

Ex. 1003

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCL Electronics Holdings Ltd. (f/k/a TCL Multimedia Technology Holdings, Ltd.
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TTE Corporation
TCL Moka International Limited
TCL Moka Manufacturing S.A. de C.V.
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TCL Smart Device (Vietnam) Co., Ltd
Shenzhen TCL New Technology Co., Ltd.
TCL Optoelectronics Technology (Huizhou) Co., Ltd.
TCL Overseas Marketing Ltd.
TCL Technology Group Corporation (f/k/a TCL Corp.),

Petitioners

v.

LG ELECTRONICS INC.,
Patent Owner.

Case No. IPR2023-00238
U.S. Patent No. 10,334,311

**DECLARATION OF IMMANUEL FREEDMAN
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 10,334,311**

Ex. 1003 – TCL Indus Holdings Co., Ltd.
TCL Indus Holdings Co., Ltd. v. LGE – IPR2023-00238

*Declaration of Immanuel Freedman
In Support of Petition for Inter Partes Review of
U.S. Patent No. 10,334,311*

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Exhibit No.	Description
1001	U.S. Patent No. 10,334,311 (“the ’311 Patent”)
1002	Excerpts of Prosecution History of U.S. Patent No. 10,334,311 (“Prosecution History”)
1003	Declaration of Immanuel Freedman
1004	U.S. Patent Publication No. 2005/0200811 A1 (“Nobori”)
1005	U.S. Patent Publication No. 2006/0158838 A1 (“Kinoshita”)
1006	U.S. Patent Publication No. 2006/0230360 A1 (“Young”)
1007	U.S. Patent Publication No. 2009/0201420 A1 (“Brown”)
1008	LGE’s Opening Claim Construction Brief
1009	U.S. Patent Publication No. 2003/0075983 (“Stecyk”)
1010	Fintiv Stipulation
1011	U.S. Patent No. 7,681,141 B2 (“Tu”)
1012	<u>Docket Control Order</u>
1013	<u>Average Time to Trial</u>
1014	<u>LGE v. TCL - Complaint for Patent Infringement</u>
1015	Infringement Contentions
1016	U.S. Patent No. 6,825,858 (“Sato”)
1017	U.S. Patent Publication No. 2009/0307615A1 (“Jalon”)
1018	U.S. Patent No. 7,065,752
1019	ISO/IEC 14496

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Exhibit No.	Description
1020	Bouilhaguet, F. et al. (2000), <i>Proc. IEEE International Symposium on Circuits & Systems</i> , May 28-31, 2000: Geneva CH
1021	U.S. Patent Publication No. 2011/0214152
1022	Kwon, B. et al. (2007), SHADOW: A Cross-Platform GUI Middleware for Home Devices. pp. 906-910
1023	Bjelica, M. Z. et al. (2009), <i>Proc. Telsiks 2009</i> , Oct 7-9, 2009: Niš RS. pp. 285-288
1024	Digital Video Broadcasting (2011). Globally Executable MGP Specification 1.3, Document A153, March 2011
1025	Gil, A. et al. (2002), <i>Proc. IEEE R8 International Symposium on Video/Image Processing. & Multimedia Communications</i> . Jun 16-19, 2002: Zadar HR. pp. 447-451.
1026	ISO/IEC 13522-5
1027	SMPTE Declarative Data Essence (DDE)-1 standard ST 397:2003
1028	Nielsen, J. (2006). “Progressive Disclosure.” Nielsen Normal Group, Dec 3, 2006
1029	Kang, S. & Kim, W. (2007), “Minimalist and Intuitive User Interface Design Guidelines for Consumer Electronics Devices”, in <i>Journal of Object Technology</i> 6(3) Mar 2007. pp. 39-52
1030	Macintosh Human Interface Guidelines, Apple Computer Inc., 1992
1031	Microsoft Windows User Experience, Microsoft Press 1999
1032	U.S. Patent Publication No. 2009/0106674 A1 (“Bray”)
1033	U.S. Patent No. 7,200,683

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I, Immanuel Freedman, declare as follows:

I. INTRODUCTION

1. My name is Immanuel Freedman.
2. My qualifications are set forth in my curriculum vitae, a copy of which is attached as an **Appendix A** to this Declaration. I have over 30 years of industry experience, including a substantial portion of which was spent working with image and video coding and developing models and simulations to analyze various video and imaging systems including graphical user interfaces. I have summarized in this section my educational background, career history, and other qualifications relevant to this matter. As set forth in my curriculum vitae:
 3. I earned a Bachelor of Science degree in Physics from the University of Durham, England, in 1979. I obtained a Doctorate in Physics from the University of Durham, England in 1986. Between obtaining my undergraduate and doctoral degree, I developed a microcomputer system for detecting coalmine fires and heatings as a scientist for the National Coal Board and worked as a software engineer for Laser-Scan Ltd. in Cambridge, England.
 4. After obtaining my Doctorate, I served as a Research Assistant at University College London from September 1986 to June 1987, where I developed digital image processing algorithms to improve image and stereo-matching quality

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for a digital terrain modeling system, including software and algorithms for affine transformation, edge filtering, kriging interpolation, and image stereo-matching with sub-pixel acuity. I continued my work with digital image processing as a Research Associate at the University of Maryland, from June 1987 to September 1988. During my time at the University of Maryland, I designed algorithms for filtering, segmenting, clustering, and path planning based on digital images organized by quad-tree data structures.

5. From September 1988 to June 1994, I worked as a Senior Systems Engineer for the Hughes STX Corporation. As part of my work, I developed methods for comparison of sky maps from the Cosmic Background Explorer (COBE) mission with sky maps from other missions based on scientific data stored in a spatially-referenced database using a quad-tree data structure. In this role, I led the Systems Engineering and end-to-end development of a novel system for compressing imaging and ancillary data that combined scientific modeling with statistical data compression. I was also charged with designing and developing evaluation tools to ensure user-transparent, system-wide compression of a 380-GB dynamic database at an image quality acceptable to end-user scientists. In public recognition of my work, I received National Aeronautics and Space Administration Group Achievement Awards in 1990 and 1992.

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6. After June 1994, I began a six-month stint as a contract Software Engineer for the Federal National Mortgage Association in Washington D.C., for which I developed a graphical user interface to monitor and validate loan servicer input for a Loss Mitigation Project. I then served as an Independent Consultant to Optivision, Inc. for the next six months, where I researched and developed rate control algorithms and software based on the MPEG-2 Test Model 5 for the OPTIVideo™ MPEG-2 video encoder, as well as adaptive quantization algorithms based on the then-JPEG-3 draft standard. In this role, I researched and developed algorithms to improve the quality of gray scale image compression for the medical imaging DICOM Standard by providing a lossless hybrid algorithm encoding image residuals with a diagonal Golomb code based an Enhanced Universal Trellis Coded Quantization algorithm.

7. Between December 1995 and March 1996, I served as a Senior Staff Engineer for General Instrument Inc. and a contract Firmware Engineer for Comstream Inc., and Armor Safe Technologies Inc. At Comstream, I worked on integrating an MPEG-2 set top box with OpenTV interactive television middleware programmed in the Microtec C language ported to a Motorola 68340 processor under the pSOS operating system. Among other things, I implemented native

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bindings of the middleware for the On-Screen Display (graphical user interface) and communications stack.

8. From January 1996-97, I was the sole proprietor of Anugraha, where I researched and developed algorithms and processes to compress fine art photography at an image quality acceptable to artists based on the JPEG imaging standard implemented with image pre-processing and adaptive quantization. For the next year or so, I worked as an engineering contractor or consultant for various companies, working primarily on image processing systems and digital interactive television set-top boxes.

9. In August 1998, I began an engagement with Stratagene evaluating frame grabber hardware for resolution and quality of imagery and specified algorithms including cluster analysis and trending, further developing a user interface for a digital image processing system supporting gene-cloning science.

10. In October 1998, I began a six-month engagement with Rockwell Collins Inc., where I worked as a Lead Systems Engineer tasked with harmonizing requirements for an MPEG-2 in-flight entertainment system. I then worked for Sun Microsystems Inc. as a Software Engineer until November 1999. During my time at Sun Microsystems Inc., I developed a Distributed Component Object Model (DCOM) software interface between a TV control graphical user interface and a

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Microsoft broadcast application programming interface (API) with the goal of improving the visual quality of interactive TV displays derived from UDP/IP datagrams synchronized with MPEG-2 audio/video packet data.

11. For the next 22 months, from January 2000 to October 2002, I worked as the Chief Systems Engineer for Media Logic Systems Ltd. During my time at Media Logic Systems, I designed and developed a live interactive television system (iSeeTV) that served as a user interface for customer communication with human sales agents in video-enabled call centers. To create this system, I researched and developed tools and encoder systems to improve image quality at prescribed latency and bit rate for distributing live video and audio streams encoded via low latency methods. To perform the above, I was required to understand and implement video codec systems employing the MPEG-2 Simple Profile at Main Level (CATV), MPEG-4 Visual Profile with background sprite coding, and the H.263+ Standard (now known as H.264).

12. Since November 2002, I have been an engineering contractor, and more recently an independent consultant in mathematical modeling, for several companies, such as Cyra Technologies Inc. and Amgen Inc. I served as a senior research fellow at Merck & Co., Inc., a manager at GlaxoSmithKline Inc., a contractor at Projections Research Inc., a director at Daiichi Sankyo, a senior

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director at Praxis Precision Medicines and currently a director at Takeda Pharmaceuticals. During this time, I have developed mathematical models and simulations related to various systems, signals, and images. Specifically, I have focused on analyzing, processing, storing, and deriving information from biomedical imaging and other data. Using the information derived from these systems and data, I have created a variety of models related to biology and the effects of drugs on the human body. I have also provided requirements analysis and design for the iDose™ precision dosing system graphical user interface. In recognition of my work, I have received GlaxoSmithKline R&D Recognition Awards in 2012, 2013, and 2016, a Daiichi Sankyo recognition award in 2021 and a Takeda Pharmaceuticals recognition award in 2022.

13. In addition to my over thirty years of relevant industry experience, I have authored many publications relating to video and imaging coding. In 2003, I authored a chapter entitled “Video Compression” for the *Internet Encyclopedia*. In 2004 I authored the chapter entitled “Video” for the *Berkshire Encyclopedia of Human-Computer Interaction*. And in 2007 I authored a chapter titled “Video Compression” for the *Handbook of Computer Networks*.

14. I am also a Senior Member of the Institute of Electrical and Electronics Engineers (“IEEE”) and serve as the current Philadelphia Chapter

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Chair of the Communications & Information Theory Societies as well as the American Association of Pharmaceutical Scientists Pharmaco-Imaging Community. I also served as the 2019 Vice Chair of the IEEE P2673 Intelligence Augmentation for Medical Imaging Standards Working Group. I also have been registered to practice as a patent agent for the United States Patent and Trademark Office since 2002 (Reg. No. 51,704).

15. Since 2017, I have also volunteered first as a Research Scholar and now as a Voluntary Researcher with the State University of New York at Buffalo. In this role, I have provided mentorship for a doctoral candidate in areas relating to computer modeling and estimation.

16. In view of the above and my curriculum vitae in Appendix A, I received a doctorate in physics and several years of work experience on technologies including image and video processing together with graphical user interfaces prior to the earliest priority date of the '311 Patent. Thus, as of the earliest possible priority date of the '311 Patent (i.e., September 2, 2011), I was at least a person of ordinary skill in the art of the '311 Patent (Section V, *infra*), and I had direct personal knowledge of the technologies involved in the '311 Patent.

17. I have reviewed the specification, file history and claims of U.S. Patent No. 10,334,311 (Ex. 1001, the “'311 patent”).

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18. I have reviewed and understand the following references:

- U.S. Patent Publication No. 2005/0200811 A1 (Nobori);
- U.S. Publication 2006/0158838 A1 (“Kinoshita”);
- U.S. Patent Publication No. 2006/0230360 A1 (Young);
- U.S. Publication 2009/0201420 A1 (“Brown”); and
- other documents cited herein.

19. I have been retained by Petitioners to provide my conclusions concerning the validity of the ’311 patent in connection with its petition for *inter partes* review of the ’311 patent.

20. I am being compensated at my normal consulting rate of \$400 per hour for my work. My compensation is not in any way dependent on the outcome of any *inter partes* review, and in no way affects the substance of my statements in this declaration, nor have I any financial or personal interest in the outcome of this proceeding.

21. To the best of my knowledge, I have no financial interest in Petitioners or in the ’311 patent. To the extent any mutual funds or other investments I own have a financial interest in the Petitioners or the ’311 patent, I do not knowingly have any financial interest that would affect or bias my judgment.

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II. UNDERSTANDING OF THE LAW

22. I am not an attorney. For the purposes of this declaration, Petitioners' counsel has informed me about certain aspects of the law that are relevant to my analysis and conclusions. My understanding of the law is as follows:

23. I understand that in an *Inter Partes* Review proceeding, a patent is not presumed valid and the Patent Trial and Appeal Board will evaluate the validity of the challenged claims under a preponderance of evidence standard. A preponderance standard is met when, considering the evidence presented, it is more likely than not a challenged claim is invalid.

24. A patent claim is invalid if it is "anticipated" by prior art. For a claim to be invalid because it is anticipated, all of its requirements must have existed in a single device or method that predates the claimed invention or must have been described in a single publication or patent, either expressly, inherently, or implicitly, that predates the claimed invention.

25. The description in a written prior art reference does not have to be in the same words as the claim, but all the requirements of the claim must be there, either stated, necessarily implied (i.e., inherent), or implied, so that someone of ordinary skill in the art, looking at that one reference, would have been able to make and use the claimed invention based on the reference.

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26. A patent claim is also anticipated if more than one year before the filing date of the patent, the claimed invention was patented anywhere in the world or described in a printed publication anywhere in the world.

27. A patent claim is invalid if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the application was filed. This means that even if all the requirements of a claim cannot be found in a single prior art reference that would anticipate the claim or constitute a statutory bar to that claim, the claim is invalid if it would have been obvious to a person of ordinary skill at the time of the alleged invention. That is, the claim is obvious if the person of ordinary skill would adapt the reference to meet the claim by applying known concepts to achieve expected results.

28. The determination of whether a claim is obvious should be based upon several factors, including:

- the level of ordinary skill in the art that someone would have had at the time of the claimed invention;
- the scope and content of the prior art; and
- what differences, if any, existed between the claimed invention and the prior art.

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29. In considering the question of obviousness, it is also appropriate to consider any objective indicia (or secondary considerations) of obviousness or non-obviousness that may be shown. These include:

- whether a product that practices the claimed invention has achieved commercial success, to the extent any such success is due to the merits of the claimed invention;
- whether a long-felt need existed in the prior art for the solution provided by the claimed invention;
- whether there were unsuccessful attempts by others to find the solution provided by the claimed invention;
- whether there was copying of the claimed invention by others;
- whether there were unexpected and/or superior results from the claimed invention;
- whether there was acceptance by others of the claimed invention as shown by praise from others in the field or from the licensing of the claimed invention; and
- whether there was independent invention of the claimed invention by others before or at about the same time the named inventor conceived of it.

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30. I further have been informed and understand that a “nexus” must exist between the claimed invention and the alleged commercial success. In other words, proof of commercial success of a product that practices the claimed invention is not enough; there must be evidence that the commercial success resulted, at least in meaningful part, from the claimed invention.

31. I have been informed and understand a patent claim composed of several elements is not obvious merely because each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, it is relevant to consider if there would have been a reason that would have motivated a person of ordinary skill in the art to combine the known elements or concepts from the prior art in the same way as in the claimed invention. For example, market forces or other design incentives may be what produced a change, rather than true inventiveness. It is also appropriate to consider:

- whether the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness;
- whether there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent;

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- whether the innovation applies a known technique that had been used to improve a similar device or method in a similar way; or
- whether the claimed invention would have been obvious to try, meaning that the claimed innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those of ordinary skill in the art.

