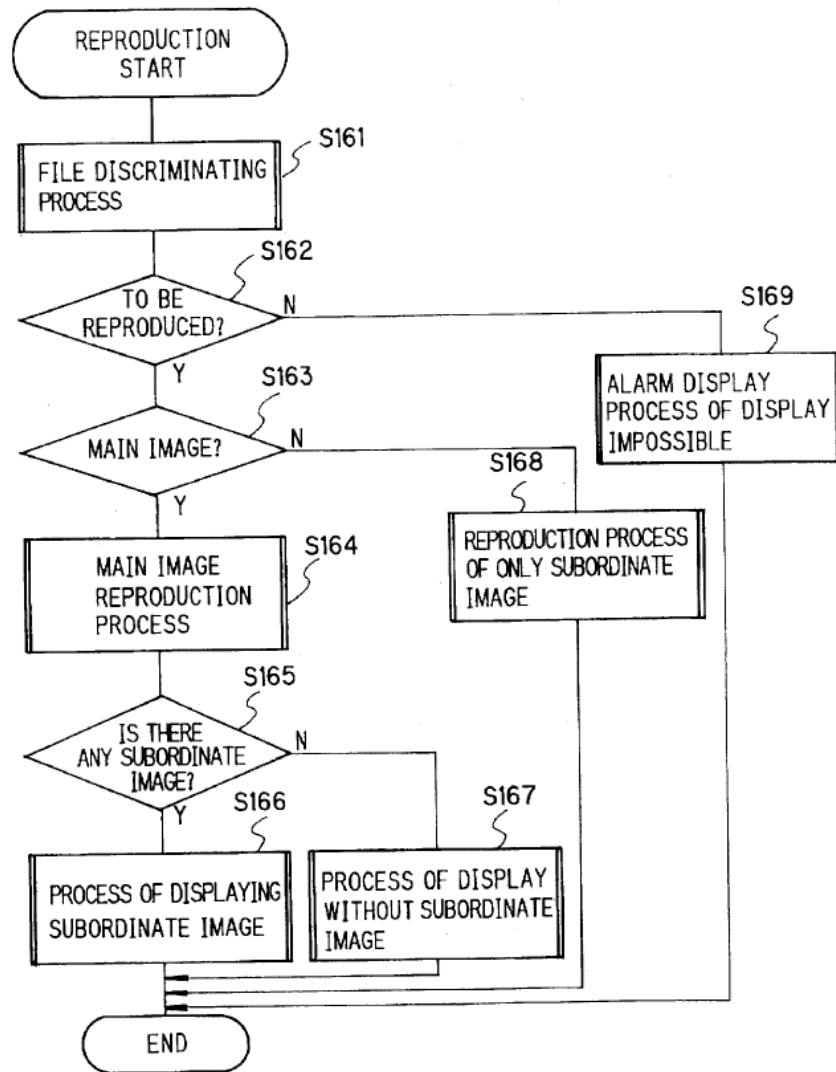
349. To the extent the preamble is limiting,¹⁵ Suzuki renders it obvious.

350. FIG. 26 and associated descriptions, for example, disclose “producing the subordinate image from a plurality of main images in conformity to the speed of continuous image pick-up.” LG-1010, 17:17-28 and FIG. 26. A POSITA would have known that continuous capture of still pictures at a particular speed (or frame rate) is video.

351. FIG. 32, for example, is a “flow chart illustrating an image reproduction sequence,” which can be used to reproduce “the main image (step S163)” and “the subordinate image” (step S168). LG-1010, 18:29-55, FIG. 32; see *also id.*, 18:56-19:15, FIG. 33. Suzuki further explains that both the main image and subordinate images are recorded in “IC memory card 15,” which “is used as a storage means.” LG-1010, 9:21-30, 13:58-64 (“the compressed main image data is

¹⁵ See §IX.A.4.[4.1] (discussion of LG-1031, 4 n.2).

recorded in IC memory card 15”), 13:65-14:8 (“recording process of recording subordinate image in IC memory card”), FIGS. 1, 13 (steps S23, S26).



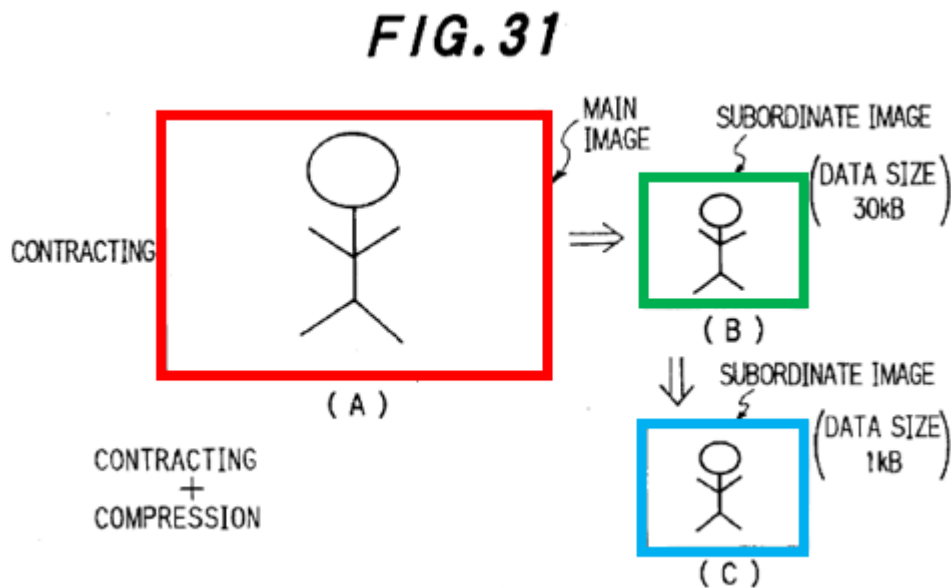
LG-1010, FIG. 32

[4.2.1] reproducing at least a first still picture, a second still picture and a picture from a recording medium,

352. Suzuki discloses or renders obvious [4.2.1].

353. Suzuki discloses reproducing a first still picture, second still picture and picture from a recording medium. As discussed in [4.1], the main image and

the subordinate images are all stored in an IC memory card. 9:21-30, 13:58-14:8, FIGS. 1, 13. Suzuki further discloses several examples where at least two subordinate images are generated. LG-1010, 1:47-60, 2:15-32, 10:23-29, 10:48-59, 11:15-64, 12:15-64, 16:21-49, 17:53-61, 18:5-8, FIGS. 2(C), 4, 6, 7, 8, 10, 11, 23, 24, 28, 31. FIG. 31, for example, shows a first still picture (“main image” (A)), second still picture (“subordinate image” (B)), and picture (“subordinate image” (C)). LG-1010, 18:20-28, FIG. 31.

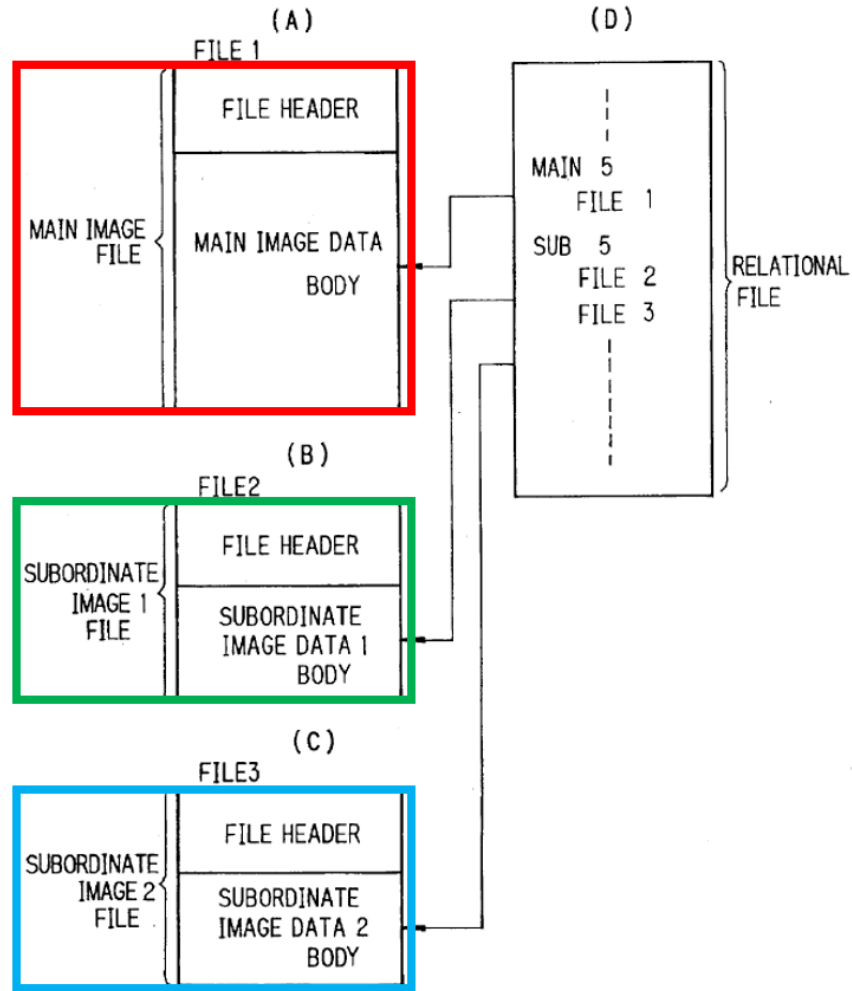


LG-1010, FIG. 31(annotated).

354. In particular, the “main image in FIG. 31(A) is contracted to obtain the subordinate image of a data size of 30 kB as shown in FIG. 31(B). This subordinate image is further compressed to an image of a data size of 1 kB as shown in FIG. 31(C).” LG-1010, 18:20-28, FIG. 31. A POSITA would have

understood that the “image of a data size of 1 kB” (C) is a second subordinate image, as labeled in FIG. 31.

355. In another example, Suzuki shows “an example of recording the subordinate image data in separate files from that of the main image data.” LG-1010, 7:34-37. In this example, a “main image file” (first still picture) is shown in (A), “subordinate image 1 file” (second still picture) is shown in (B), and “subordinate image 2 file” (picture) is shown in (C). LG-1010, 11:15-27. A “relational file,” shown in (D), “‘MAIN 5’ that the main image data in the fifth frame is recorded in FILE 1” and “‘SUB5’ indicates that the subordinate image data in the fifth frame is recorded in FILES 2 and 3.” *Id.*



LG-1010, FIG. 6 (annotated).

356. To the extent that Suzuki does not inherently disclose this, a POSITA would have found obvious that the subordinate images (B) and (C) of FIG. 31 would be recorded in memory, for example, in a manner like that shown in FIG. 6, such that a relational file indicates that subordinate images (B) and (C) are subordinate images of main image (A).

357. Suzuki describes reproducing these images with reference to FIG. 32. LG-1010, 18:29-55, FIG. 32; *see also id.*, 18:1-8, 18:56-19:15, FIGS. 27-28, 33.

In particular, “a check is made as to whether the image is the main image (step S163),” and if so, “the main image is reproduced (step S164), and then whether there is a subordinate image is checked (step S165).” LG-1010, 18:29-46. “If it is determined in step S165 that there is a subordinate image, a process of displaying the subordinate image data as shown in FIGS. 27 or 28 is executed (step S166).” LG-1010, 18:1-8, 18:29-46. A POSITA would have known that following the sequence of FIG. 32 given the existence of a main image (first still picture) and a first subordinate image (second still picture) would result in the reproduction of those two pictures.

358. Suzuki continues the description of FIG. 32, “If it is determined in step S163 that the image is not the main image, this is it is the subordinate image, only the subordinate image is reproduced (step S168), thus bringing an end to the routine.” LG-1010, 18:47-50. Suzuki thus discloses performing this image reproduction sequence after the reproduction of a first subordinate image (e.g., the second still picture). A POSITA would have known that following the sequence of FIG. 32 given the existence of such a second subordinate image (picture) would result in the reproduction of that third picture.

359. Further, Suzuki discloses multiple instances of more than one subordinate image being generated, a POSITA would have understood from Suzuki’s teachings of generating subordinate images that reproducing the images

(e.g., per FIG. 32) would include checking for the existence of each of the subordinate images and reproducing all of them (i.e., displaying both subordinate images (B) and (C) of FIG. 31, or both subordinate images files in FIG. 6).

360. Thus, Suzuki discloses or renders obvious reproducing the first still picture, second still picture and picture from a recording medium (IC memory card) and displaying those pictures on a display monitor.

361. Accordingly, Suzuki discloses or renders obvious [4.2.1].

[4.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

362. Suzuki discloses or renders obvious [4.2.2], at least for the same reasons cited above for Ground 4 [1.2.1]-[1.3.3] and [3].

363. Regarding the first still picture, Suzuki explains that the main image is “coded in coder/decoder 13 and subjected to a compression process in a compression system conforming to the **JPEG** system.” LG-1010, 9:21-30 (emphasis added), 10:60-63 (“recording the main image data after compression thereof in the JPEG standard image data format”), 11:55-64.

364. Regarding the second still picture, Suzuki discloses that the subordinate images can be TIFF, PICT, or BMP. LG-1010, 11:3-6, 11:56-64, 14:9-54, FIG. 14. Suzuki describes a subordinate image production process that includes “a conversion conforming to a format necessary for personal computer

processing.” LG-1010, 14:9-54, FIG. 14. Suzuki additionally states that “[i]f it is determined in step S36 that the image is not to be compressed, the image data read out from frame memory 11 is subjected without compression to a non-compressed data conversion process, such as a conversion conforming to a format necessary for personal computer processing.” LG-1010, 14:36-41.

365. Suzuki further explains that “[i]mage data formats available for personal computers include TIFF, PICT, BMP, etc. as well as JPEG, and the present invention is applicable to those systems as well.” LG-1010, 11:3-6. Thus, a POSITA would have understood that the subordinate images of Suzuki, including subordinate image (B), can be any such format, including, formats different from JPEG, for example TIFF, PICT, BMP. *Id.*

366. Suzuki’s FIG. 8 further illustrates the different encoding methods of the first and second encoding methods, where the main image data file (for the first still picture) has a file name (e.g., DSC004.JPI) having an “extender” that indicates it is encoded using a JPEG method (“‘J’ represents JPEG as the compression system”). LG-10101, 11:56-64, FIG. 8.

367. Further, the subordinate image in Figure 8 does not have a “J” indicating “JPEG” and instead has a “T” indicating “thumbnail.” While indication of thumbnail does not preclude JPEG compression, a POSITA would have known that the reduced resolutions associated with thumbnails allowed more simple

encodings that did not perform complex compression like JPEG, e.g., an uncompressed bitmap data file (BMP). Suzuki expressly discloses such encodings different from JPEG for the subordinate image (second still picture), including TIFF, PICT, and BMP (*see supra*). As a further example, “The parameters of the subordinate image data may be the subordinate image data start address or the ***subordinate image data type*** (such as compressed or ***non-compressed information***, pixel size, etc.).” LG-1010, 10:37-40. A POSITA would have known that non-compressed information would include, e.g., an uncompressed bitmap data file (BMP).

368. In sum, Suzuki discloses subordinate images can be uncompressed, which a POSITA would have understood to be a BMP, TIFF, or PICT format and not JPEG (which is a compressed format). LG-1010, 14:31-54. A POSITA, thus, would have understood from Suzuki’s disclosures that when the subordinate image (second still picture) is in a BMP, TIFF, or PICT format, it would then be encoded by an encoding method that is different than the encoding method of the main image (first still picture)—JPEG. *Id.*

369. The first still picture is encoded in JPEG, which is described in LG-1050 and LG-1052. The second still picture is encoded in TIFF, PICT, or BMP. The TIFF format is described in LG-1052. The PICT format is described in LG-

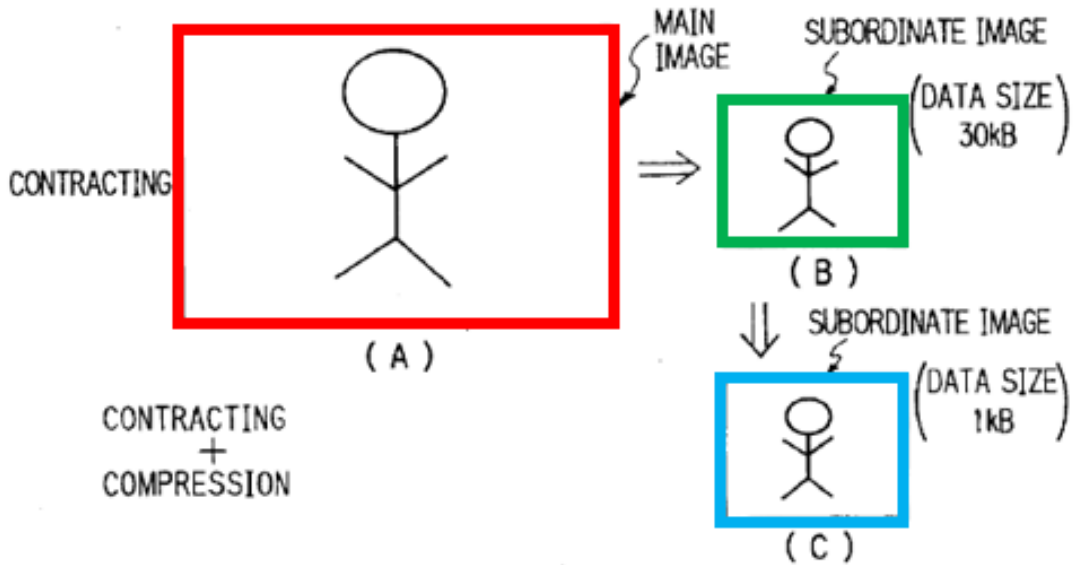
1053, The BMP format is described in LG-1054. These respective formats are different.