32. In considering obviousness, it is important to be careful not use the benefit of hindsight.

33. A single prior art reference can alone render a patent claim obvious, if any differences between that reference and the claims would have been obvious to a person of ordinary skill in the art at the time of the alleged invention—that is, the patent claim is obvious if a person of ordinary skill would adapt the prior art reference to meet the claim by applying known concepts to achieve expected results.

34. I have been informed that claim construction is a matter of law and that the final claim construction will ultimately be determined by the Board. For the purposes of my analysis in this proceeding and with respect to the prior art, I have been informed that claim terms in an *inter partes* review (IPR) proceeding are generally given their plain and ordinary meaning as understood by a person of

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ordinary skill in the art at the time of the invention, with the claim term read not only in the context of the particular claim in which the disputed term appears, but also in the context of the entire patent, including the specification. I understand that this is referred to as the “Phillips standard.”

35. I have been informed that the Patent Owner can serve as his or her own lexicographer. As such, if a claim term is provided with a specific definition in the specification, that claim term should be interpreted in light of the particular definition provided by the Patent Owner.

36. I have been informed that a patent must satisfy the written description requirement separate from any enablement requirement, each of which are found in 35 U.S.C. §112, first paragraph.

37. To satisfy the written description requirement, I understand that the patent’s description must describe the claimed invention in sufficient detail that a person of ordinary skill in the art can reasonably conclude that the inventor had possession of the claimed invention. I understand that the breadth of the claims determines the extent of the required disclosure. I understand that the written description must be commensurate with the scope of the claims. In other words, I understand that the test is whether the disclosure of the application reasonably conveys to those skilled in the art that the inventor had possession of the claimed

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subject matter as of the filing date. I understand that new matter is matter not supported by the disclosure.

38. I have been informed that a patent must satisfy the enablement requirement separate from any written description requirement. To satisfy the enablement requirement, the patent's description must describe the invention such that one skilled in the art is enabled to make and use it without undue or unreasonable experimentation. I understand that certain factors are relevant, including the breadth of the claims, the nature of the invention, the state of the prior art, the level of one of ordinary skill, the level of predictability in the art, the amount of direction provided by the inventor, the existence of working examples, and the quantity of experimentation needed to make or use the invention based on the content of the disclosure.

III. TECHNOLOGY BACKGROUND

39. The '311 patent relates to graphical user interfaces (GUIs) that image display devices present to a user for navigating and selecting among the various viewing options.

40. There are many types of "image viewing devices," such as projectors, computer monitors, televisions, and smartphones.. For ease of a user of such image viewing devices, navigable menus have existed and been known for

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decades. For example, Nobori (Ex. 1004, discussed in detail below) from 2004 provides an on screen menu allowing users to choose video inputs to a projector from several video input sources (Fig. 2, below). Users may navigate from icon to icon to select video inputs from different video sources to the projector. *Id.* at ¶48.

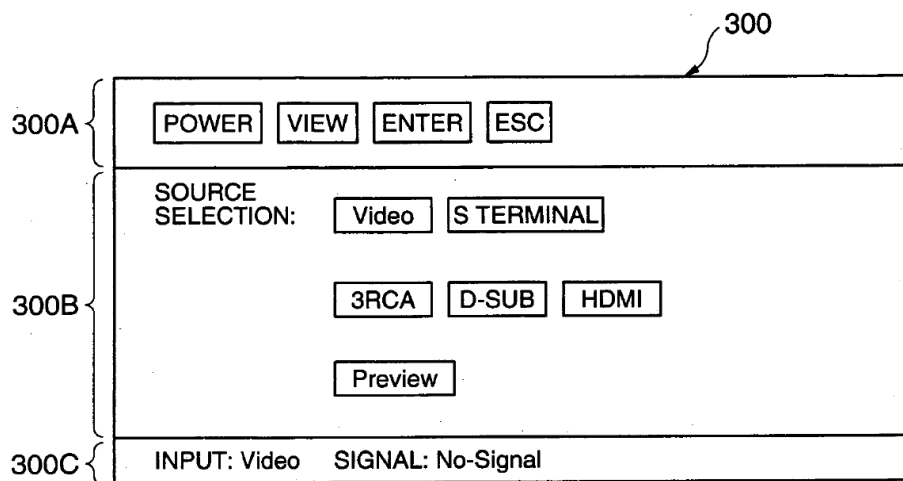


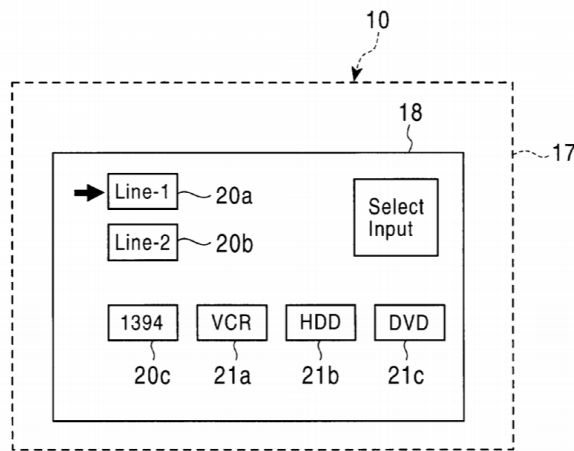
FIG. 2

Id. at FIG .2.

41. Television menus may also display different external input sources. For example, U.S. Patent 6,825,858 to Sato (Ex. 1016), filed in early 2000, discloses a menu with icons representing external devices to a user, as in Fig. 1 (below):

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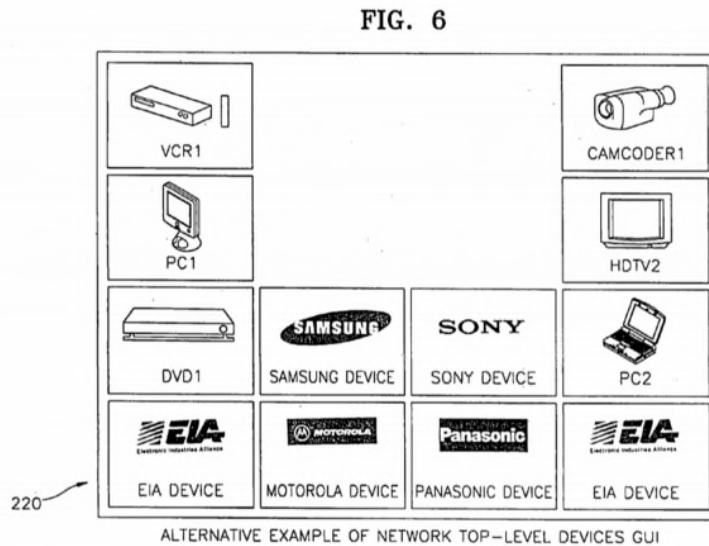
FIG. 1



Id. at FIG. 1.

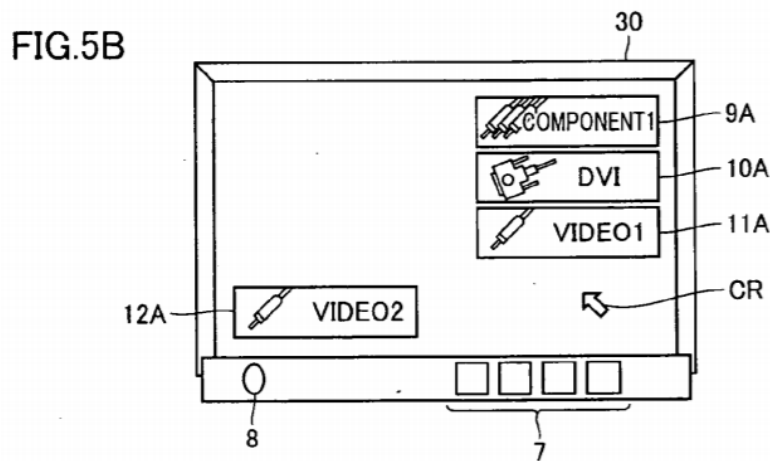
42. Over time, the appearance of menu icons has varied, and may provide more information than a simple textual label. For example, graphic icons may also be presented to aid user selection. U.S. patent 7,200,683 to Wang (Ex. 1033), filed Aug. 17, 1999, provides a graphical user interface (“GUI”) with icons showing images of particular devices, as in Fig. 6 (below):

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Id. at FIG. 6.

43. Kinoshita filed Jan. 18, 2005, provides graphic images of input terminals as part of a menu for selecting among AV devices, as in Fig. 5B (below):



Ex. 1005 at FIG. 5B.

44. Kinoshita (discussed in detail below) teaches that images showing terminal shapes not only help users identify the desired input, but also inform the

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user of the proper terminal that a given device should be connected to. *See id.* at 2:40-42.

45. Yet another example is provided in Young, which claims priority to an application filed Apr. 8, 2005. Young (discussed in detail below) teaches that prior menus, which may identify external components based only on terminal names, could provide more information to a user to assist in selection of desired content. Ex. 1006 at ¶¶5, 8. Young provides a menu that incorporates “image contents” from a connected device or input source (represented as circles and triangles in Fig. 2, below), that might be “static images, namely snapshots, or real-time motion images.” *Id.* at ¶16.

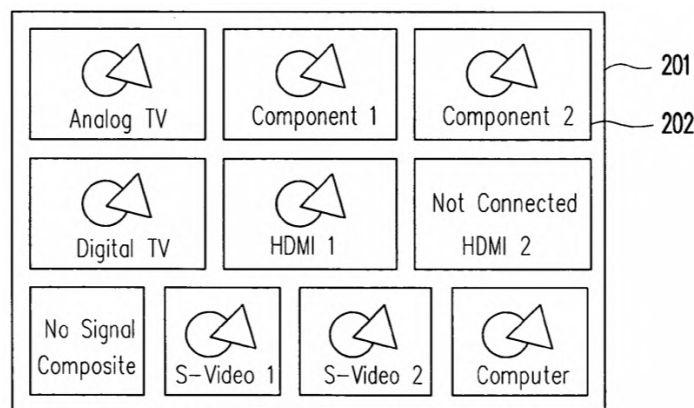


FIG. 2

Ex. 1006 at FIG. 2.

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46. A television menu may also be combined with the display of a currently playing program. For example, in U.S. patent 7,681,141 to Tu (Ex. 1011) a menu is “superimposed on top of the currently playing video,” as shown in Fig. 4 below. *Id.* at 7:49-50.

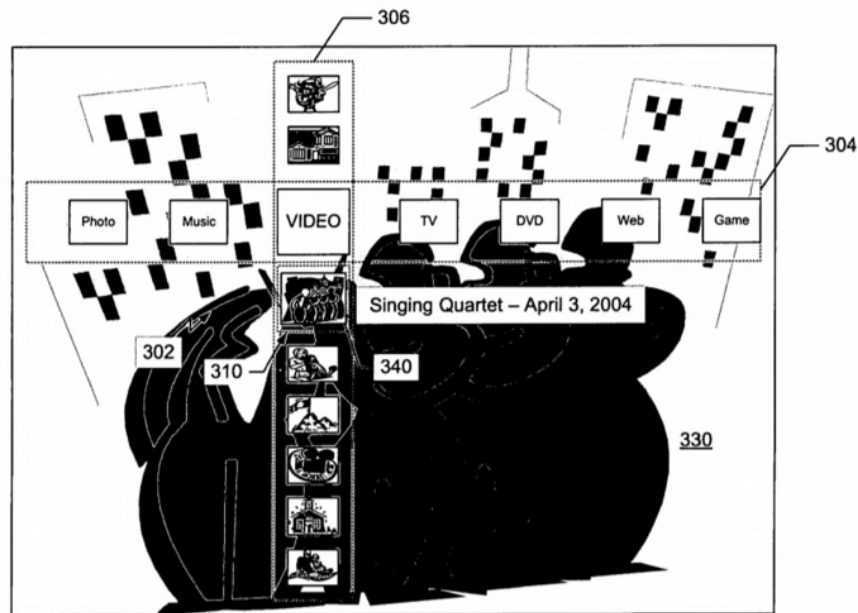


FIG. 4

Id. at FIG. 4.

47. Projectors and televisions are not the only image viewing devices, however. Over time, personal computers have gained importance as a device for viewing media. For example, U.S. Publication 2009/0307615A1 to Jalon (Ex. 1017) provides a computer icon design that incorporates a video or image previews. *Id.* at ¶7.

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48. U.S. Publication 2009/0106674 A1 to Bray (Ex. 1032) provides yet another computer-based method for displaying content previews. Bray teaches that a simpler form of an icon, called an “initial preview,” may be replaced by a more detailed “enhanced preview” upon a user’s selection. *Id.* at ¶¶6, 7. An “enhanced preview” may have embedded in it “interactive content” such as a movie or music, similarly to Jalon. *Id.* at ¶124.

49. Modern televisions have increasingly adopted computer-like architecture and functionality. By the early 2000s, it was already clear that analog televisions were being supplemented and would be eventually supplanted by digital televisions with a built-in computer, or computer-like, processing units. *See e.g.*, Ex. 1009 (U.S. 2003/0075983 to Stecyk, (“Stecyk”)) at ¶¶3, 8. Stecyk, for example, discloses a digital television system, or DTV, which includes “a dedicated controller or computer...comprising appropriate programmable logic for operation of a control system.” *Id.* at ¶8. Similarly, Brown, (Ex. 1007, U.S. Publication 2009/0201420, discussed in detail below), also teaches a user interface for a television that is generated, and controlled by means of a processing device 801 which “can be a general purpose processor executing embedded software or locally stored software.” *Id.* at ¶86.

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50. The design of GUIs and applications for the DTV was expedited by the development of middleware and display standards that could bridge computer and DTV operating systems. OpenTV as developed initially by Sun Microsystems paved the way with a method and apparatus for compilation of an interpretative language for interactive television, known as “ocode,” a forerunner of Java.¹ This platform enabled the broadcast streaming of ocode applications to be rendered on DTVs. In a similar timeframe, the Moving Picture Expert Group (MPEG) developed an MPEG-4 Standard framework² that addressed interactivity in DTV applications. (*See, e.g., Bouilhaguet, F et al. 2000.*³)

51. While the Open TV development organization was spun off from Sun Microsystems as Open TV, Inc., Sun Microsystems further developed a graphical user interface middleware language implemented by a Personal Java (pJava) system known as JavaTV.⁴ To satisfy DTV GUI developer’s aspirations, it was necessary to provide portability of GUIs between computers and DTVs so that

¹ Ex. 1018, U.S. patent 7,065,752

² Ex. 1019, ISO/IEC 14496

³ Ex. 1020, Bouilhaguet, F. et al. (2000), *Proc. IEEE International Symposium on Circuits & Systems*, May 28-31, 2000: Geneva CH

⁴ Ex. 1021, U.S. patent publication 2011/0214152

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developers could continue to use existing desktop toolsets for development of high-quality GUIs to be rendered on either computer or DTV.^{5,6}

52. Additionally, the Digital Video Broadcasting (DVB) Multimedia Home Platform (MHP) standard⁷ for interactive digital television enabled the portability of internet Hypertext Markup Language (HTML) and Java application content across computers and numerous DTV set-top boxes⁸. Additional standards in the same field including the Multimedia and Hypermedia Experts Group (MHEG) standard⁹ and the Advanced Television Enhancement Forum (ATVEF) protocol- enhanced Web television standard¹⁰ promulgated by Microsoft which is a compliant version of ATVEF version 1.1r26.