[4.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

370. Suzuki renders [4.2.3] obvious. *See also supra* §IX.E. [1.4.1].

371. As illustrated in FIG. 31, the picture (“subordinate image” (C)) corresponds to the first still picture (“main image” (A)) and the second still picture (“subordinate image” (B)), where both the picture and second still picture were derived from the first still picture. LG-1010, 18:20-28, FIG. 31. For example, Suzuki describes a “first image contracting means for making contracted image data obtained through contraction of the main image,” and states that “the subordinate image producing means includes three specific subordinate image producing means, i.e., the area selecting means, ***the image contracting means*** and the image compressing means.” LG-1010, 2:55-67, 14:55-67. Thus, the subordinate image (C) corresponds to subordinate image (B) and the main image (A). *Id.*

FIG. 31



LG-1010, FIG. 31 (annotated).

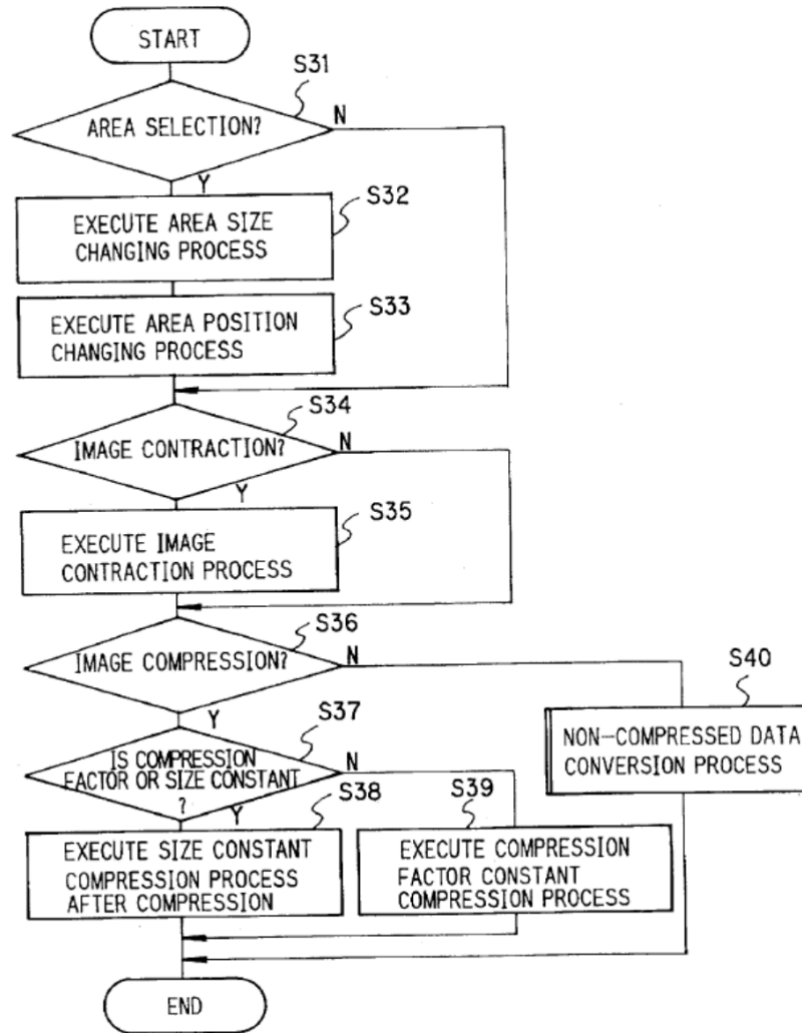
372. Regarding the number of pixels, Suzuki explains that the “main image in FIG. 31(A) is contracted to obtain the subordinate image of a data size of 30 kB as shown in FIG. 31(B),” which is “further compressed to an image of a data size of 1 kB as shown in FIG. 31(C).” LG-1010, 18:20-28, FIG. 31. Based on this description, a POSITA would have understood that the picture (“subordinate image” (C)) has fewer pixels than the first still picture (“main image” (A)) because the picture was generated by contracting, or “thinning,” the first still picture. *Id.*; LG-1010, 9:49-59 (“subordinate image (e.g., thinned image, contracted image, etc.) is produced by extracting part of the image data of one image”), 20:31-34 (“produces a contracted image A2 through thinning of the main image”).

373. Suzuki further describes several instances where a second subordinate image is generated. *E.g.*, LG-1010, 1:47-60, 2:15-32. For instance, Suzuki discloses a “first subordinate image producing means [that] includes ... first image contracting means for making contracted image data obtained through contraction of the main image to be the part of image data” and a “second subordinate image producing means [that] includes ... second image contracting means for making contracted image data obtained through contraction of the first subordinate image to be the part of image data, and image compressing means for making compressed image data obtained through contraction of data of the first subordinate image to be the part of image data.. LG-1010, 2:1-33; *see id.*, 14:55-67. That is, the second subordinate image is generated by, first, contracting the main image to generate a first subordinate image, and second, contracting the first subordinate image to generate the second subordinate image. *Id.* Thus, while Suzuki explains that subordinate image (C) in FIG. 31 is generated by compressing subordinate image (B), a POSITA would have found it obvious, in view of Suzuki’s teaching for subordinate image (C) to be generated by further contracting subordinate image (B). Thus, it would have been obvious for subordinate image (B) to be further contracted by the “second image contracting means” of the “second subordinate image producing means” to produce subordinate image (C). *Id.* Suzuki provides a motivation for such contraction, noting that, “[w]hen a contracted subordinate

image is produced, it is simpler and requires less data to record the contraction factor alone than to record the pixel size as the parameters.” LG-1010, 10:41-47.

Where subordinate image (C) (picture) is generated by contracting subordinate image (B) (second still picture), as Suzuki discloses or suggests, subordinate image (C) has fewer pixels than subordinate image (B).

374. Specifically, Suzuki discloses three alternatives in the “subordinate image production process” Fig. 14 that can be invoked alone or in combination: area selection (or cropping), image contraction (or resolution reduction), and/or image compression. LG-1010, 7:58-60, FIG. 14.



LG-1010, FIG. 14.

375. Suzuki discloses making a second subordinate image from a first subordinate image in Fig. 31 (*see supra*), where compression is used, and also in claim 4, where contraction is used (“4. The image processing apparatus of claim 1, said first and second subordinate image producing means each including image contracting means for contracting the main image data and first subordinate image data part of the image data, respectively.” LG-1010, 21:11-15.)

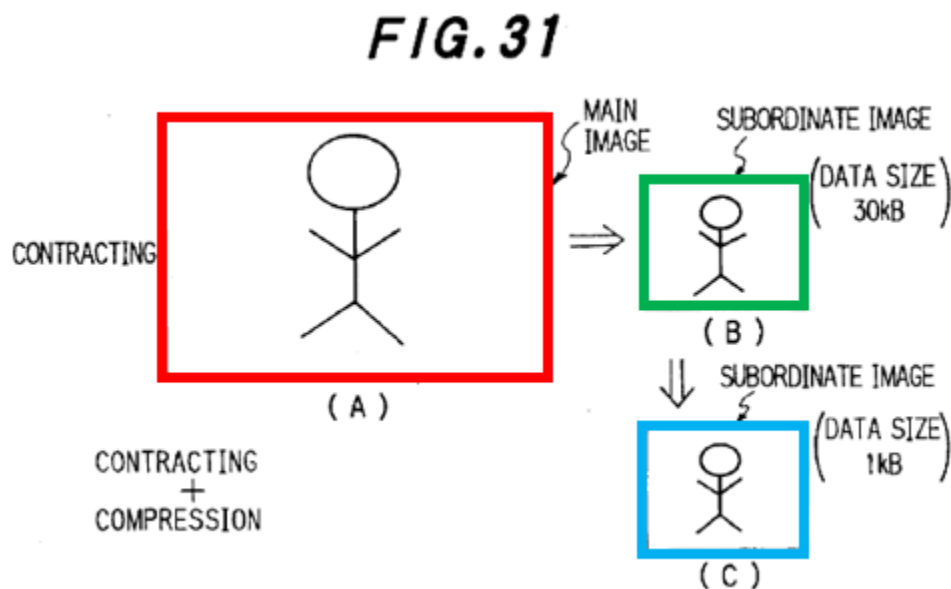
376. Regarding the method of contraction, Suzuki discloses “the usual thinning process” (*id.*, 14:52) which a POSITA would have understood to mean taking one pixel and then skipping over another number of pixels in both the horizontal and vertical dimensions, also called decimation or subsampling. Taking every other pixel in each dimension would reduce by 2 in each dimension or by 4 total. For example 640 x 480 pixels would be thinned to 320 x 240 pixels. Suzuki discloses another way “by recording only the DC components of the orthogonal coefficient data output from the DCT/IDCT circuit 12.” (*Id.*, 14:47-49.) A POSITA would have known that JPEG includes an 8x8 DCT transform that produces a single DC coefficient that is analogous to an average of all 64 pixels in the block. A POSITA would have known other ways to perform Suzuki’s contraction that produce a smaller number of pixels on the subordinate image than on the input image (main or another subordinate image), such as binning, i.e., mathematically grouping a number of adjacent pixels into one value, e.g., by averaging.