53. Thus, in view of the foregoing developments, the technology underlying GUIs for computers and televisions had essentially converged as of 2011.

⁵ Ex. 1022, Kwon, B. et al. (2007), SHADOW: A Cross-Platform GUI Middleware for Home Devices. pp. 906-910.

⁶ Ex. 1023, Bjelica, M. Z. et al. (2009), *Proc. Telsiks 2009*, Oct 7-9, 2009: Niš RS. pp. 285-288

⁷ Ex. 1024, Digital Video Broadcasting (2011). Globally Executable MGP Specification 1.3, Document A153, March 2011

⁸ Ex. 1025, Gil, A. et al. (2002), *Proc. IEEE R8 International Symposium on Video/Image Processing. & Multimedia Communications*. Jun 16-19, 2002: Zadar HR. pp. 447-451.

⁹ Ex. 1026, ISO/IEC 13522-5

¹⁰ Ex. 1027, SMPTE Declarative Data Essence (DDE)-1 standard ST 397:2003

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54. Designers of television GUIs frequently borrow from principles of design originally developed in the computer context. Indeed, similar UI design principles apply across television and PC contexts.^{11,12} In particular, Nielsen emphasizes simplicity and progressive disclosure while Kang & Kim at 45-46 point out that an interface is preferably as simple as possible. *Id.*; *also e.g.*, Ex. 1030 at 35; *also*, Ex. 1031 at 30. “One way to support simplicity is to reduce the presentation of information to the minimum required to communicate adequately.” *Id.* Interface designers can manage the amount of information presented to a user using “progressive disclosure,” whereby information is initially hidden, and “shown only at the appropriate time,” such as in response to a user’s selection or navigation. *E.g.*, Ex. 1031 at 30; *also* Ex. 1030 at 35-36. For example, Bray teaches hiding more detailed content previews until a user navigates to or selects a given item. A Person of Ordinary Skill in the Art (“POSITA”) would have understood that such displays implement a form of progressive disclosure, in that the initial display is kept relatively simple, and more detailed information concerning object content is kept hidden.

¹¹ Ex. 1028, Nielsen, J. (2006). “Progressive Disclosure.” Nielsen Normal Group, Dec 3, 2006

¹² Ex. 1029, Kang, S. & Kim, W. (2007), “Minimalist and Intuitive User Interface Design Guidelines for Consumer Electronics Devices”, in *Journal of Object Technology* 6(3) Mar 2007. pp. 39-52

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55. TV input devices are typically selected via a software or firmware application resident on the TV. A POSITA would have understood that selecting an input is a lean-forward (interactive) activity so “progressive disclosure” makes sense from a user experience standpoint.

IV. LEVEL OF ORDINARY SKILL

56. I understand that the level of ordinary skill may be reflected by the prior art of record, and that a POSITA to which the claimed subject matter pertains would have the capability of understanding the scientific and engineering principles applicable to the pertinent art. I understand that one of ordinary skill in the art has ordinary creativity and is not a robot.

57. I understand there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems. There is likely a wide range of educational backgrounds in the technology fields pertinent to the '311 Patent.

58. I am familiar with the knowledge and capabilities that a person of ordinary skill in the art of graphical user interfaces would have possessed in the September 2011 time frame. Specifically, my experience in the industry and with

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engineers practicing in the industry during the relevant timeframe allowed me to become personally familiar with the knowledge and capabilities of a person of ordinary skill in graphical user interfaces. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in the art in the field of graphical user interfaces at the time of the priority date of the '311 Patent.

59. A person of ordinary skill in the art, at the time the '311 patent was filed, would have had at least an undergraduate degree in electrical or computer engineering or closely related scientific field, or similar advanced post-graduate education, and at least two years of experience with graphical user interfaces. Such a person of ordinary skill in the art would have been capable of understanding the '311 Patent and the prior art references discussed herein.

60. Based on my education, training, and professional experience in the field of the claimed invention, I am familiar with the level and abilities of a person of ordinary skill in the art at the time of the claimed invention. Additionally, I met at least these minimum qualifications to be a POSITA at least as of September 2011. Further, although my qualifications may exceed those of the hypothetical person having ordinary skill in the art defined above, my analysis and opinions regarding the '311 Patent have been rendered from the perspective of a person having ordinary skill in the art at the time of the invention.

V. OVERVIEW OF THE ‘311 PATENT

61. The ’311 patent, titled “Method of providing external device list and image display device,” issued from an application filed on October 19, 2017.

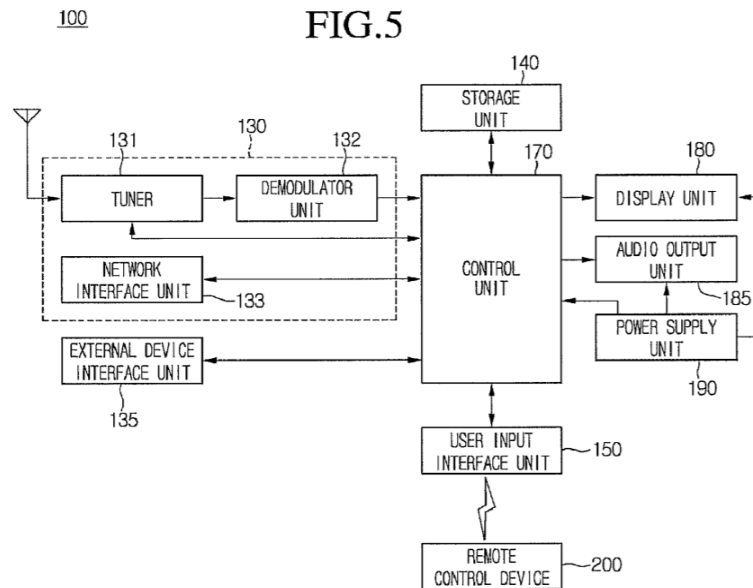
Counsel has informed me that this application claims priority to a Korean patent application filed on September 2, 2011. Ex. 1001.

A. Specification:

62. The ’311 patent relates to an “external device list” for an image viewing device that may be used to view a variety of content, such as a connected external device such as a DVD player, as well as broadcast content and the internet. *Id.* at 2:29-31; 6:66-7:5. In particular, the image devices and methods of the ’311 patent allow a user to “recognize an input switch in advance before an image signal of an external device, which is applied to an image display device, is switched for input.” *Id.* at 1:38-41.

63. Figure 5 (below) shows that the exemplary devices include subunits dedicated to receiving and displaying content. *See id.* at 6:66-7:5.

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64. For example, “the external device interface unit 135 may connect an external device with the image display device 100, and for this, may include an A/V input/output unit (not shown) or a wireless communication unit (not shown).” *Id.* at 8:3-6. External devices may include “a Digital Versatile Disk (DVD) player, a Blu-ray player, a game console, a camera, a camcorder, and a computer (such as a notebook computer).” *Id.* at 8:9-11. The A/V input/output unit can include “a USB terminal, a Composite Video Baseband Signal (CVBS) terminal, a component terminal, an S-video terminal (i.e., an analog type), a Digital Visual Interface (DVI) terminal, a High Definition Multimedia Interface (HDMI) terminal, an RGB terminal, and a D-SUB terminal.” *Id.* at 8:19-24. A control unit 170 is connected to all the disparate components of image display device 100, and

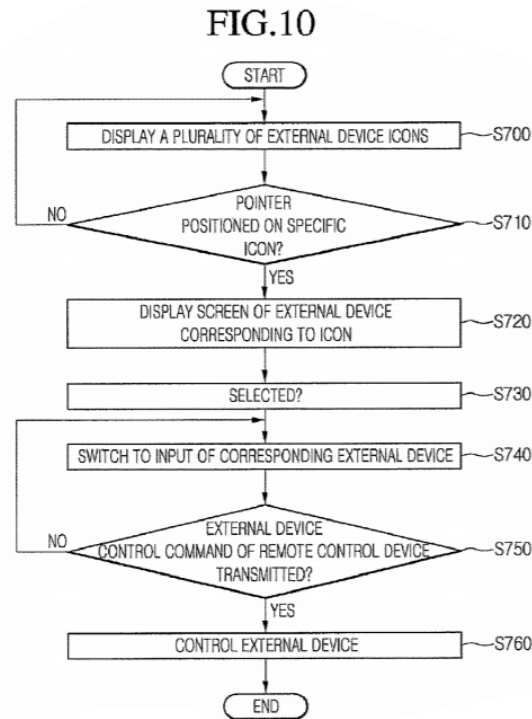
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“may control overall operations” of the device, including the generation and display of the ’311 patent’s claimed external device list. *See id.* at 10:9, 10-44.

65. A user interacts with the image display device 100 by means of the user interface unit 150. *See id.* at 9:35-37. A remote-control device 200 is used to transmit user input to the user input interface 150. *Id.* at 9:40; 11:40-41. Remote control 200 could be used in a manner similar to a computer mouse, in that a user’s movement of the remote can cause a pointer to move about on the screen. *Id.* at 14:49-55. The “pointer” itself may take different shapes, such as “a dot, a cursor, and a thick outline.” *Id.* at 15:37-38. During operation, a user may use the remote control 200 to navigate an external device list.

66. Figure 10 provides a flowchart illustrating how the external device list might be presented and operated by a user:

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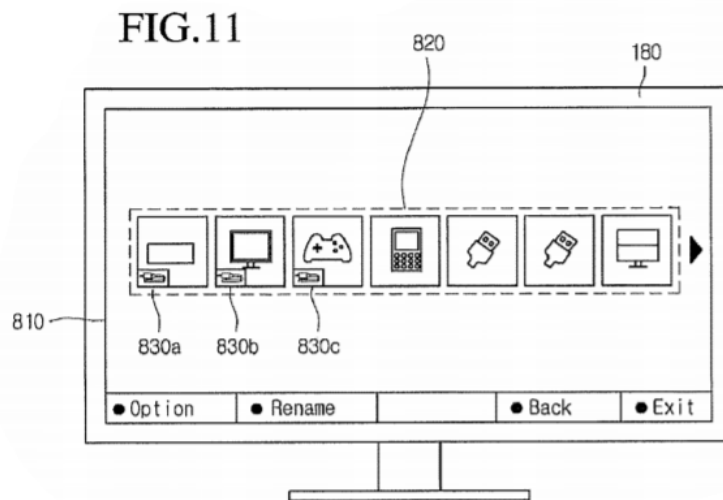


67. First, a plurality of external device icons is presented to a user. *Id.* at 20:22-26; Fig. 10. Then, if a user positions a pointer on a specific device icon, this would permit display of an image signal 860 from the corresponding external device on the full screen, at step S720. *See id.* at 20:53-59; Fig. 10; Fig. 12. This step is best understood as a preview, rather than actual switching of the input: according to Fig. 10, it is not until a subsequent step, S730, that a user indicates a selection that allows switching of input to the corresponding external device at step S740. *See id.* at Fig. 10; see also 21:19-24. Thus, in other words, “a user could confirm an image signal in advance, which is inputted from an external device

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before switching the input of the external device, so that the user's convenience may be improved.” *Id.* at 20:59-63.

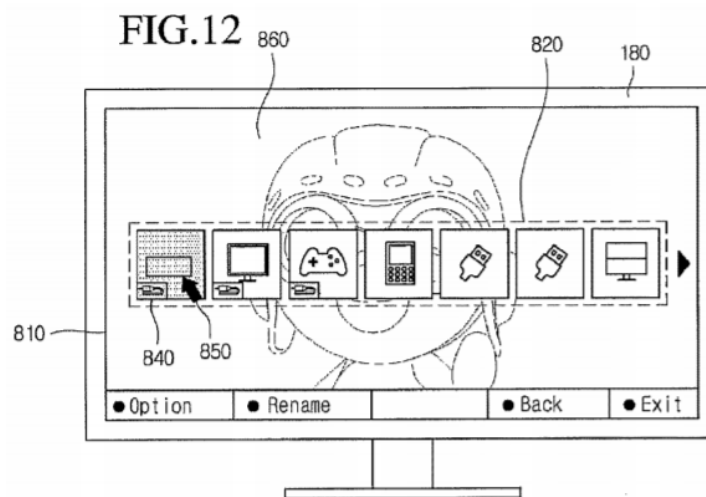
68. An exemplary display corresponding to the steps of Fig. 10 is illustrated in Figs. 11 (below):



69. Fig. 11 shows an exemplary menu, or external device list, which may be shown to a user at step S700, the start of Fig. 10's process. External device icons 820 represent the plurality of external devices. *Id.* at 20:35-37. Moreover, the control unit 170 determines which external device icons 820 are connected to the image display device 100 in order to display specific symbols 830 a, 830 b, and 830 c on the external device icons that are being connected to the image display device 100.” *Id.* at 20:37-42.

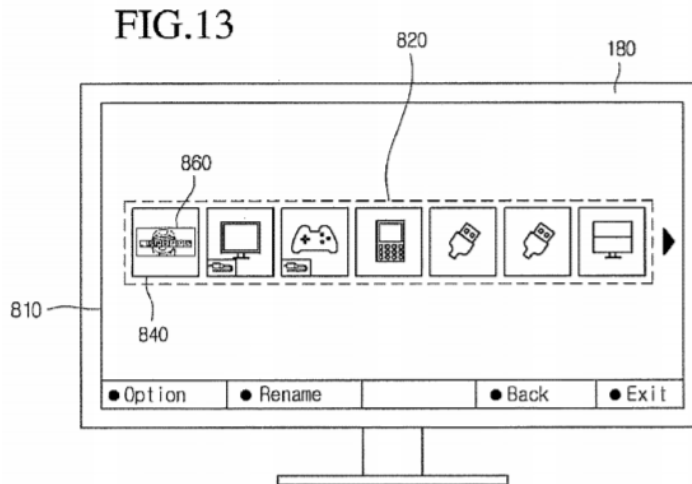
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70. In Fig. 12 (below), “when the pointer 850 is positioned on the first external device icon 840 among the plurality of external device icons 820,” image signal 860 is displayed “on the full screen 810 of the image display device 100 in operation S720” of Fig. 10. *Id.* at 20:53-55, 20:55-59.



71. The preview, or image signal 860, may be displayed at different locations on the screen. For example, in Fig. 13 (below), image signal 860 of an external device related to the first external device icon 840 is displayed in the same location as the icon that the pointer is indicating, i.e., “the area where the first external device icon 840 is displayed.” *Id.* at 21:1-4. In other words, the device icon is replaced with a preview of the input signal from that device.

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72. The specification does not provide any figure or text specifically describing the changes occurring when then pointer is transferred to a second icon in the embodiment of Fig. 13.

B. Challenged Claims:

73. The Petitioners challenge claims 1-21. Of these, claims 1-11 are directed to image display devices, and claims 12-21 are directed to methods performed by an image display device.

74. The text of independent claim 1 is provided in full:

1. An image display device comprising:

a display;

a first external interface configured to receive a first image signal input from a first external device connected to the image display device;

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a second external interface configured to receive a second image signal input from a second external device connected to the image display device; and

a controller coupled with the display, the first external interface and the second external interface, the controller configured to:

display a plurality of external device icons, on the display, wherein the plurality of external device icons include a first external device icon and a second external device icon, wherein a first default image corresponding to the first external interface is displayed on the first external device icon and a second default image corresponding to the second external interface is displayed on the second external device icon, and

change the first default image to a first image based on the first image signal in response to the first external device icon being selected if the first external device is connected to the image display device, and

change the first image to the first default image in response to the second external device icon being selected,

wherein the first image is displayed at a position corresponding to an area where the first external device icon is displayed.

75. The device of claim has six basic elements: a display, a first external interface, a first external device, a second external interface, a second external device and a controller. The combination of these elements is not unique. Rather, the alleged novelty of claim 1 lies in the way in which the GUI reacts to a user's

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navigation. *See, e.g.*, (Ex. 1002, excerpts of '311 patent File History, Applicant arguments/Remarks made in an amendment, February 8, 2018) at 66. Specifically, as the emphasized text shows, an icon's "default image" will change to a "first image," and then back, as a user navigates to a different icon. As discussed below, this feature was already disclosed in Nobori.

76. Claims depending on claim 1 introduce additional variations on the basic GUI display and operation. For example, claim 2 further requires that the first external device icon be highlighted in response to selection. Claim 3 further requires that multiple "external device icons" are displayed even while one of these icons has a "first image" displayed. Claims 4 and 5 provide that navigation may include display of a "cursor" that can be positioned on the icons, and that this cursor is controlled "by a remote controller." Claims 6 and 7 further require that selection of a second external device icon will initiate a transition from second default image to a second image, paralleling the analogous transition for the first icon set out in claim 1. Claim 8 requires that the controller "transmit a control command for controlling the first external device" and "display an execution result of the control command." Claim 9 provides that the first and second "default images" are "image[s] identifying the [first and second] external interface[s]," respectively. Claim 10 requires "the changed first image is an image which is

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currently displayed on the first external device> Claim 11 requires that the first default image be displayed, even while the first icon is selected, if the first device is not connected.

77. Claims 12-21 are method claim analogs of the foregoing device claims. Specifically, claim 12 is the method analog of claim 1; claim 13 of claim 2; claim 14 of claim 3; claim 15 of claim 4; claim 16 of claim 5; claim 17 of claim 6; claim 18 of claim 7; claim 19 of claim 8; claim 20 of claim 10; and claim 21 of claim 11.

C. Prosecution History:

a) *First Office Action and Response*

78. The originally filed claims did not require the specific transitions that are in claim 1 as issued, but merely that external device icons be displayed “on a first area of the display,” and that a preview, or “first image based on the first image signal” be displayed on a “second area.” Ex. 1002, 123. The Examiner rejected these claims on a variety of grounds, including based on disclosures in the prior art. *Id.*, 84-89. In response, the applicant added language requiring a “first default image identifying the first external device on the first external device icon,” and upon selection of the first icon, the displayed “first image is an image which is currently being displayed on the first external device.” *Id.*, 63.

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b) *Second Office Action and Response*

79. Following these amendments, the Examiner issued a Final Rejection of the pending claims. Ex. 1002, 50. In response, the applicant made further narrowing amendments requiring a specific transition to “change the first default image to” a first image, and then “change the first image to the first default image in response to the second external device icon being selected.” *Id.*, 40. The applicant also added language requiring that “the first image is displayed at a position corresponding to an area where the first external device icon is displayed.” *Id.* The claim language describing the first and second default images was also amended to specify that the first default image “correspond[s] to” the “first external interface,” while the second default image “correspond[s]” to the “second external device.” *Id.*

c) *Third Office Action and Response*

80. Notwithstanding these amendments, the Examiner once more rejected the claims, this time adding the Jeong reference. Ex. 1002, 26. The applicant did not respond to this rejection on the merits, but rather argued that Jeong was disqualified as prior art under § 103(c) because it was subject to an assignment to Patent Owner. *Id.*, 20. After this response, the Examiner allowed the application.

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VI. CLAIM CONSTRUCTION

81. I understand that the ‘311 patent was asserted in *LG Electronics Inc. v. Hisense Electronics Manufacturing Company of America Corporation et al*, filed in the United States District Court for the Central District of California on November 4, 2019, and assigned case #: 2:19-cv-09474-JAK-E (the “9474 case”). I further understand that the 9474 case was settled prior to Patent Owner filing a co-pending litigation in the Eastern District of Texas, captioned *LG Electronics Inc. v. TCL Electronics Holdings Ltd. (f/k/a TCL Multimedia Technology Holdings, Ltd.) et al.*, Case No. 2:22-cv-00122-JRG. I have been informed that the co-pending litigation has not reached the claim construction stage.

82. I propose constructions for this proceeding for “external device icon” and “select.” The proposed constructions are essentially the same constructions for these terms in Patent Owner’s opening claim construction brief in the 9747 case. Ex. 1008. It is my opinion that all other terms of the claims be afforded their plain and ordinary meanings as understood by POSITA at the time of the purported invention of the ‘311 patent.

A. “External device icon”

83. In its Opening Claim Construction Brief in the 9474 case, Patent Owner proposed a construction for this term. More specifically, Patent Owner stated: “‘external device icon’ should be construed according to its plain and

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ordinary meaning, which is an icon corresponding to an external device.” Ex. 1008 at 3. Patent Owner’s non-limiting examples of “external device icons” include text, images, and pictorial representations corresponding to external devices, and combinations thereof. Id, at 4-5; Ex. 1001 at FIG. 11.

B. “Select” (including “selected” and “selectable”)

84. In the same Opening Claim Construction Brief, Patent Owner proposed a construction for these terms. More specifically, Patent Owner stated: In the 9474 case Patent Owner stated that: “‘select’ (including ‘selected’ and ‘selectable’) should be construed according to its [their] plain and ordinary meaning, which includes selection by placing a cursor on or highlighting an icon. The plain and ordinary meaning is not limited to a two-step process (e.g., placing a cursor on an icon and then pressing OK).” Ex. 1008 at 5-7. The plain meaning of these terms also includes selecting by touching areas of touchscreen display.

VII. OVERVIEW OF THE PRIOR ART

A. Overview of Nobori

85. The Nobori reference (Ex. 1004, U.S. Patent Publication No. 2005/0200811), was filed on March 8, 2005 and published on September 15, 2005. Counsel has informed me that Nobori is prior art to the ’311 patent under at least pre-AIA 35 U.S.C. §§ 102(a), (b), and (e).

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86. Nobori describes a user interface for navigating and selecting among a variety of image input interfaces and for displaying a plurality of thumbnail images of video provided by the image input interfaces. Ex. 1004 at Abstract, ¶¶4,5. Nobori discloses a projector including image input interface terminals into which image input signals from image input devices are inputted and a touch panel having a liquid crystal display to display image information inputted from the image input I/Fs as thumbnail images. *Id.* at Abstract, ¶5. “[T]he image input interface terminals are also referred to as image input I/Fs” include “S-Video terminal, a 3RCA terminal, a D-Sub terminal, an HDMI (High-Definition Multimedia Interface) terminal.” *Id.* at ¶6. Image input devices include personal computers and video players. *Id.* at ¶25.

87. The functional components of Nobori's projector are illustrated in FIG. 1.

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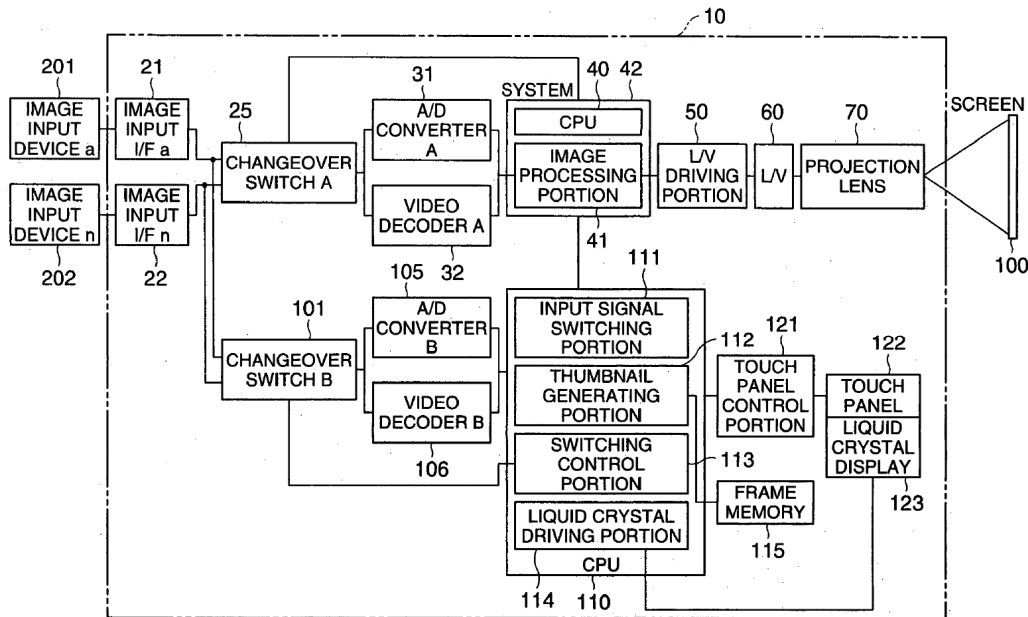


FIG. 1

Ex. 1004 at FIG. 1.

88. Image information from image input devices 201 and 202 is input into image input I/Fs 21 and 22, respectively. *Id.* at ¶35. Thumbnails generated by thumbnail generating portion 112 are displayed on liquid crystal display 123. *Id.* at ¶¶37-38. FIG. 1 shows two image input devices 201 and 202 and additional image input devices can be connected. *Id.* at ¶27.

89. FIG. 3 shows that the selection of an icon (image input I/F) causes the display of a preview image from the corresponding image input device. *Id.* at ¶¶49-53 & FIG. 3.

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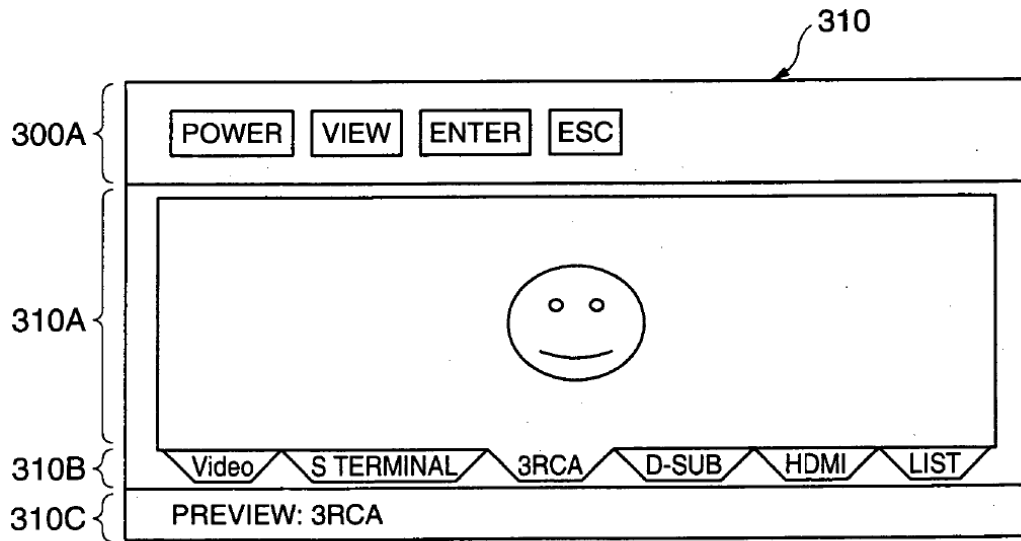


FIG. 3

Ex. 1004 at FIG. 3

90. Nobori explains, “when one desired image input I/F (herein, 3RCA terminal) is selected from the plural image input I/Fs, ... image information 310A of the selected I/F (3RCA) is displayed in the [form] of a thumbnail in the region within the image input I/F display screen 300B.” *Id.* at ¶49.

B. Overview of Kinoshita

91. The Kinoshita reference (Ex. 1005, U.S. Patent Publication No. 2006/0158838), was filed on January 11, 2006 and published on July 20, 2006. Counsel has informed me that Kinoshita is prior art to the '311 patent under at least pre-AIA 35 U.S.C. §§ 102(a), (b), and (e).

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92. Kinoshita relates to an improved user interface for selecting among a “plurality of AV (Audio-Visual) devices” connected to a display unit, such as a digital television. Ex. 1005 at Abstract, ¶4. According to Kinoshita, prior displays for external devices only provided the input name, such as “component” or “Video1.” *Id.* at ¶4, FIG. 7. Thus, “[w]hen a plurality of AV (Audio-Visual) devices are connected to a digital television ... it is difficult simply by the input name to know which AV device corresponds to which input. Further, for a user not very familiar with terminal names, it is difficult, by the display of input name only, to find which terminal should be used for connection with another AV device.” *Id.* at ¶4. Kinoshita addresses these problems by displaying icons that are images of the input terminals so that the user can easily confirm by the shape of the input terminal the identity of the device supplying the video signal. *Id.* at Abstract.

93. Data relating to each input may be stored in a table as shown in FIG. 2:

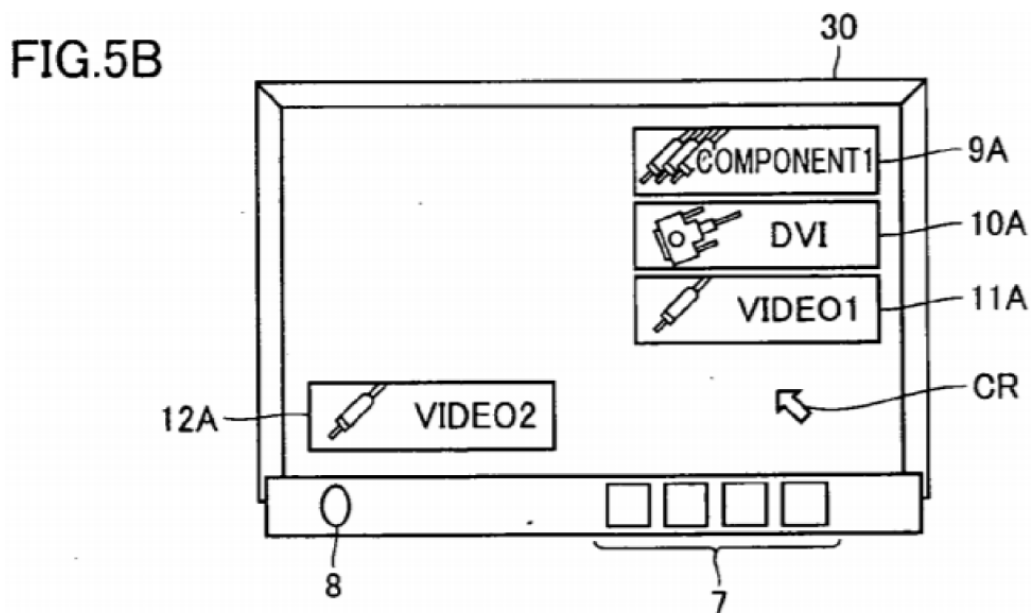
FIG.2

51 INPUT TERMINAL	52 INPUT NAME	53 SHAPE OF TERMINAL	54 DISPLAY POSITION
I1	'COMPONENT'		(X1,Y1)
I2	'DVI'		(X2,Y2)
I3	'VIDEO1'		(X3,Y3)
I4	'VIDEO2'		(X4,Y4)
⋮	⋮	⋮	⋮

Ex. 1005 at FIG. 2

94. Each input has associated with it “terminal shape data 53 for displaying the picture indicating the shape of corresponding input terminal.” *Id.* at ¶41.