[4.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

377. Suzuki discloses [4.2.4]. *See also supra* Ground 4 [1.5].

378. The first still picture, second still picture, and picture are related pictures derived from common signal data—namely, “image data read out from frame memory 11.” LG-1010, 9:4-20. Suzuki discloses that that image data is

used to generate the main image (first still picture), which is then used to generate subordinate images (second still picture, picture). LG-1010, 2:55-67, 9:49-59 (describing “the subordinate image [...] is produced by extracting part of the image data of one image frame (hereinafter referred to as the main image), the extracted image being [...] or otherwise being processed....”), 13:46-14:8 (describing “an image data recording sequence in the case of recording the subordinate image data after the recording of the main image data”), 14:55-67, 18:20-28, FIG. 31(annotated, depicting the red main image (first still picture) used as the source for the green subordinate image (second still picture) which is then used as the source for the blue subordinate image (picture)).



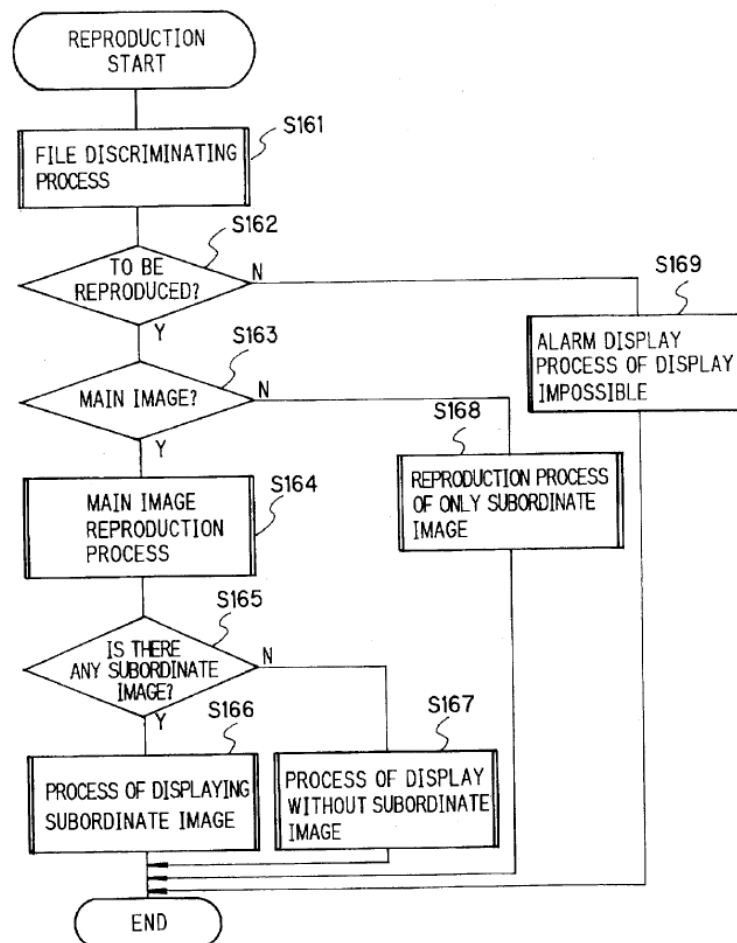
LG-1010, FIG. 31(annotated).

379. *See also supra* Ground 4 [1.5].

[4.3] outputting a plurality of pictures from the reproducing operation; and

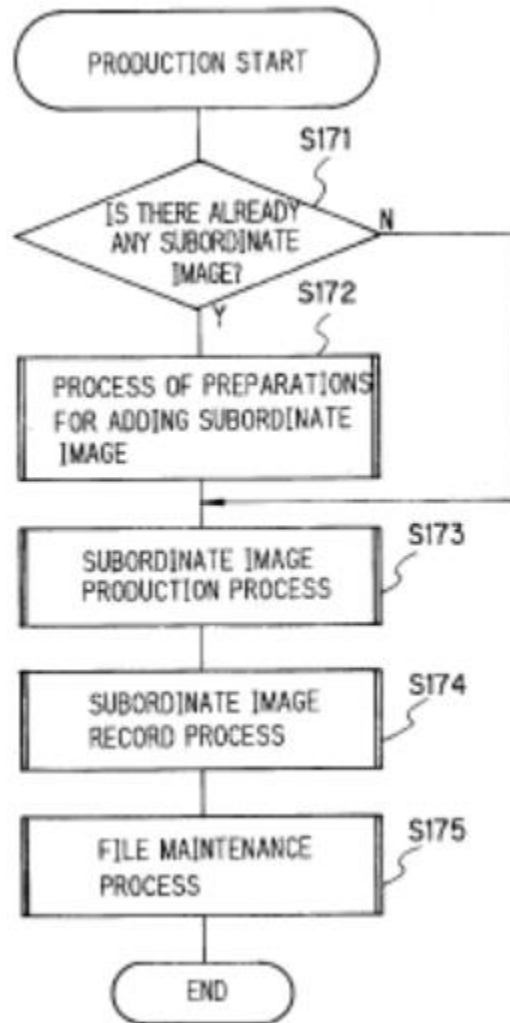
380. Suzuki discloses [4.3].

381. Referencing FIG. 32, Suzuki describes “an image reproduction sequence” that includes “displaying the subordinate image data,” which includes all subordinate images that are determined to exist (i.e., (B) and (C)). LG-1010, 18:1-8 (“the subordinate image is displayed on the monitor screen on which the main image is displayed”), 18:29-55, FIGS. 27-28, 32; *see id.*, 19:63-20:11, FIG. 36.



LG-1010, FIG. 32

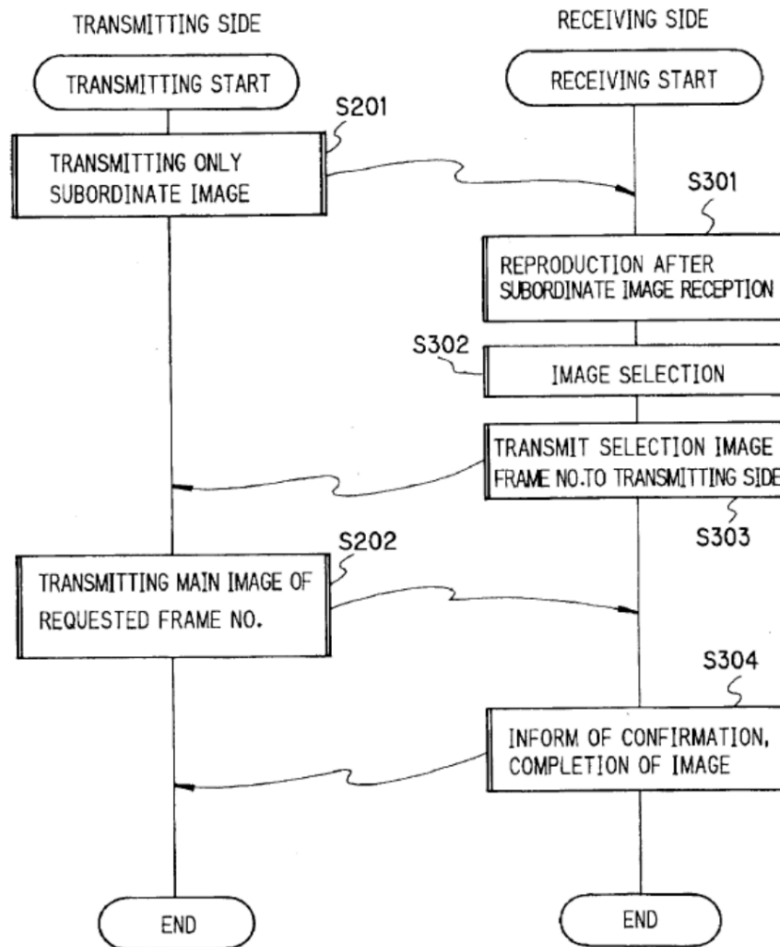
382. Referencing FIG. 33, Suzuki describes “reproducing a subordinate image” where “the main image has already been reproduced and displayed for the subordinate image production.” LG-1010, 18:56-19:10, FIG. 33.



LG-1010, FIG. 33

383. Additionally or alternatively, referencing FIG. 36, Suzuki provides “a flow chart showing the procedure of transmitting the subordinate and main image data.” LG-1010, 19:63-20:8, FIG. 36. Thus, the reproduced first still picture

(main image) and second still picture and picture (subordinate images) are output (transmitted).



LG-1010 FIG. 36.

[4.4] outputting said first still picture corresponding to a selected picture.

384. Suzuki discloses [4.4].

385. Referencing FIG. 36, Suzuki provides “a flow chart showing the procedure of transmitting the subordinate and main image data” where first only the subordinate image data is transmitted (step S201)” then after image selection the designated main image is transmitted. LG-1010, 19:63-20:8, FIG. 36.