95. FIG. 5B shows an exemplary display which includes “[i]cons 9A, 10A, 11A and 12A.” *Id.* at ¶41, 32.

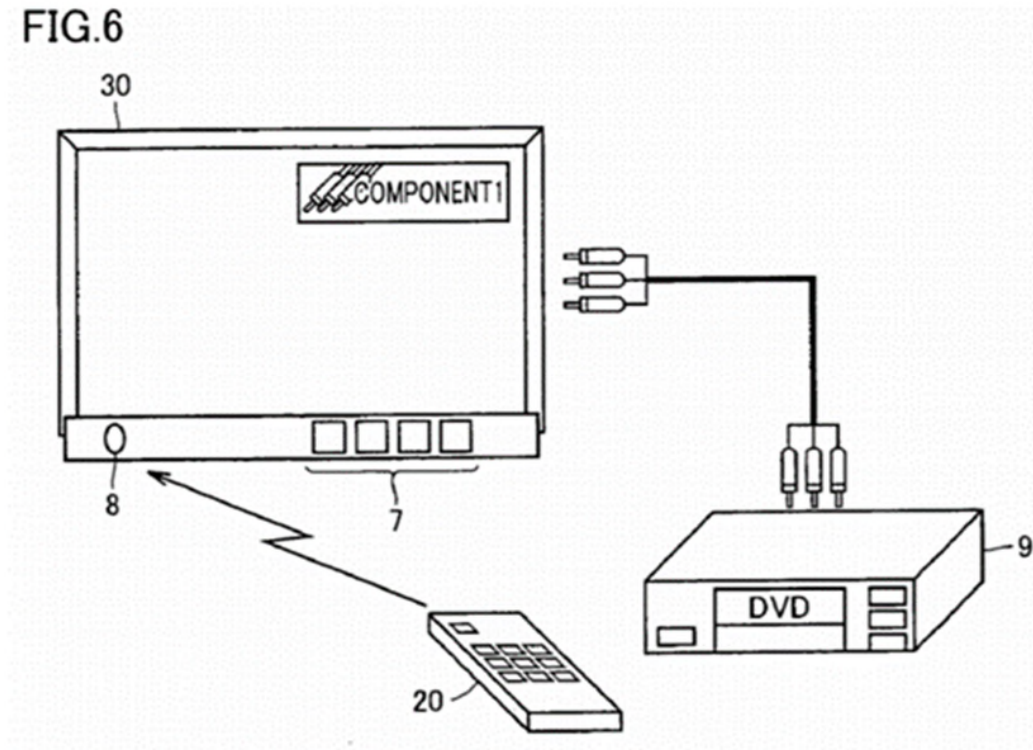


Ex. 1005 at FIG. 5B.

96. Cursor CR selects the icon of the input name as the desired input source.

Id. at ¶55.

97. Kinoshita emphasizes the benefits of presenting a terminal shape in the icon: “In FIG. 6, the icon displays not only the characters representing the input name as in the conventional example shown in FIG. 7 but also a picture indicating the terminal shape. Therefore, the user can recognize at one sight, which input terminal of which shape should be connected to the AV device that supplies the type of video signal indicated by the input name. Therefore, even a user who does not know the correspondence between the input terminal and the AV device to be connected can easily and reliably connect each input terminal to the AV terminal of the type that should be connected thereto.” *Id.* at ¶60.



Ex. 1005 at FIG. 6

98. Kinoshita further teaches that the display of icons may be different to indicate connection status of devices. *Id.* at ¶57. “For instance, the display color of icons may be made different, or the tone of display color may be made different. By such different manner of display, the user can recognize only the actually connected AV devices as the candidates of input switching...” *Id.*

C. Overview of Brown

99. The Brown reference (Ex. 1007, U.S. Patent Publication No. 2009/0201420), was filed on December 31, 2008 and published on August 13,

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2009. Counsel has informed me that Brown is prior art to the '311 patent under at least pre-AIA 35 U.S.C. §§ 102(a), (b), and (e).

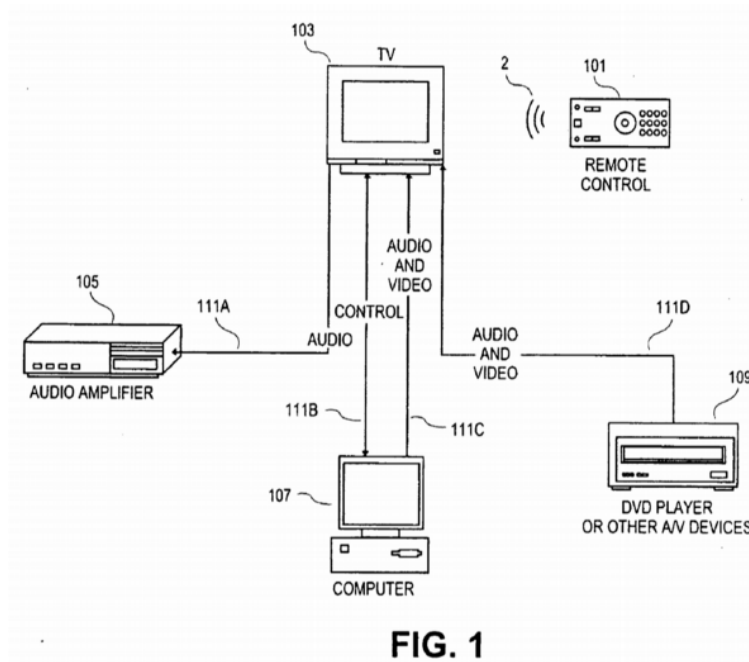
100. Brown, like the '311 patent, concerns a GUI for navigating content from a variety of sources. Specifically, Brown discloses “a television system that provides an on-screen display menu system that allows a user to select from available input source[s] using a graphical user interface.” Ex. 1007 at Abstract. Brown is directed to television systems that can display content from a variety of sources, including “a video cassette recorder (VCR) device, a digital versatile disk (DVD) device, a cable or satellite receiver or an audio amplifier. Connector types for receiving these input sources include composite connectors, S-Video connectors, component connectors, coaxial connectors, HDMI connectors and audio RCA connectors.” *Id.* at ¶3.

101. According to Brown, prior menus for such navigating these sources are less than optimal: Although a typical menu “displays a name for each of the input sources as they are selected or cycled through,” a problem arises because “[t]he names are fixed in relation to the connector,” so that “designations such as DVD may actually be for connectors attached to another device such as a cable box and not to a DVD device. As a result, input source selection is difficult to understand and utilize. Many users unintentionally change input sources and

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require assistance to change the input sources to the desired input source.” *Id.* at ¶4.

102. Brown’s solution is to provide a television system that can assist the user in selecting an input source by means of an improved menu, or “on screen display” (OSD). *See id.* at Abstract. A variety of different devices may be connected to the television system, as illustrated in Fig. 1 (below). Any number of devices or input sources may be attached to connections 111A-D. *Id.* at ¶28.



103. The functional components of Brown’s television system are illustrated in Fig. 8, below:

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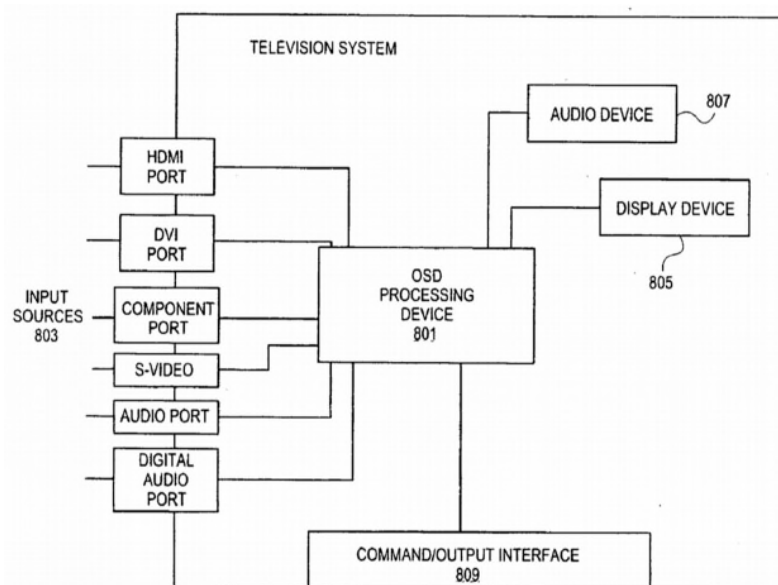


FIG. 8

104. The television system receives and displays input via a set of input ports 803 for this purpose. *Id.* at ¶85. Input is received by the processing device 801, which “generates and integrates the on screen display with the incoming signals to generate a set of output signals for the display device 805 and audio device 807.” *Id.* at ¶86. “The processing device 801 can be a general purpose processor executing embedded software or locally stored software,” and “can be [a] monolithic processing device or set of processing devices...” *Id.*

105. “The television system can utilize any number of input sources within the user interface (e.g., the OSD) to display the input sources to the user to assist in the decision making process of the user.” *Id.* at ¶30. Thus, incoming signals from

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the attached devices can be used to provide more accurate, and detailed, information to a user. *See e.g., Id. at ¶¶41, 30.*

106. Brown provides multiple options for displaying navigation options: “In one embodiment, the on screen display system displays the navigation options as simple icons that label each of the available input sources. ... The icons can also be graphical icons that represent the devices, input sources or content of the input sources, such as a DVD disc that represents a DVD player or an image from the movie on the DVD.” *Id. at ¶41.* The navigation options may also be displayed “as text labels or as text labels combined with icons.” *Id. at ¶43.* One particularly simple embodiment of an OSD menu layout is provided in Fig. 3, below:

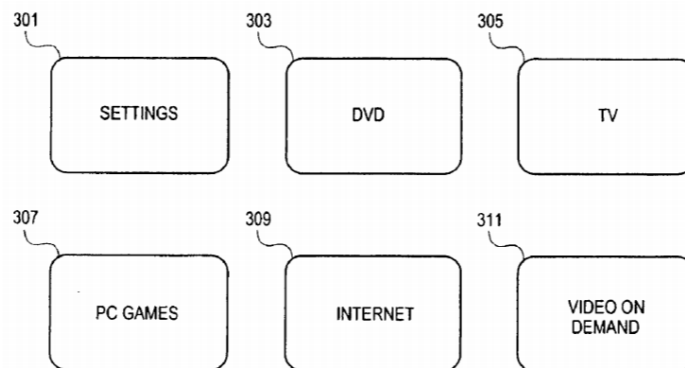


FIG. 3

107. In operation, a user interacts with the OSD by means of a remote control. *Id. at ¶52].* An exemplary process is shown in Fig. 5, below:

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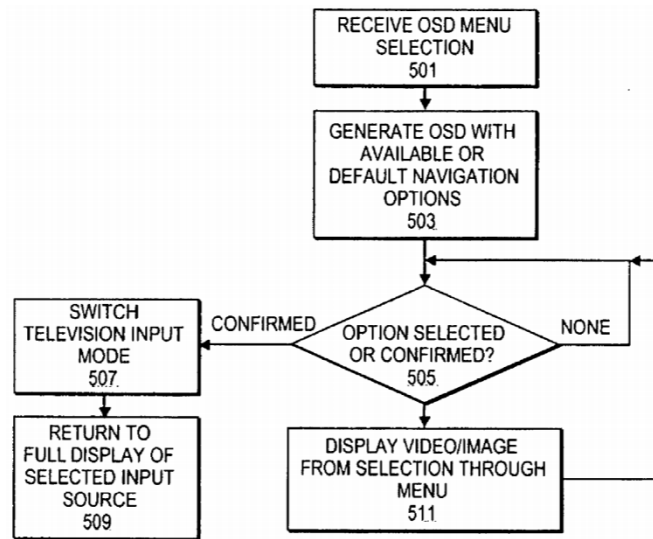


FIG. 5

108. A user provides input to the television system, which is received at block 501. *Id.* at ¶52. Then, “[t]he television responds by generating the on screen display menu (block 503).” *Id.* At block 505, a user may “initially select” an option, which Brown distinguishes from “confirming” a selection. *See id.* at Fig. 5, ¶¶54-56. At the point of an initial selection, “[t]he on screen display will continue to be displayed in response to inaction by the user.” *Id.* at ¶53. By contrast, “[i]f a user input is received that confirms a selection, then the on screen display system initiates an action to switch to the confirmed television input source (block 507).” *Id.* at ¶55 (emphasis added). “The confirmation of a selection can cause the on screen display menu to close (block 509). This allows the television system to switch to the selected

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input source and output it in a full screen mode (or at any selected settings) to the television monitor.” *Id.* at ¶56.

109. Brown teaches that “selection” of a navigation option causes the display of that option to change. Specifically, if the user navigates from one option on the OSD menu to another, “then the on screen display menu alters the indication of selection (*e.g.*, highlights the newly selected navigation options) and can alter the display of an associated input source to enlarge it, update it, start playback or similarly emphasize the input source or provide additional information about the input source (block 511).” (emphasis added). *Id.* at ¶54. For example, in an embodiment where “[a]n image or video may be displayed for each input source...[h]ighlighting or similarly indicating an input source can initiate the update of the video or image being displayed. The video or image can also be enlarged when selected.” *Id.* at ¶42. The desired input source may similarly be indicated by “a cursor, tab, pointer, highlight or similar selection mechanism.” *Id.* at ¶48.

110. As shown in Figure 6A below, Brown discloses embodiments in which the selection of an icon causes the display of a preview image from the external device. Ex. 1007, ¶¶57-59 & Fig. 6A.

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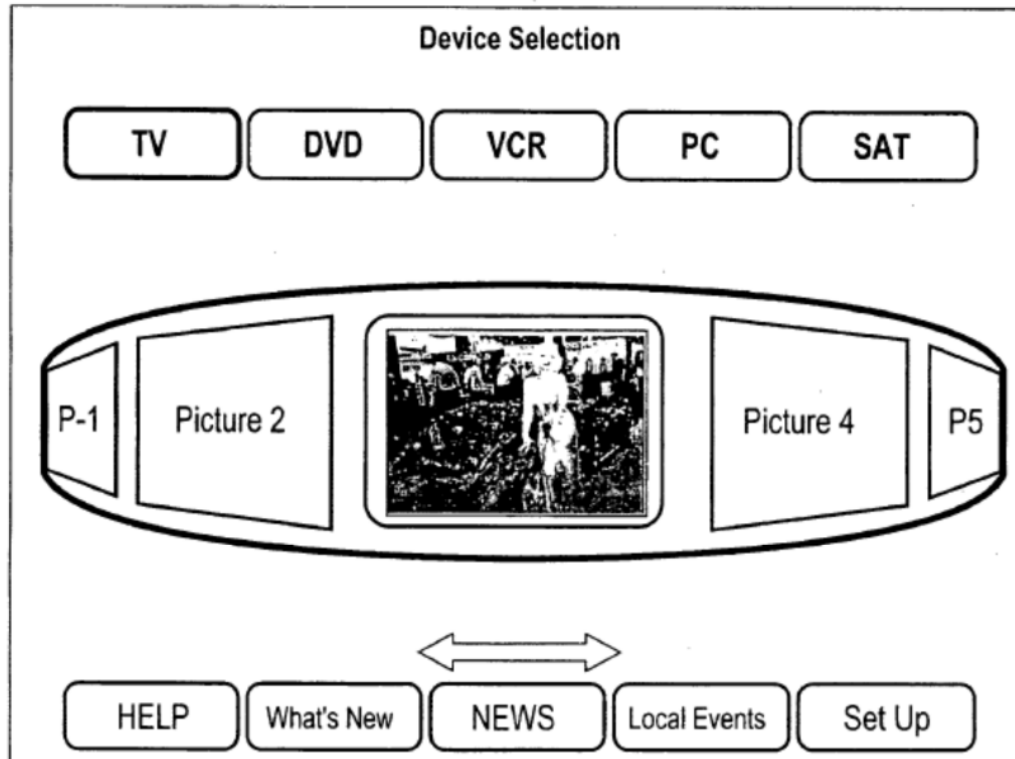


FIG. 6A

Ex. 1007, Fig. 6A

111. As Brown explains, “[a]s each icon is selected, the corresponding input source video and audio are displayed and output to allow a user to confirm that the desired content has been selected.” Ex. 1007, ¶59.

D. Overview of Young

112. The Young reference (Ex. 1006, U.S. Patent Publication No. 2006/0230360), was filed on December 29, 2005 and published on October 12, 2006. Counsel has informed me that Young is prior art to the ’311 patent under at least pre-AIA 35 U.S.C. §§ 102(a), (b), and (e).

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113. Young discloses a method of improving user convenience for selecting among a variety of signal sources by displaying in windows image contents and the status of the signal sources. Ex. 1006 at Abstract, ¶3. Young shows a TV with input terminals displayed in the windows to identify sources such as Analog TV, Digital TV, Component 1, Component 2, HDMI 1, HDMI 2, Composite, S-Video (Separate Video) 1, S-Video 2, and Computer. Id. at ¶¶6, 16.

114. FIG. 2 is an exemplary display.

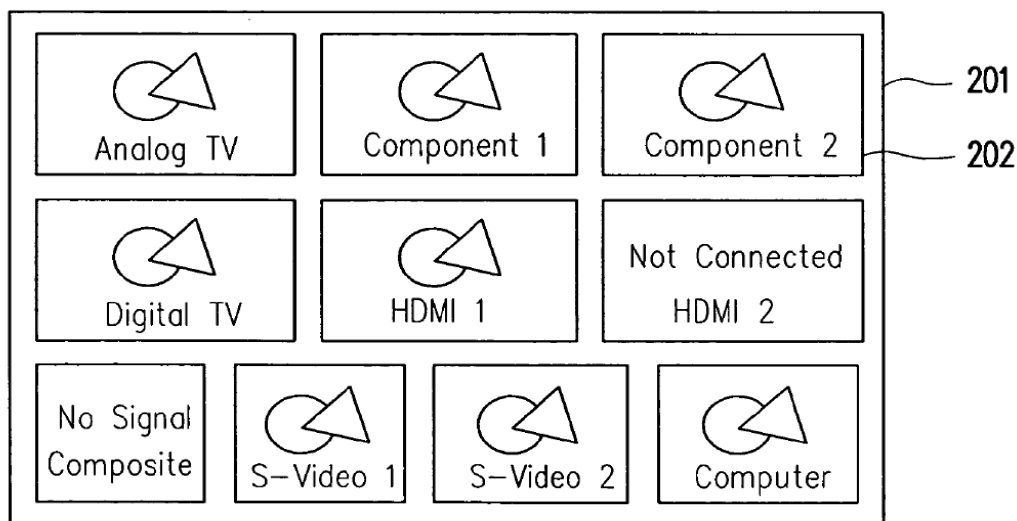


FIG. 2

Id. at FIG. 2

115. The menu for selecting signal sources is displayed as an on-screen display (OSD). Id. at ¶16. FIG. 2 shows the menu 201 having ten windows 202 for

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displaying image contents of the ten signal sources and names of the signal sources at the same time. *Id.* “The image contents of the signal sources can be either instant extracted static images, namely snapshots, or real-time motion images.” *Id.* Further, for an unconnected device, Young presents a blank image content (with the text “Not Connected”) labeled with the interface name, such as HDMI2. *Id.* at ¶17.

116. Young's process is illustrated in FIG. 3, below:

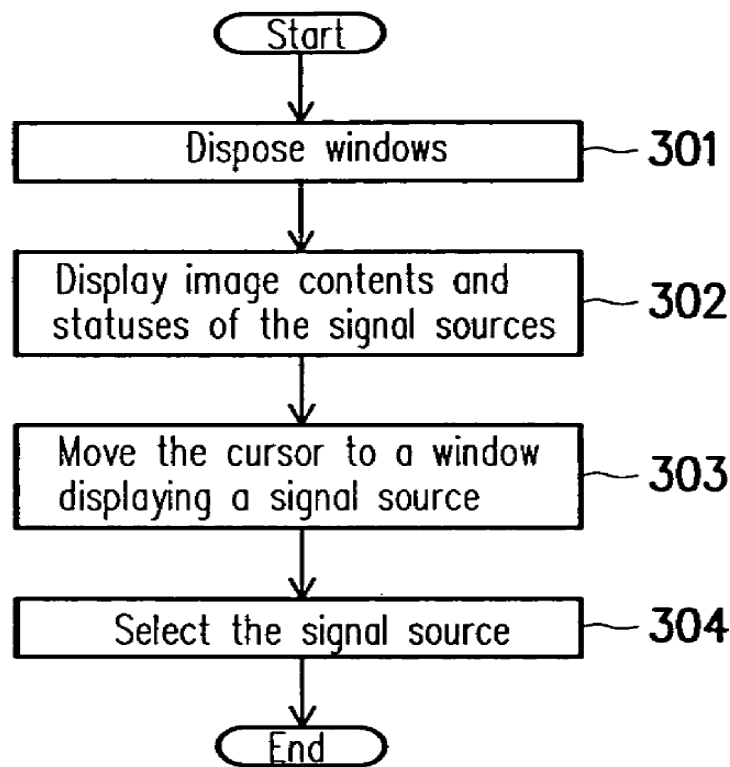


FIG. 3

Id. at FIG. 3

117. The TV displays a plurality of windows in a menu at block 301. *Id.* at ¶21. At block 302, the TV displays the image contents and the statuses of the signal sources via the windows. *Id.* “At a step 303, the cursor moves to one of the windows.

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Finally, at a step 304, the signal source corresponding to the window indicated by the cursor is selected.” *Id.*

VIII. GROUND 1: CLAIMS 1-21 OF THE '311 PATENT ARE UNPATENTABLE UNDER 35 U.S.C. §103 OVER THE COMBINATION OF NOBORI, KINOSHITA, AND BROWN

118. For at least the reasons below, claims 1-21 of the '311 patent are invalid as obvious over Nobori in view of Kinoshita and, for some claims, further in view of Brown.

B. Independent Claim 1

a) *I[p] “An image display device comprising:”*

119. To the extent the preamble is limiting, it is disclosed in Nobori. Nobori discloses a video projector to display image information inputted to the projector on a screen 100. Ex. 1004 at ¶¶5, 43. The projector also includes an LCD display 123 for displaying image information. *Id.* at Abstract, ¶25 and FIG. 1.

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b) *1.1 “a display;”*

120. Nobori discloses LCD display 123 in FIG. 1. Ex. 1004 at ¶28.

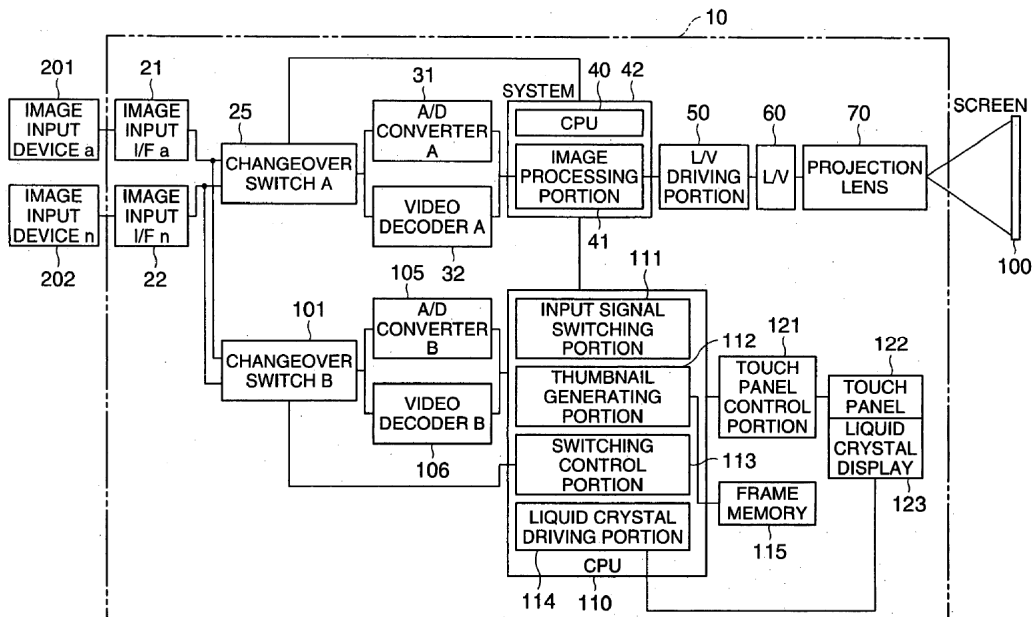


FIG. 1

Ex. 1004 at FIG. 1

c) *1.2 “a first external interface configured to receive a first image signal input from a first external device connected to the image display device;”*

121. Nobori discloses this limitation. In Nobori's FIG. 1 above, the projector 10 includes an image input I/F 21 used as image input I/F into which image input signal from image input device 201, such as a personal computer, is inputted. Ex. 1004 at ¶¶25, 31.

122. Nobori teaches that the image input interface terminals (also referred to as image input I/Fs) include S-Video terminal, a 3RCA terminal, a D-Sub

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terminal, an HDMI (High-Definition Multimedia Interface) terminal. *Id.* at ¶6.

Video image input devices include “a personal computer and a video player” that can be selected for display. *Id.* at ¶25. The ’311 patent describes exemplary external interface units as delivering “image, sound or data signal inputted from a connected external” and include examples such as USB terminals, Composite Video Baseband Signal (CVBS) terminal, a component terminal, an S-video terminal, HDMI terminal, D-SUB terminal. Ex. 1001, 8:3-26. Therefore, any of Nobori's image input I/Fs, such as the S-Video, 3RCA, D-Sub, and HDMI terminals, constitutes a first external interface configured to receive an image signal from a first external device connected to the image display device.

- d) *1.3 “a second external interface configured to receive a second image signal input from a second external device connected to the image display device; and”*

123. Nobori discloses multiple image input I/Fs for connecting multiple external devices. Any image input I/Fs other than the one selected as the first external interface constitutes a second external interface that satisfies this limitation for the same reasons addressed above for limitation 1.2. Ex. 1004, ¶¶5, 6, 25, 31.

124. As shown in Nobori's FIG. 1, projector 10 includes an image input I/F 22 used as image input I/F into which image input signal from image input device 202, such as a video player, is inputted. Ex. 1004 at ¶¶25, 31. Nobori teaches that

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the “switching control portion 113, the thumbnail generating portion 112, the input signal switching portion 111, and the liquid crystal driving portion 114 are all stored in the CPU 110.” *Id.* at ¶29.

- e) *1.4 “a controller coupled with the display, the first external interface and the second external interface, the controller configured to:”*

125. Nobori discloses a controller coupled to the display and to the two external interfaces. In FIG. 1, above, a system CPU 40 controls the overall system of the projector 10 and a CPU 110 is connected to each of image input I/Fs 21, 22 by the changeover switch B101 and to liquid crystal display device 123. Ex. 1004 at ¶¶26, 28-29, 35. Further, “[o]perations until image input signals inputted from the image input devices 201 and 202 are projected onto the screen 100 are omitted from the drawing; however, these operations are controlled by a program installed inside.” *Id.* at ¶26. Thus, system CPU 40 and/or CPU 110 is “a controller coupled with the display, the first external interface and the second external interface.”

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- f) *1.5 “display a plurality of external device icons, on the display, wherein the plurality of external device icons include a first external device icon and a second external device icon, wherein a first default image corresponding to the first external interface is displayed on the first external device icon and a second default image corresponding to the second external interface is displayed on the second external device icon, and”*

126. Nobori discloses “displaying a plurality of external device icons, on the display, wherein the plurality of external device icons, [which Patent Owner has previously construed as including the display of only text (see, Section IV.D.1, *supra*)] include a first external device icon and a second external device icon.”

Nobori teaches that the projector displays on the image input I/F display screen 300B “Video”, “S-Video”, “3RCA”, “D-Sub”, and “HDMI” representing the image input I/Fs. Ex. 1004 at ¶¶45, 48. Thus, Nobori teaches displaying a plurality of icons that correspond to external devices. Because multiple external devices may be connected concurrently to the projector 10, Nobori teaches displaying a plurality of external device icons, which includes a first external device icon and a second external device icon. Ex. 1004 at ¶31, FIGs. 1 & 2.

127. In FIG. 2, Nobori discloses an embodiment that displays icons (e.g., “Video”, “S-Video”, “3RCA”, “D-Sub”, and “HDMI”) on the image input I/F display screen 300B. *See* Ex. 1004 at ¶¶45, 48.

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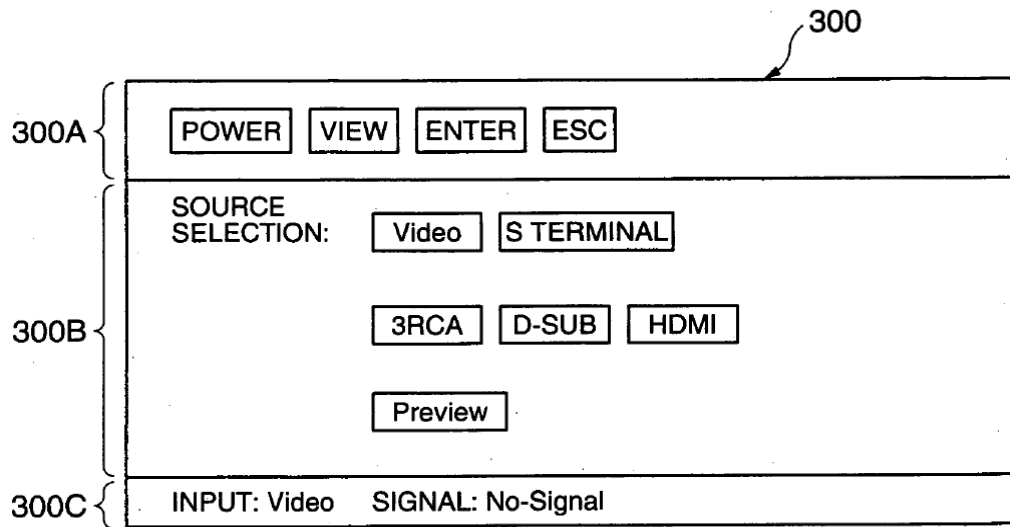


FIG. 2

Ex. 1004 at FIG. 2.

128. Kinoshita discloses digital television terminal-shaped icons (Ex. 1005 at ¶¶ 41, 32) meeting the limitation “wherein a first default image corresponding to the first external interface is displayed on the first external device icon and a second default image corresponding to the second external interface is displayed on the second external device icon.”

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FIG.2

51 INPUT TERMINAL	52 INPUT NAME	53 SHAPE OF TERMINAL	54 DISPLAY POSITION
I1	'COMPONENT'		(X1,Y1)
I2	'DVI'		(X2,Y2)
I3	'VIDEO1'		(X3,Y3)
I4	'VIDEO2'		(X4,Y4)
⋮	⋮	⋮	⋮

Ex. 1005 at Fig. 2.

129. Nobori discloses “displaying a plurality of external device icons, on the display, wherein the plurality of external device icons, [which Patent Owner has previously construed as including the display of only text (see, Section IV.D.1, *supra*)] include a first external device icon and a second external device icon.”

Nobori teaches that the projector displays on the image input interface (I/F) display screen 300B “Video”, “S-Video”, “3RCA”, “D-Sub”, and “HDMI” representing the image input I/Fs. Ex. 1004 at ¶¶45, 48. Thus, Nobori teaches displaying a plurality of icons that correspond to external devices. Because multiple external devices may be connected concurrently to the projector 10, Nobori teaches displaying a plurality of external device icons, which includes a first external device icon and a second external device icon. Ex. 1004 at ¶31, FIGs. 1 & 2.