386. Suzuki explains that “a necessary image is selected (step S302), and designation data about the frame No., file name, etc. of the selected image is **transmitted** to the transmitting side (step S303).” LG-1010, 20:2-5 (emphasis added). “Receiving the designation data, the transmitting side transmits the main image data of the designation frame No. to the receiving side.” LG-1010, 20:6-8. “The receiving side receives, **reproduces** and confirms the designated main image data.” LG-1010, 20:6-12 (emphasis added). A POSITA reading Suzuki would have understood that images that are reproduced are reproduced for the purpose of displaying or outputting the image, so a POSITA would have thus found that it would have at least been obvious that the receiving side outputs or displays the first still picture. LG-1010, 5:28-50 (“when the main image is reproduced and displayed”), 18:55-64. Thus, the first still picture (main image) is output (by transmitting and/or reproducing/displaying) when the “necessary image is selected.”

[6] A video reproducing method in accordance with claim 4, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

387. Suzuki renders obvious [6]. See §IX.E.[3].

388. Further, as described in [4.2.2], the first encoding method is JPEG and the second encoding standard is TIFF, PICT, or BMP.

[7.1] A video reproducing method, comprising:

389. See §IX.E.[4.1].

[7.2.1] reproducing at least a first still picture, a second still picture and a picture recorded on a recording medium,

390. See §IX.E.[4.2.1].

[7.2.2] wherein said first still picture is encoded by a first encoding method, said second still picture is encoded by a second encoding method different from the first encoding method, and

391. See §IX.E.[4.2.2].

[7.2.3] said picture corresponds to said first and second still pictures and has a smaller number of pixels than said first and second still pictures, and

392. See §IX.E.[4.2.3].

[7.2.4] wherein said first still picture, said second still picture and said picture are related pictures derived from common signal data;

393. See §IX.E.[4.2.4]

[7.3] displaying a plurality of pictures from the reproducing operation; and

394. See §IX.E.[4.3].

[7.4] displaying said first still picture corresponding to a selected picture.

395. See §IX.E.[4.4].

[9] A video reproducing method in accordance with claim 7, wherein said first encoding method is according to a first encoding standard and said second encoding method is according to a second encoding standard.

396. See §IX.E.[3].

X. SECONDARY CONSIDERATIONS OF NON-OBVIOUSNESS

397. I understand that Maxell has not offered any secondary considerations of non-obviousness. I reserve the right to opine on any such secondary considerations that Maxell may offer at a later time.

XI. CONCLUSION

398. For all the reasons I have noted in the foregoing paragraphs, claims 1-9 of the '760 Patent are obvious in view of the references discussed above.

399. I currently hold the opinions 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.

EXHIBIT A

Summary	An executive with a broad spectrum of leadership, management, technology, operations and business experience. • Founded Media Strategies and Solutions, LLC, a media and entertainment consultancy whose clients include content producers, distributors and technology companies. • Serves as an expert witness. Numerous patent and copyright cases. Numerous reports and declarations. Deposed and testified numerous times. • Led Hollywood industry's efforts to facilitate a smooth digital transition, working with content producers, distributors, technology companies, advocacy groups and governments. • Worked closely with the six major motion picture studios to advance movie and television producer's interests in various technology-related capacities, including content protection license negotiation, license enforcement, industry relations, government relations, pro-technology public outreach and standardization. Expanded such initiatives internationally into Europe, Latin America, Asia-Pacific and, specifically, into China. • Led business startup of DIRECTV Japan, the fastest full-scale Direct Broadcast Satellite startup in history. • Led the launch team for the first U.S. nationwide HDTV service. • Formed and led DIRECTV set-top box development team. • Managed up to 300 employees and up to 70 development engineers. • Managed a \$20M/year research and development budget. • Holds fifteen (15) US Patents plus numerous foreign patents (<i>see attachment for details</i>). • Has won six (6) Technology and Engineering and Advanced Media Technology Emmy Awards as part of various engineering teams (<i>see attachment</i>). • Prolific public speaker and author able to communicate complex ideas in understandable terms having delivered over fifty addresses on five continents. • Well-rounded systems engineer with strong background in hardware, software, and chip design. • Member of Board of Directors, Mastermedia International.
Education	▪ MS, Electrical Engineering, California State University, Long Beach. ▪ BS, Engineering, University of California, Los Angeles.



Professional experience	2010 – present	Media Strategies and Solutions, LLC
	▪ President & Founder	
	Founded a consultancy to bridge the traditional divide between technology providers and major media producers, helping each to understand and work well with the other. Clients include content producers and distributors, security technology providers, computer/information technology providers, consumer electronics companies, mobile and semiconductor companies and Internet infrastructure providers. My consultancy works with clients to define and implement new media distribution and product strategies with special focus on technology, business, copyright protection and regulatory matters. A foundational objective is lowering legal, technical and business risk for my clients. I also serve as an expert witness.	
	2002 – 2010	Motion Picture Association of America, Inc.
	▪ Senior Vice President & Chief Technology Officer (2007 – 2010)	
	Led the Office of Technology for the Motion Picture Association of America, Inc. (MPAA) in its efforts to facilitate a smooth digital transition that provides consumers new ways to enjoy Hollywood content when, where and how they want. Worked closely with the six major motion picture studios to advance movie and television producer’s interests throughout the world in various capacities, including content protection license negotiation, license enforcement, industry relations, government relations and standardization. Worked closely with other departments to align technology activities with the overall priorities of the MPAA.	
	▪ Vice President, Television & Video Systems (2002-2007)	
Led motion picture industry participation in a broad range of television and video engineering standards-setting activities. Worked proactively with the consumer electronics and computer industries to safeguard motion picture and television content in future products. Spot checked products as they entered the market to ensure that they fulfilled legal and contractual commitments. Supported lobbying and regulatory activities throughout the world. Led all international technology initiatives of the MPAA’s international counterpart, the Motion Picture Association (MPA).		
2001 – 2002	Independent Consultant	
Performed strategic planning, systems engineering and program management in digital television, digital entertainment and digital rights management on a key project for a leading conditional access system provider.		
1995 – 2001	DIRECTV, Inc. (GM Hughes)	
▪ Director, Product Development (1999-2001)		

	Formed and led DIRECTV's first receiver development team. • Hired & managed a multi-disciplined team of 70 engineers. • Managed a \$20M/yr research and development budget. • Established design processes and support infrastructure. • Formed external relationships and managed contracts. ▪ Director, HDTV Program (1998-1999) Launched first nationwide HDTV service. • Directed all HDTV start of service activities of DIRECTV. • Built cross-functional team from engineering, broadcast operations, sales, programming, customer service, IT, finance, legal and public relations. • Rolled out high definition channels and receivers on budget and on schedule. ▪ Director, DIRECTV Japan Enterprise Startup Team (1997-1998) Launched DIRECTV Japan (DTVJ), the fastest full-scale Direct Broadcast Satellite (DBS) business startup in history. • Reported to the Chairman of DTVJ acting as COO during startup. • Directed day-to-day activities/priorities of the 300+ person company. • Formed business launch team from key Japanese senior managers and U.S. experts from Corporate Planning, Sales, Programming, Finance, Engineering, Operations, IT, and Customer Service departments. • Launched service on December 1, 1997, beating expectations. • Directed operations of company for first 2 months of service. ▪ Director/Sr.Manager, Multi-user Systems (1995-1997) Formed, hired and led engineering team within DIRECTV to address the apartment, condominium, hotel, and airborne markets. 1982 – 1995 GM Hughes Electronics ▪ Manager/Sr. Staff Engineer, Display Systems Laboratory (1991-1995) Led R&D activities in multimedia technologies for entertainment, security, financial, medical, and command and control business initiatives. • Developed real-time image compression and processing technologies. • Performed research on Digital Cinema and HDTV display systems. • Developed digital video solutions for in-flight entertainment (IFE) & founded/chaired an IFE standards committee to transition IFE to digital movies. • International Standards – Led US delegation to JBIG. Participated in MPEG and JPEG. Founding member of Digital Audio-Visual Council (DAVIC). ▪ MTS, Staff & Sr. Staff Naval & Maritime Systems (1982-1991) Developed from a prolific hardware, software, and chip designer into a well-rounded systems engineer. • Performed several hardware designs for sonar array test set, naval display systems, and air traffic control display systems. Most designs were error free.
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- Developed a high performance, computer graphics rendering ASIC.
- Performed high-level language coding, assembly language coding and machine language coding for several projects.
- Managed groups of hardware, software and test engineers and proposal teams.