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130. Like Nobori, Kinoshita is directed to assisting a user of a display to select among a plurality of video inputs to a display device.

On a display unit, icons representing types of video signals supplied to respective ones of a plurality of input terminals are displayed. When a user operates a remote and selects an icon representing the type of desired video signal, a video image derived from the video signal of the desired type supplied to the input terminal that corresponds to the selected icon is displayed on the display unit. In such a situation, arrangement of icons on the display unit can be changed by a user instruction given by an operation of the remote. Further, the icons also show shapes of the input terminals, and therefore, the user can easily confirm to which input terminal of which shape the device supplying the video signal of the type indicated by the icon is to be connected. Ex. 1005, Abstract.

131. Kinoshita also discloses displaying icons to differentiate among the types of external devices that can be connected to the display device, and goes one step further in using images of the shapes of the terminals as icons. Ex. 1005 at ¶¶41, 60. Nobori teaches that icons may be used to represent image input I/Fs to which the image input devices are connected. Ex. 1004 at ¶41.

132. A POSITA would have been motivated to modify Nobori in view of Kinoshita. As discussed above, Kinoshita, like Nobori, provides an improved interface for selecting content from multiple video sources with the aim of

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improving user convenience. A POSITA would have recognized that Kinoshita's teachings could further improve user convenience. Nobori and Kinoshita both provide improved interfaces, Kinoshita is especially concerned with difficulties that arise when multiple external devices are connected via different terminals. *Id.* Kinoshita further recognizes that "for a user not very familiar with terminal names, it is difficult, by the display of input name only, to find which terminal should be used for connection with another AV device." Ex. 1005 at ¶4. Kinoshita addresses this problem by providing images that "show shapes of the input terminals" on the icons provided to a user for input selection.

133. Since Nobori's projector receives inputs from multiple external devices, the problem recognized in Kinoshita would also affect users of Nobori's projector. It would have been obvious to try the combination of the terminal images of Kinoshita with Nobori's image input I/Fs icons to provide image input I/Fs icons that display images corresponding to the terminal in a manner similar to Kinoshita's terminal icons 9A, 10A, 11A and 12A. *Id.* This simple substitution of icons in the form of images of terminals as disclosed by Kinoshita for the icons of Nobori would provide a user of Nobori's projector the additional convenience of identifying more easily the appropriate input terminal for use with a particular external device. *Id.*

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134. A POSITA would have had a reasonable expectation of success in making this combination because it would amount to no more than the combination of known elements to yield predictable results. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 415-16 (2007). Nobori discloses using icons to represent image input I/Fs for connected image input devices. A POSITA would have been readily able to modify these icons to show images of terminal shapes using known techniques, and expect success.

- g) *1.6 “change the first default image to a first image based on the first image signal in response to the first external device icon being selected if the first external device is connected to the image display device, and”*

135. Nobori discloses this limitation. As shown in FIG. 3 below, Nobori discloses an embodiment that displays the thumbnail image in the region within the image input I/F display screen 300B in which the icons (e.g., “Video”, “S-Video”, “3RCA”, “D-Sub”, and “HDMI”) are displayed in response to the first external device icon being selected. Ex. 1004 at ¶¶49-53 & FIG. 3. Nobori discloses using a touch panel display through which a user can select an icon for an image input I/f. More specifically:

According to this invention, image information inputted from the image input I/F can be displayed on the display portion, and the user is able to see the image information by looking through the touch panel. Hence, the user is able to select an image input I/F easily and

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promptly for the desired image to be projected by merely touching a specific position on the touch panel with his finger (hereinafter, this operation is referred to as the touch-key operation).

Ex. 1004 at ¶[0011].

The act of a user touching an icon on a touch screen is “selection/selected”

as proposed in Petitioners’ claim construction in Section VI, *supra*.

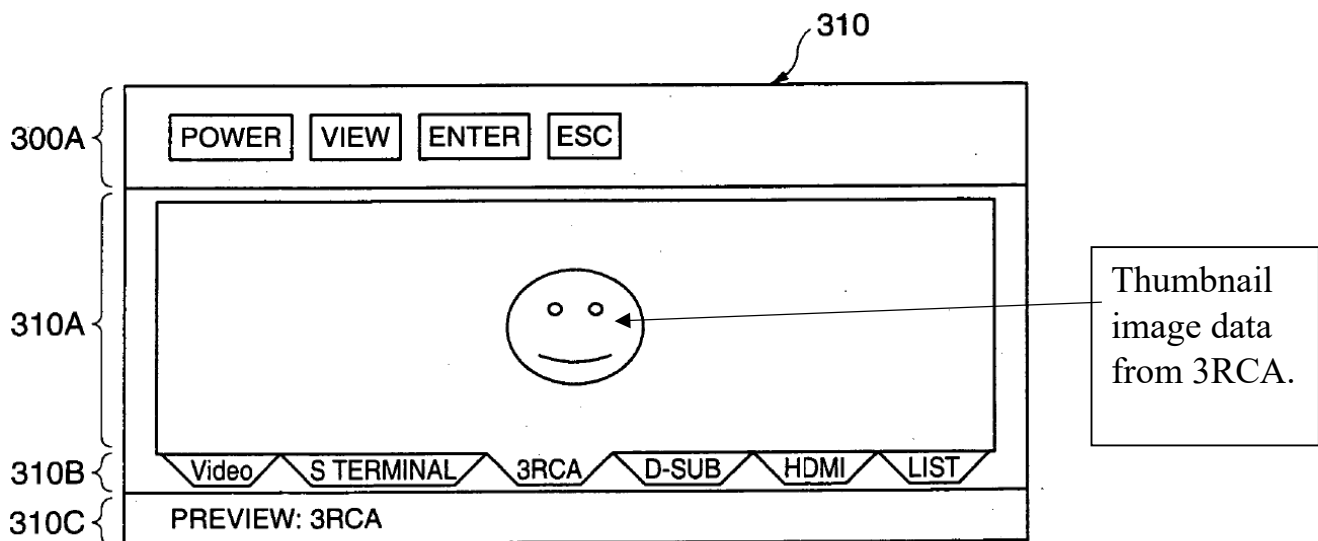


FIG. 3

Ex. 1004 at FIG. 3 (annotated).

136. Nobori teaches that when an icon is selected, a preview of the content from the associated input source is displayed on the screen. Ex. 1004 at ¶49.

Nobori explains that “when one desired image input I/F (here, 3RCA terminal) is selected from the plural image input I/Fs, ... image information 310A of the selected image input I/F (3RCA) is displayed in the [form] of a thumbnail in the

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region within the image input I/F display screen 300B.” Ex. 1004 at ¶¶49, 52. As shown in FIG. 3 the selected icon “3RCA” is changed to be displayed in a manner different from the unselected icons. By displaying "3RCA" in the form of a tab hollow on the inverse background, it is possible to judge which of the image input I/Fs in the tab display column is currently selected. As discussed previously, by combining Nobori with Kinoshita, the “Video,” “S Terminal,” “D-Sub,” and “HDMI” icons would each be a square shaped external device icon with a default image of the source displayed thereon instead of the inverted trapezoid tab shown in figure 3.

137. In FIG. 3 the preview image is displayed in the form of a thumbnail in the region within the image input I/F display screen 300B. *Id.* at ¶49, FIG. 3. In this figure, the thumbnail image is a “first image based on the first image signal in response to the first external device icon being selected.” Nobori states that “[t]humbnail image can be generated in the thumbnail generating portion 112 on the basis of an image signal inputted from the selected image input I/F, and changed into an adequate image size to be written into the frame memory 115.” Ex. 1004 at ¶66. The thumbnail image [in FIG. 3] is displayed in the region within the image input I/F display screen 300B, when the image input I/F [3RCA in FIG. 3] is selected. *Id.* That is, the thumbnail image is input from an external device

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and displayed when the user selects an image input I/F from the array of image input I/F icons, such as the “Video”, “S-Video”, “3RCA”, “D-Sub”, and “HDMI”, etc.

138. The preview image is only displayed if the external device is connected to the projector because otherwise no signal is available to display. “For an image input I/F to which the image input device is not connected or an image input I/F into which an image input signal is not inputted, ‘No-Signal’ is displayed.” Ex. 1004 at ¶56.

- h) *1.7 “change the first image to the first default image in response to the second external device icon being selected,”*

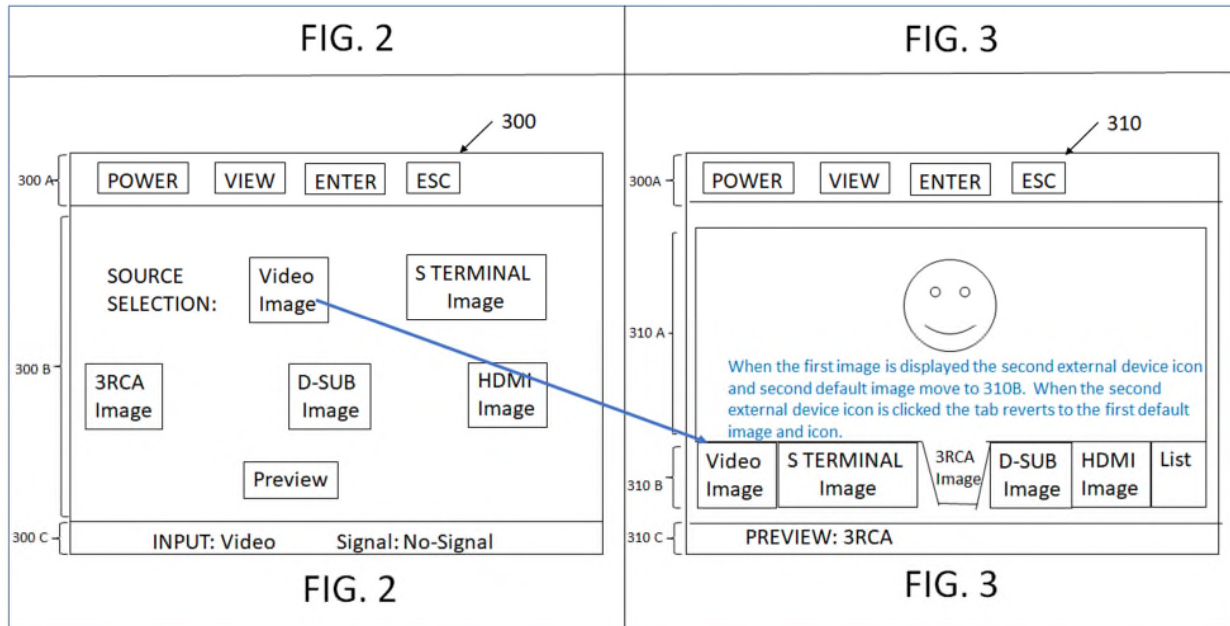
139. Nobori discloses this limitation. As shown in FIG. 3 above, Nobori explains that “[b]y displaying ‘3RCA’ in the form of a tab hollow on the inverse background [a modified icon], it is possible to judge which of the image input I/Fs in the tab display column is currently selected.” Ex. 1004 at ¶52.

140. Nobori teaches that “[w]hen an image input I/F other than ‘3RCA’ ... is selected, a desired image input I/F is selected by selecting a tab for the desired image to be displayed.” *Id.* at ¶54. Thus, Nobori teaches changing the first image to the first default image in response to the second image input I/F icon being selected. Because the icon currently selected (e.g., in the form of a tab hollow on

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an inverse background) and unselected icons (e.g., in the form of a closed tab) are displayed differently, Nobori teaches displaying the first default image (i.e., the image input I/F icon) when the second image input I/F icon is selected. Ex. 1004 at ¶¶52, 54, FIG. 3. Specifically, the combination of Noburi and Kinoshita teaches, changing the first image in the tab hollow back to the first default image with the 3RCA picture in the external device icon. This first default image is now located at the bottom of 310B portion of Figure 3. However, the Asserted Claims contain no limitations regarding where the first external device icon and first default image are located after the first image is displayed. Therefore, it is entirely appropriate that the first external device icon is displayed in the bottom of 310B instead of the middle of the screen. Compare original Figs. 2 and 3 with Figs. 2 and 3 as modified by Kinoshita with an image of the devices below.

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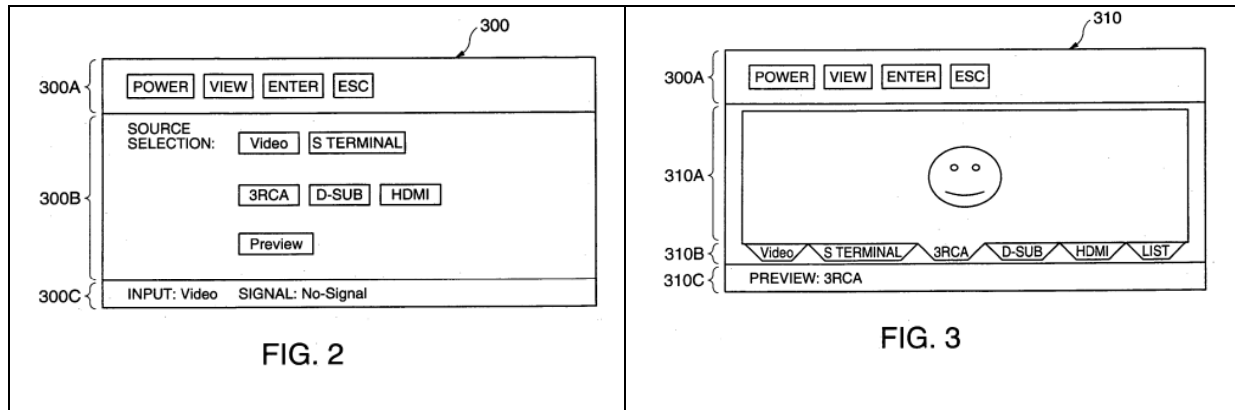
Ex. 1004 modified in accordance with the teachings of Ex. 1005.

- i) 1.8 “wherein the first image is displayed at a position corresponding to an area where the first external device icon is displayed.”

141. Nobori discloses this limitation. Referring again to FIGs. 2 and 3 juxtaposed below, Nobori describes that on the image input I/F display screen 300B shown in the middle of the display screen 300 are displayed: “Video”, “S-Video”, “3RCA”, “D-Sub”, and “HDMI” representing the image input I/Fs to which the image input devices are connected. Ex. 1004 at ¶¶45, 48.

FIG. 2	FIG. 3
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Ex. 1004 at Figs 2 and 3.

142. Further, Nobori teaches that “image information 310A of the selected image input I/F (3RCA) is displayed in the [form] of a thumbnail in the region within the image input I/F display screen 300B.” *Id.* at ¶49, FIG. 3. Thus, Nobori teaches displaying the first image (i.e., the thumbnail image) at a position corresponding to an area where the first external device icon (i.e., the image input I/F icon) is displayed. Because the thumbnail image is displayed in the region within the image input I/F display screen 300B in which the image input I/F icon is displayed, Nobori teaches displaying the first image at a position corresponding to an area where the first external device icon is displayed. Ex. 1004 at ¶¶48-49.

C. Claim 2:

- a) 2. “The image display device according to claim 1, wherein the first image displayed on the display is simultaneously displayed with the plurality of external

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device icons while the first external device icon is selected.”

143. Nobori discloses this limitation. In particular, Nobori discloses that the image input I/F icon can be highlighted (i.e., displayed differently than how the other icons are displayed) as the user changes the selection from one image input I/F icon to another. Ex. 1004 at ¶¶52, 54. Nobori also discloses that this can be accomplished in the form of a tab hollow on the inverse background of, for example, the 3RCA icon in FIG. 3. *Id.*

D. Claim 3:

- a) 3. *"The image display device according to claim 1, wherein the controller is further configured to: highlight the first external device icon in response to the first external device icon being selected, and highlight the second external device icon in response to the second external device icon being selected."*

144. Nobori discloses this limitation in connection with Nobori's FIG. 3 discussed above with respect to limitation 1.6. In particular, the thumbnail image is displayed simultaneously with the display of the icons for the other image input I/Fs (Video, S-Video, D-Sub, HDMI). Ex1004 at ¶¶49, 52, FIG. 3.