Patents, awards and publications attachment

Patents

1. US Patent 5,557,298. Method for receiving a video window's boundary coordinates to partition a video signal and compress it's components. Awarded 9/17/1996.
2. US Patent 5,790,175. Aircraft Satellite Television System for Distributing Television Programming Derived from Direct Broadcast Satellite. Awarded 8/4/1998.
3. US Patent 5,926,611. High resolution digital recorder and method using lossy and lossless compression technique. Awarded 7/20/1999.
4. US Patent 5,970,386. Transmodulated Broadcast Delivery System for Use in Multiple Dwelling Units. Awarded 10/19/1999.
5. US Patent 6,005,620. Statistical Multiplexer for Live and Pre-Compressed Video. Awarded 12/21/1999.
6. US Patent 6,100,853. Receiver/Transmitter System Including a Planar Waveguide-to-stripline adapter. Awarded 8/8/2000.
7. US Patent 6,134,419. Transmodulated Broadcast Delivery System for Use in Multiple Dwelling Units. Awarded 10/17/2000.
8. US Patent 6,188,436. Video Broadcast System with Video Data Shifting. Awarded 2/13/2001.
9. US Patent 6,216,250. Error encoding method and apparatus for satellite and cable signals. Awarded 4/10/2001.
10. US Patent 6,493,873. Transmodulator with dynamically selectable channels. Awarded 12/10/2002.
11. US Patent 7,047,029. Adaptive transmission system. Awarded 5/16/2006.
12. US Patent 7,450,930. Digital rights management using a triangulating geographic locating device. Awarded 11/11/2008.
13. US Patent 7,454,019. System and Method for controlling display of Copy-Never content. Awarded 11/18/2008.
14. US Patent 7,512,987. Adaptive digital rights management system for plural device domains. Awarded 3/31/2009.
15. US Patent 7,676,219. Digital rights management using a triangulating geographic locating device. Awarded 3/9/2010.
16. – on. Numerous foreign patents.

Patents, awards and publications attachment (continued)

Awards	1. Hughes Electronics Corporate Patent Award 1996 for Transmodulator patents. 2. Hughes Electronics Corporate Patent Award 1999 for various patents. 3. Hughes Electronics Corporate Patent Award 2000 for Statistical Multiplex patent. 4. Several Hughes Achievement, Superior Performance, Outstanding Contribution and Outstanding Team Contribution awards. 5. Technology and Engineering Emmy Award for "Pioneering Development of Direct to Home Digital Satellite Broadcasting", DIRECTV, 1995. 6. Technology and Engineering Emmy Award for "Standardization of JPEG, MPEG 1 and MPEG 2", ISO and IEC, 1996. 7. Technology and Engineering Emmy Award for "Pioneering Application of SMPTE 270 Mb/s Technology to Large Scale Television Facilities", DIRECTV, 1997. 8. Technology and Engineering Emmy Award for "Preprocessing of baseband video for digital compressed transmission system to deliver pictures with maximum subjective quality and minimum bit rates", DIRECTV, 2000. 9. Technology and Engineering Emmy Award for "Pioneering Efforts in the Development of Spot Beam Satellites for Distribution of Local Broadcast Channels Directly to Home Receivers", DIRECTV, 2004. 10. Advanced Media Technology Emmy Award for "Closed Caption Standardization", CEA, National Academy of Television Arts and Sciences, Outstanding Achievement in Technical/Engineering Development Award, 2005.
Publications / speaking engage- ments (selected)	1. "Tactical Sensor Data Compression for Military Multimedia Systems", AIAA Conf., San Diego, October 1993. 2. "Airborne Satellite Television", Avion magazine, Fourth Quarter, 1994, pp 43-54. 3. "The In-flight Entertainment Revolution", Indian Sub-Continent Aircraft Technology & Maintenance Conference, Bombay, June 1995. 4. "HDTV on the DIRECTV Platform", SMPTE/USC Seminar - Production and Display Technologies for Advanced Television, Los Angeles, May 1998. 5. "HDTV Rollout: Technical Hurdles", DBS Summit, Denver, June 1998. 6. "HDTV on DIRECTV", SBCA Distributor Forum, Nashville, July 1998. 7. "DBS Opportunities for China", State Administration for Radio, Film, and Television (SARFT) conference, Beijing, June 1999. 8. "MPAA Views on Secure Home Networking", ITU Home Services and Home Networking workshop, Tokyo, June 2004.

Patents, awards and publications attachment (continued)

Publications (selected, continued)

9. "Deploying a Viable Digital Television System", SET (Brazilian Society of Television and Telecommunications Engineering) Conference, Sao Paulo, August 2004.
10. "Content Interoperability on Secure Home Networks", Digital Hollywood, Santa Monica, September 2004.
11. "MPAA Views on TelcoTV Content Protection", TelcoTV 2004, Orlando, November 2004.
12. "DVB Content Protection and Copy Management", DVB World 2005, Dublin, March 2005.
13. "Content Owner's Views on Digital Cable Ready Products and Secure Home Networking", The National Show (NCTA), San Francisco, April 2005.
14. "Managing Rights in a Digital Home", Connections Conference, San Francisco, May 2005.
15. "Protecting Digital Broadcast Content from Unauthorized Redistribution", BroadcastAsia 2005, Singapore, June 2005.
16. "Preserving the Viability of Digital Broadcast TV", Asia-Pacific Broadcasting Union (ABU) Technical Review, No. 219 July-August 2005, pp 14-21.
17. "Challenges in Content Protection", IBC, Amsterdam, September 2005.
18. "Hollywood Views on Enabling Content Interoperability in the Digital Home", Digital Home Developer's Conference, Taipei, September 2005.
19. "Preserving the Viability of Digital Broadcast TV", ABU 1st Annual International DTV Symposium, Kuala Lumpur, October 2005.
20. "Content Copyright and Broadcast Legislation", ABU 1st Annual International DTV Symposium, Kuala Lumpur, October 2005.
21. "Protecting Movies and TV: Traditional and New Media", 12th Shanghai TV Festival, Magnolia International Forum, People's Republic of China, June 2006
22. "Worldwide Content Protection Systems (including DVB CPCM)", Broadcast Asia, Singapore, June 2006.
23. "The Entertainment Experience", Digital Living Conference, Singapore, June 2006.
24. "Worldwide Content Protection Systems – A Primer for Chip Developer's", ARM Partner's Meeting, St. John's College, Cambridge, UK, August 2006.
25. "The Transition to Digital TV: Prevention of Unauthorized Redistribution", SET (Brazilian Society of Television and Telecommunications Engineering) Conference, Sao Paulo, and seminars in Brasilia and Buenos Aires, August 2006.
26. "A Promising Future: Content Protection and Anti-Piracy", SMPTE Motion Imaging Journal, September 2006, pp. 334-341.
27. "Content Protection/Piracy", Session Chair, SMPTE Technical Conference, Hollywood, October 2006.
28. "Views from Hollywood: Offering Consumers Choice through Digital Cable TV", European Cable Congress, Amsterdam, February 2007.
29. "Content Protection – Protecting Digital Broadcast TV", session chair, Asia-Pacific Broadcasting Union (ABU) 2nd International DTV Symposium, Kuala Lumpur, March 2007.

Publications (selected, continued)	30. "Preserving the Viability of Australian Digital Broadcast TV", Television Industry Forum hosted by University of Melbourne Center for Media and Communications Law, Sydney, Australia, April 2007. 31. "Content Protection in the Digital Age", Ernst & Young Partner's Conference, May 2007. 32. "Growing collaboration between Hollywood and ISPs", 5th Annual Australian Telecommunications Summit, Sydney, Australia, August 2007. 33. "Worldwide Content Protection Systems – Enabling New Choices for Consumers", IBC, Amsterdam, September 2007. 34. "New Technical Developments in Content Protection", American-German Copyright Law Summit, Los Angeles, October 2007. 35. "Content Protection – Enabling New Choices for Consumers", Digital Future Symposium, Singapore, November 2007. 36. "New Media and Distribution", panel moderator, Digital Future Symposium, Singapore, November 2007. 37. "Global directions in the use of technology to fight movie theft", keynote address, Independent Cinemas Association of Australia (ICAA), Sydney, Australia, February 2008. 38. "Enforcing DMCA on the Web: What's Working, What's Next?", Tech Policy Summit, Hollywood, March 2008. 39. "Service Providers and Content Providers Talk the Digital Rights Management Language", NXTCOMM TechThink, Las Vegas, June 2008. 40. "Content protection enables consumer choice", Global Forum 2008, Athens, Greece, October 2008. 41. "The Dynamics of China's Coming IPTV Revolution", CASBAA Legal Seminar, Hong Kong, October 2008. 42. "Free-to-air television protection – a US perspective", World Content Protection Seminar, Tokyo, November 2008. 43. "Protecting Copyright in a Digital Age", Korean Copyright Commission, Korean Cultural Center, Los Angeles, November 2008. 44. "DRM Implementation in New Media and Entertainment", Digital Hollywood, Consumer Electronics Show, Las Vegas, January 2009. 45. "Early collaboration for better security and better consumer experience", HDBaseT technical symposium, Tokyo, January 2009. 46. "Interview with Jim Williams – CTO of the MPAA", Thomson Security Newsletter, Spring 2009. 47. "Recommendations for Asia-Pacific Digital Televisions Systems", International Telecommunication Union - Asia-Pacific Institute for Broadcasting Development (ITU-AIBD) Workshop on Content Protection, Singapore, June 2009. 48. "DRM enables Consumer Choice", Broadcast Asia, Singapore, June 2009. 49. "Bringing Early Window Movies into a Networked Home", CommunicAsia, Singapore, June 2011. 50. "Privacy of whom from whom? Tradeoffs that consumers seem willing to make (but pirates are not)", Global Forum 2011, Brussels, Belgium, November, 2011. 51. "Technology Piracy and Countermeasures", Moderator, SMPTE Technology Summit for Cinema, NAB conference, April 2012.
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Technical skills attachment

Media Strategies and Solutions	Areas of expertise include: • Movies, Television, HDTV, UHD, HDR, and Media, in general • Patents, Copyrights, and IP, in general • Internet, Broadband, Mobile, and Telecommunications, in general • Cable, Satellite, IPTV, Internet TV, Over-The-Top (OTT) TV, Adaptive Bitrate Streaming and Distribution • DRM, Conditional Access, Copyright Protection, and Security, in general • MPEG Video, Audio, and Transport, and Other Audiovisual Compression and Communications Algorithms • Piracy, Anti-piracy, Cyber-security Technologies, and Related Copyright Regulations, Laws, and Practices • Consumer Electronics, Computers, Tablets, Phones, and Mobile Electronics • Software, Firmware, Hardware, and ASIC Design, Test, and Deployment • Electrical Engineering, Computer Engineering, and Engineering, in general
Led MPAA activities	• Worldwide television and movie distribution systems; consumer electronics technologies and products; computer technologies and products; communications technologies; and integrated circuit technologies. • Free-to-air, pay television and electronic sell-through protection technologies and systems including various Conditional Access (CA) systems (e.g., NDS, Nagra and Irdeto), various Digital Rights Management (DRM) systems (e.g., Windows Media DRM and Marlin), Digital Entertainment Content Ecosystem (DECE), the Open Cable system, the free-to-air protection methods, the Cable Plug and Play & tru2way protection regimes and other emerging systems. • Digital link protection technologies, systems and license regimes including Digital Transmission Content Protection (DTCP) and High-bandwidth Digital Content Protection (HDCP). • Digital storage protection technologies, systems, and license regimes including the DVD Content Scramble System (CSS), Advanced Access Content System (AACS) and Content Protection for Recordable Media and Pre-Recorded Media (CPRM / CPPM). • Digital content protection and copy management systems including DVB Content Protection and Copy Management (CPCM), Secure Video Processor (SVP), Motorola's IPRM, SmartRight and IBM's xCP. • Specific standards development activities in the Digital Video Broadcasting (DVB) consortium, the Consumer Electronics Association (CEA), the International Telecommunications Union (ITU), the Advanced Television Systems Committee (ATSC), the Society of Motion Picture and Television Engineers (SMPTE), Digital Living Network Alliance (DLNA) and High-Definition Audio-visual Network Alliance (HANA). • Analog copy protection systems including Macrovision and Dwight Cavendish. • Watermarking and fingerprinting systems and technologies for audio and video in analog and digital forms. • Copy protection and content protection technology testing systems and techniques. • Provided expert witness affidavits to numerous entertainment technology legal cases.

Technical skills attachment (continued)

Led receiver development team	• Software included C/C++ coded modules using OO techniques, client/server architecture. Advanced UI, view TV, PIP, program guide (APG/EPG), digital video recording (DVR/PVR), internet access, web apps, email, enhanced TV (with Wink and ATVEF), customer self help, music, games, ad insertion, data mining, trusted boot, and downloadable applications. • OS included Linux with real-time extensions, MS Windows, NT, and RTOSes. • Middleware included app manager, data broadcast manager, digital rights manager (DRM), X server, Motif, Java and Qt widgets, JVM, browser, HTML renderer, DES/AES encryption manager, an I/O manager and an MSTV framework; performed analysis on OpenTV, Canal+, Liberate, and Spyglass. • Interfaces included IR & RF remotes, V.90 & DSL modems, 1394, HPNA 2.0 home network, USB 1.1, Ethernet and QPSK modulated satellite input. • Hardware included advanced, customized ASICs, 300+ MIPS processors with FPU and MMU, DDR SDRAM, 100GB+ Ultra ATA/66 hard disk drives, multiple QPSK tuner/demods, Reed-Solomon decoders, Viterbi convolutional decoders, DES descramblers, AES encrypt/decrypt, smart cards, 2D/3D graphics engines, PIP, MPEG-2 Main Profile at Main Level and higher video decoders, MPEG-1 Layer 2 audio decoders, Dolby Digital (AC-3) audio decoders, DVI, NTSC video output, S-video outputs, and line audio outputs. PWBs, chassis, power supplies, fans, and connectors designed for high volume manufacturing.
Led HDTV launch	• HDTV televisions – 16:9 and 4:3 CRTs, CRT projection displays, DMD displays, Plasma displays working with RCA, Hitachi, Toshiba, Sarnoff, Mitsubishi, Panasonic, Philips, Zenith/LG, HNS, Sony, and Samsung. • HDTV receivers – MPEG-2 video Main Profile at High Level, ITU-R601 and ITU-R709 color format conversion, aspect ratio conversion, letter-boxing and pillar-boxing, MPEG Transport carriage of MPEG video and Dolby Digital 5.1 channel audio, ATSC reception; format display/conversion 1920x1080i, 1280x1080i, 1280x720p, the many others, 3:2 pull-down, MPEG splicing and field inversion recovery. • HDTV broadcast – ATSC conversion, satellite turnaround, DVB to DIRECTV transport transcoding, D5 tapes, custom MPEG HD encoders, post-production telecine and tape format specifications; media library, broadcast operations systems and training, satellite RF uplink system, antenna systems, transponder design, link analysis and edit/QA bays. • HDTV production and post-production for a promotional channel • International HDTV for China – ATSC versus DVB analysis, VSB versus COFDM modulation, video formats, terrestrial versus satellite tradeoffs, PSIP versus SI/EPG; double-hopped US HDTV broadcast over the Pacific via D-5 to PAS-2 to Beijing and received on a commercial RCA HDTV.
Led DIRECTV Japan launch	• Satellite acquisition/launch, land acquisition and broadcast center construction. • Broadcast center included two remote encoding sites supporting the main center in Otemachi, Japan. The Fillmore, CA center used satellite backhaul. The Tokyo center used OC-3 fiber backhaul. The broadcast center also received individual channels via satellite backhaul and physical media (tapes). • DVB based digital video broadcast architecture using SI/EPG, MPEG-2 video, MPEG-1 Layer 2 audio, NDS security, Panasonic receivers, Sony broadcast center integration and wiring, Sunup traffic and Sunup/Sony automation systems, video servers, media library systems, RF uplink, Ku-band satellites and 18 inch dishes, to name a small number of the system components.

Technical skills attachment (continued)

Led multi-user systems engineering	• QPSK modulation, 32-,64-, 128-, and 256-QAM modulation, Reed-Solomon, Viterbi convolutional encoding, interleaving, randomization/scramblers, transport repacketization, RF design, apartment complex mini-headend and remote receiver system design, mini-HITS system. • QAM receivers, cable distribution. • QPSK receivers, L-band up- and down-conversion, L-band distribution RF design, amplifiers, splitters, taps, attenuation non-linearities, SMATV. • Tracking antennas for aircraft using GPS and INS systems. • Wireless distribution, 60GHz techniques, 5GHz techniques.
Led multimedia IR&D	• MPEG-1 and MPEG-2 audio, video, systems compression and encoding, H.261 video coding, DSM-CC storage and retrieval expression, MPEG-4 object based compression, MPEG-7 object expression, JPEG still picture compression, JBIG lossless compression, MHEG multimedia encoding, PREMO multimedia presentation, CGM and PHIGS graphics specifications, IPI image processing specification, NIST image compression. Active member in these standards committees. Chaired US JBIG committee and headed US delegation. • Image processing and target recognition algorithms. • Image transmission techniques for remote acquisition, local networking using FDDI and Ethernet, and secondary dissemination. • Image display techniques for military, air traffic control and air defense systems. • HDTV display research and DARPA proposals. • Electronic cinema research and ARPA proposals. • Founded/chaired Digital Media Distribution Technical Committee of the World Airline Entertainment Association to define delivery format for MPEG movies.
Designed ASICs	• The Multi-Cogenerator (MCG) was an error-free design that was the largest gate array ever built upon completion. I designed the line, character, conic, texture and filled polygon circuits for this graphics engine. • Designed memory management functions on another IC. • Designed an advanced radar image processor.
Designed hardware	• MPEG codec • Framegrabber and Image Processor • Color video generator and high resolution display driver • Area fill controller card • Bit-slice I/O controller • Radar display generator • NTDS Slow controller and multiple associated interface cards • NTDS Fast tester unit • Seven card set (3 different designs) to expand memory in an Apple II computer.
Designed software	• Pascal radar and image processing algorithms • x86 assembly language SW suite for command and control workstations • Bit-slice assembly and machine coding for timing critical I/O processing • Assembly language coding for torpedo sonar array testing

EXHIBIT B

**Expert witness
cases, including
reports,
depositions, and
trial testimony**

Summary:

- Twenty-five (25) cases.
- District Courts, ITC, PTAB, and foreign.
- Numerous reports, declarations, and affidavits.
- Seventeen (17) depositions.
- Seven (7) times testifying.
- Patent, trade secret, copyright, and false advertising cases, including class actions.

LG v. Maxell

- United States Patent and Trademark Office (PTAB).
- *Inter Partes* Review of US Patent No. 6,856,760.
- Subject matter: Moving and still pictures on recording medium.
- Retained by Fish & Richardson on behalf of LG.
- Declaration.
- Timeframe: 2024-ongoing.

MCP LLC v. Dell, HP, Lenovo, Intel, MediaTek, and Realtek

- United States District Court for the District of Delaware
- Case No. 20-cv-1240-43, 46-47 -CFC
- Subject matter: Digital video-capable devices and components.
- Retained by Mintz Levin on behalf of Media Content Protection LLC.
- Timeframe: 2024-ongoing (from Philips 2022-2024).

Western Digital, SanDisk, et al. v. Viasat, Inc.

- United States District Court for the N. Distr. of California (Oakland Div.)
- Case No. 4:22-cv-4376-HSG.
- Subject matter: Streamed and stored content; DRM.
- Retained by Quinn Emanuel on behalf of Viasat Inc.
- Timeframe: 2023-ongoing.

Starratt, et al. v. Amazon.com, et al.

- United States District Court for the N. Distr. of California.
- Case No. 4:22-cv-04775-KAW.
- Subject matter: Home security cameras and HDTV formats.
- Retained by Hueston Hennigan on behalf of Amazon.com and Immedia Semiconductor LLC.
- Report.
- Deposed.
- Settled.
- Timeframe: 2023-2024.

Philips v. Dell, HP, Lenovo, Intel, and MediaTek

- United States District Court for the District of Delaware
- Case No. 20-cv-1243-CFC
- Subject matter: Digital video-capable devices and components.
- Retained by Mintz Levin on behalf of Philips.
- Declarations.
- Deposed twice.
- Testified twice.
- Timeframe: 2022-ongoing (to MCP LLC in 2024).

VidStream v Twitter

- United States District Court for the N. Distr. of Texas (Dallas Div.).
- Case No. 3:16-cv-00764-N.
- Subject matter: Capturing, formatting, and distributing digital video.
- Retained by WilmerHale on behalf of Twitter.
- Declaration, report
- Deposed twice.
- Timeframe: 2022-ongoing.

Broadband iTV v Amazon

- United States District Court for the Western Distr. of Texas (Waco Div.).
- Case No. W-20-CV-00921-ADA.
- Subject matter: Video-on-demand (VOD) systems, web-based content management, and Electronic Program Guide (EPG) designs.
- Retained by Fenwick & West LLP on behalf of Amazon.
- Report.
- Deposed.
- Invalid under §101.
- Timeframe: 2021-2022.

Intel v Philips

- United States Patent and Trademark Office (PTAB).
- *Inter Partes* Review No. IPR2021-00327 and IPR2021-00370 of US Patent No. 9,436,809 B2.
- Subject matter: Secure Authenticated Distance Measurement.
- Retained by Mintz Levin on behalf of Philips.
- Declaration.
- Deposed.
- Validity upheld.
- Timeframe: 2021-2022.

DivX, LLC v. Netflix Entretenimento Brasil LTDA

- 5th Business Court of the State of Rio de Janeiro.
- Docket #: 0214224-53.2020.8.19.0001.
- Subject matter: Digital video compression technologies for adaptive bitrate streaming.
- Retained by Robins Kaplan for Licks Attorneys on behalf of DivX.
- Affidavit.
- Timeframe: 2020-2021.

Philips v. Dell, et.al.

- United States International Trade Commission, Washington, D.C.
- Investigation No. 337-TA-1224.
- Subject matter: Digital video-capable devices and components.
- Retained by Mintz Levin on behalf of Philips.
- Declaration, report.
- Deposed.
- Testified.
- Timeframe: 2020-2022.

Quibi Holdings, LLC v JBF Interlude (Eko)

- United States Patent and Trademark Office (PTAB).
- *Inter Partes* Review No. IPR2021-00231 of US Patent No. 10,418,066.
- Subject matter: Interactive media system with synchronization.
- Retained by Morrison & Foerster LLP on behalf of Quibi.
- Declaration.
- Settled.
- Timeframe: 2020-2021.

Helios Streaming and Ideahub v. Starz and Lionsgate

- United States District Court, Central Distr. of California, Southern Div.
- Case No. 8:19-cv-02140-JVS-ADS.
- Subject matter: Adaptive HTTP streaming media services and technologies.
- Retained by Dentons on behalf of Starz and Lionsgate.
- Declarations.
- Deposed.
- Settled.
- Timeframe: 2020-2021.

JBF Interlude (Eko) v. Quibi

- United States District Court, Central Distr. of California, Western Div.
- Case No. 2:20-cv-02299-JAK-SK (Consolidated).
- Case No. 2:20-cv-02250-JAK-SK.
- Subject matter: Patent infringement and trade secret misappropriation re: technologies for streaming media to mobile phones.
- Retained by Morrison & Foerster LLP on behalf of Quibi.
- Declarations regarding PI, TRO, construction.
- Settled.
- Timeframe: 2020-2021.

Canon v. TCL

- United States District Court for the Eastern Distr. of Texas Marshall Div.
- Case No. 2:18-cv-00546.
- Subject matter: Display methods, streaming television, and remote control systems.
- Retained by Paul Hastings on behalf of Canon.
- Settled.
- Timeframe: 2019-2020.

Krush v. Zoom

- United States District Court for the Northern Distr. of California.
- Case No. 3:19-cv-01841-WHA.
- Subject matter: Video conferencing systems and technologies.
- Retained by McDermott Will & Emory on behalf of Krush Technologies.
- Settled.
- Timeframe: 2019.

Uniloc v. Samsung

- United States District Court for the Eastern Distr. of Texas Marshall Div.
- Case No. 2:18-cv-00506-JRG.
- Subject matter: Displays, television and communications technologies.
- Retained by Greenberg Traurig on behalf of Samsung.
- Reports and declaration.
- Deposed.
- Settled.
- Timeframe: 2019-2020.

Rovi v. Comcast, et.al.

- United States International Trade Commission, Washington, D.C.
- Investigation No. 337-TA-1158.
- Subject matter: Digital Video Receivers, Broadband Gateway, and related HW and SW.
- Retained by McKool Smith on behalf of Rovi.
- Reports.
- Deposed.
- Testified.
- Settled.
- Timeframe: 2019-2020.

Rovi v. Comcast, et.al.

- United States International Trade Commission, Washington, D.C.
- Investigation No. 337-TA-1103.
- Subject matter: Digital Video Receivers and related HW and SW.
- Retained by McKool Smith on behalf of Rovi.
- Reports.
- Deposed.
- Testified.
- Timeframe: 2018 (settled 2020).

Keck v. Alibaba

- United States District Court for the Northern District of California.
- Case No. 3:17-cv-05672.
- Subject matter: Copyright and Lanham Act; art through online shopping platforms.
- Retained by Hare, Wynn, Newell & Newton, counsel for Keck and others similarly situated.
- Timeframe: 2017-2020.

Sony v. Pace

- United States District Court for the Southern District of New York.
- Case No. 15-288-SLR-SRF.
- Subject matter: Satellite, cable and IPTV set-top box technologies.
- Retained by Andrews Kurth Kenyon on behalf of Sony Corporation.
- Also retained by Finnegan on behalf of Sony Corporation.
- Settled.
- Timeframe: 2016-2018.

Rovi v. Comcast, et.al.

- United States District Court for the Southern District of New York.
- Subject matter: Interactive Program Guide technologies.
- Retained by McKool Smith on behalf of Rovi.
- Reports.
- Deposed.
- Timeframe: 2016-2020 (settled 2020).

Rovi v. Comcast, et.al.

- United States International Trade Commission, Washington, D.C.
- Investigation No. 337-TA-1001.
- Subject matter: Interactive Program Guide technologies.
- Retained by McKool Smith on behalf of Rovi.
- Reports.
- Deposed.
- Testified twice.
- Timeframe: 2016-2017 (settled 2020).

Mitsubishi Electric Corporation et al v. Sceptre, Inc.

- United States District Court for the Central District of California.
- Case No. 2:14-cv-04994-ODW-AJW.
- Subject matter: MPEG digital audio-visual standards and televisions.
- Retained by Vinson & Elkins on behalf of Sceptre, Inc.
- Report.
- Deposed.
- Settled.
- Timeframe: 2015-2016.

Zenith Electronics, LLC et al v. Sceptre, Inc.

- United States District Court for the Central District of California.
- Case No. LA CV14-05150 JAK (AJWx).
- Subject matter: ATSC digital television standards and televisions.
- Retained by Manatt, Phelps and Phillips on behalf of Sceptre, Inc.; wrote expert reports while Manatt had the case; case transferred to Vinson & Elkins.
- Reports.
- Deposed.
- Settled.
- Timeframe: 2015-2016.

Medien Patent Verwaltung, AG, v. Warner Bros. Entertainment Inc.,
Technicolor Inc., and **Deluxe Entertainment Services Groups, Inc.**

- United States District Court for the Southern District of New York.
- Case No. 1:10-CV-04119-CM-GWG.
- Subject matter: Forensic markings on film prints and anti-piracy.
- Retained by Greenberg Traurig on behalf of Deluxe.
- Report.
- Deposed.
- Settled.
- Timeframe: 2013-2014.