E. Claim 4:

- a) 4. *"The image display device according to claim 1, wherein the first and second external device icons are*

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*selectable via a cursor positioned on the first and second
external device icons, respectively.”*

145. Kinoshita discloses this limitation. For example, Kinoshita teaches that the user positions the cursor CR to the icon and selects this icon by pressing a determination key on a remote control. Ex. 1005 at ¶55, FIG. 5B. I understand that Petitioner has proposed that the term select according to it’s plain and ordinary meaning that includes selection by placing a cursor on or highlighting an icon. However, I also understand that this can include a one or two step process such as just placing a cursor over the icon or selection by touching the icon or using a cursor and then pressing OK. Therefore, Kinoshita reads on the claim because the cursor is placed over the icon for selection and pressing a determination key is analagous to touching a touchscreen or pressing OK. While the term “select” has been construed as placing a cursor over an icon and Kinoshita requires an additional step of pressing a determination key, Kinoshita reads on the claim because the cursor is placed over the icon for selection and a POSITA would consider the step of pressing a determination key to be a mere workshop variation that is obvious to try, with a high likelihood of success. Thus, the combination of Nobori modified in view of Kinoshita discloses that the first and second external device icons are selectable via a cursor positioned on the first and second external device icons, respectively. *Id.*

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F. Claim 5:

- a) 5. *“The image display device according to claim 4, wherein the cursor is controlled by a remote controller interfacing with the image display device.”*

146. The combination of Nobori with Kinoshita discloses this limitation. For example, Kinoshita teaches that the user positions the cursor CR to the icon, such as the representation of the terminal, of the desired input source, and selects this icon using a remote control. Ex. 1005 at ¶55, FIG. 5B. Thus, modification of Nobori in view of Kinoshita discloses that the cursor is controlled by a remote controller interfacing with the image display device. *Id.*

G. Claim 6: : “The image display device according to claim 1, wherein the controller is further configured to display a symbol representing that the first external device or the second external device is being connected to the display device on the first external device icon or the second external device icon.”

147. Nobori modified in view of Kinoshita renders this limitation obvious. Nobori discloses making it more convenient for a user to understand “into which image input I/F an image signal is inputted ... by displaying ... ‘No-Signal’ for the image input I/F that is not connected, or into which no image signal is inputted.” Ex. 1004 at ¶17.

148. FIG. 2 shows a state where the video terminal is currently selected, and “No-Signal” is displayed for the video signal, indicating that no video signal is being inputted. *Id.* at ¶45. “For an image input I/F to which the image input device

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is not connected or an image input I/F into which an image input signal is not inputted, 'No-Signal' is displayed.” Id. at ¶56 & FIG. 4. By doing this, input I/Fs connected to external devices are inherently identified because a user would have understood that an icon displayed without the designation “No-Signal” would be connected because the presence of a signal had been detected from input I/F.

149. Moreover, Kinoshita explicitly discloses identifying devices that are connected to the display device so that the user can easily understand which devices are available for selection to provide video content. Kinoshita discloses:

Here, it is assumed that input terminals I1 to I4 are all connected to AV devices. If there is any input terminal that is not connected to the AV device, icon display unit 42 may display the icon of the input terminal not connected to any AV device in a manner different from the icon of the input terminal connected to the AV device. For instance, the display color of icons may be made different, or the tone of display color may be made different. By such different manner of display, the user can recognize only the actually connected AV devices as the candidates of input switching, and therefore, operation of input switching is facilitated.

Ex. 1005 at ¶57.

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150. Adopting Kinoshita’s teachings and a conventional use of the colors green and red to mean the opposite, e.g., a stoplight using green for go and red for stop, and assuming, for example, that the first external device is connected to the display device and the second external device is not connected to the display device, the icon representing the first (connected) external device is colored green and the icon representing the second (disconnected) external device is colored red. This provides a user with symbols (differently colored icons) “indicating the first external device or the second external device is being connected to the display device.” By such different manner of display, the user can recognize only the actually connected AV devices as the candidates of input switching, and therefore, operation of input switching is facilitated.” Ex. 1005 at ¶57.

151. Alternatively, Kinoshita also discloses that the icons of input terminals not connected to any AV device are displayed in a manner different from icons of input terminal connected to the AV device. The display color may be made different so the user can recognize only the actually connected AV devices so operation of input switching is facilitated. *Id.*

152. Thus, this claim is obvious in view of Nobori modified in accordance with Kinoshita to change the color of an icon associated with a specific external device to indicate that the external device is connected or disconnected.

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H. Claim 7:

- (1) 7. *“The image display device according to claim 1, wherein the controller is further configured to change the second default image to a second image based on the second image signal in response to the second external device icon being selected if the second external device is connected to the image display device.”*

153. Nobori discloses this limitation for the reasons discussed above with respect to limitations 1.6 and 1.7. In particular, Nobori teaches that when the user selects an image input I/F icon other than 3RCA, the input to the display changes to a thumbnail of the input from the second external device and the icon corresponding to the second I/F changes to the tab hollow format. Ex. 1004 at ¶54.

I. Claim 8: "The image display device according to claim 1, wherein the controller is further configured to: transmit a control command for controlling the first external device to the first external device, and display an execution result of the control command on the display."

154. Nobori as modified in view of Kinoshita and further modified in view of Brown discloses this limitation.

155. Brown discloses that the system can transmit commands to control an attached PC, and display the results of those commands on the display. More specifically, “[i]n an example where personal computer control is initiated, the television is set to the personal computer input and the user watches personal computer-based content. The user presses a personal computer related button, such

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as channel up. The television system sends the command to the personal computer. The personal computer responds to the remote control command.” Ex. 1007 at ¶80; see also ¶¶68-70, 74-75, 79. The effect of using the remote to change the input channel for the personal computer content necessarily results in the content being displayed on the display operating in PC mode changing such that “an execution result of the control command on [is displayed on] the display.”

156. Brown discloses that "if a command is received from a remote control that is related to control or interaction with a personal computer, then a command is sent to the attached personal computer (block 707)." Ex. 1007 at ¶68. Brown also explains that in certain circumstances "the transition screen can inform the user of the status of the personal computer and let them know it is loading." *Id.*, 69. Brown also discloses that after the TV system is in the personal computer content display mode, "If a television mode or input source switch is requested then the transition back to a non-personal computer display mode is initiated. This also includes sending a command to the personal computer to instruct it to transition to a standby mode, shut down or similarly react to the command (block 719)." *Id.* at ¶70. After this command is sent to the PC, Brown explains that the TV can display "a status screen." *Id.* This status screen would presumably display the results of the command that was sent to the TV, or it would have been obvious

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to have the status screen display that information in order to inform the user of the results of the command.

157. Brown also discloses that "The personal computer can receive signals from the user through the remote control directly or through the television system." Ex. 1007 at ¶74. Brown also states that "If at any point during operation in the connected state, communication between the television system and the personal computer is lost, then the software can generate an error message display or similar feedback and return to the non-connected stage (block 753)." *Id.* at 75.

Accordingly, Brown teaches that an error message can be displayed if communication is lost during operation. This would include a loss of communication during operation, such as during execution of a command. As such, this is an example of Brown displaying an execution result when a command fails due to a loss of communication.

158. Brown also discloses that when the user selects personal computer based content, "[t]he television sends a request for the selected content from the personal computer and switches to the personal computer input. If the personal computer is not connected, the television system will display a 'PC not connected' message, and will not change inputs." Ex. 1007 at ¶79. This disclosure satisfies

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the claim's requirement to transmit a command to an external device and to display the result of the command.

159. Moreover, POSITA would have been motivated to modify Nobori in view of Kinoshita and Brown to achieve the result of claim 8. Kinoshita uses a remote to select the video content to be displayed on a display device.

When a user operates a remote and selects an icon representing the type of desired video signal, a video image derived from the video signal of the desired type supplied to the input terminal that corresponds to the selected icon is displayed on the display unit. In such a situation, arrangement of icons on the display unit can be changed by a user instruction given by an operation of the remote.

Ex. 1005 at Abstract.

Brown also teaches using a remote to select the video input to be displayed on a display, e.g., a television.

A television system that provides an on screen display menu system that allows a user to select from available input source using a graphical user interface. The television system also automatically adapts to the type on input signal selected for display. The television system and on screen display menu also support interaction between the television system and attached devices to unify the control of such devices including attached personal computers through the remote control of the television system.

Ex. 1007 at Abstract.

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160. A POSITA would have been motivated to modify Nobori in view of Kinoshita and Brown. The references are all directed to technology for making it easier for a user of a display to select the video content to be displayed on the display by selecting icons shown on the display device. Kinoshita teaches using a remote control to select the icons and the video input for display. Brown teaches an icon-based system by which a remote control has the functionality to control the video output of a PC providing video content to a television and to control the operation of the television itself, including selection of video input. A POSITA would have been motivated to adopt the remote control disclosed by Brown to control both the content of the video output of a PC to a television (display) and the television itself to eliminate the necessity and inconvenience of requiring two remote controls.

161. A common problem with remote-controlled televisions can be finding the remote when a user wants to control the television. A POSITA would have found it highly desirable to provide the capability to control both the television and a PC video input to the television by using a single, common remote controller instead of requiring separate remotes. Incorporating the functionality in a single remote to control both the video output of a PC and the video input of a television would only require adopting known technology in a conventional way to obtain predictable and desired result, i.e., a single remote to operate both devices. This would have been

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well within the ordinary skill of a POSITA to promote convenience for the user of the display (television) to select and control its video inputs. Thus, the benefits of combining Nobori modified in view of Kinoshita and further in view of Brown would have been readily apparent to a POSITA and a POSITA would have had a reasonable expectation of success for such combination.

J. Claim 9: “The image display device according to claim 1, wherein the first default image is an image identifying the first external interface and the second default image is an image identifying the second external interface.”

162. Nobori in combination with Kinoshita discloses this limitation.

Specifically, the combination of Nobori with Kinoshita results in icons that include images of the terminal shapes of the inputs to the video device. Kinoshita teaches that displaying icons including images of terminal shapes allows a user to "easily confirm to which input terminal of which shape the device supplying the video signal of the type indicated by the icon is to be connected." Ex. 1005 at Abstract.

Thus, the images of terminal shapes identify their respective interfaces.

Accordingly, the first and second default images identify the first and second external interfaces, respectively.

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K. Claim 10: “The image display device according to claim 1, wherein the changed first image is an image which is currently displayed on the first external device.”

163. Brown discloses this limitation. Specifically, Brown discloses displaying a preview image from a PC on the television screen. Ex. 1007 at ¶64, FIG. 6E. Brown’s FIG. 1 shows a desktop PC 107 with its own video display separate from the television system 103. Brown further discloses that when personal computer input is selected the user may watch video content on the television system 103 which is from the personal computer. *Id.* at ¶80. The changed first image is displayed on both the PC and the television at the same time. *Id.* at ¶82 (“In an example of exiting a personal computer mode, the ... user presses the ‘OSD’ button on the remote control...The television system switches to the DVD player input source. The personal computer...stops playing the current content.”) Accordingly, a POSITA would have understood that Nobori modified in view of Kinoshita and further modified in view of Brown would provide the ability to select as the first image, computer-based video input from a personal computer a preview image from a PC on the television screen. This meets the additional limitation of claim 10. *Id.*

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L. Claim 11:

- a) 11. “The image display device according to claim 1, wherein the controller is further configured to display the first default image although first external device icon is selected if the first external device is not connected to the image display device.”

164. Nobori discloses this limitation. Specifically, Nobori teaches continuing to display an image containing the interface name even when there is no external device connected. Ex. 1004 at ¶56, FIG. 4.

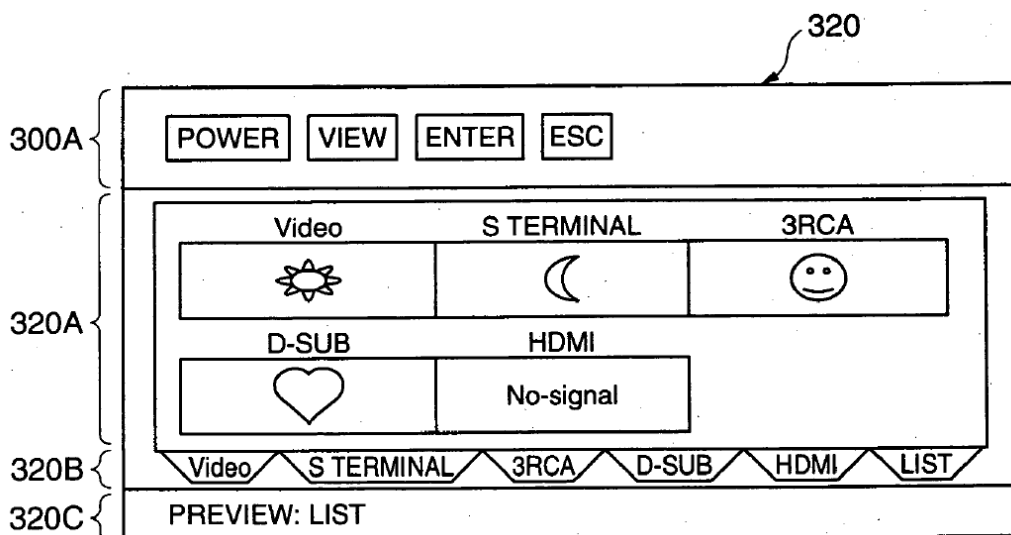


FIG. 4

Ex. 1004 at FIG. 4

165. Nobori also teaches that “[f]or an image input I/F to which the image input device is not connected or an image input I/F into which an image input signal is not inputted, ‘No-Signal’ is displayed. FIG. 4 shows a state where no

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image input signal is inputted into the “HDMI” terminal.” *Id.* at ¶56. Thus, Nobori teaches displaying the first default image although the first external device icon is selected if the first external device is not connected to the image display device.

M. Independent claim 12

- a) *12[p] “A method of an image display device, the method comprising:”*

166. This limitation is a method version of apparatus limitation 1.P. As such, this claim limitation is disclosed by Nobori for the same reasons discussed above for limitation 1.P.

- b) *12.1 “receiving, by a first external interface, a first image signal input from a first external device connected to the image display device;”*

167. This limitation is a method version of apparatus limitation 1.2. As such, this claim limitation is disclosed by Nobori for the same reasons discussed above for limitation 1.2.

- c) *12.2 “receiving, by a second external interface, a second image signal input from a second external device connected to the image display device;”*

168. This limitation is a method version of apparatus limitation 1.3. As such, this claim limitation is disclosed by Nobori for the same reasons discussed above for limitation 1.3.

- d) *12.3 “displaying a plurality of external device icons, on a display, wherein the plurality of external device icons*

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include a first external device icon and a second external device icon, wherein a first default image corresponding to the first external interface is displayed on the first external device icon and a second default image corresponding to the second external interface is displayed on the second external device icon;”

169. This limitation is a method version of apparatus limitations 1.4 and 1.5. As such, this claim limitation is disclosed by Nobori in view of Kinoshita for the same reasons discussed above for limitations 1.4 and 1.5.

- e) *12.4 “changing the first default image to a first image based on the first image signal in response to the first external device icon being selected if the first external device is connected to the image display device; and”*

170. This limitation is a method version of apparatus limitation 1.6. As such, this claim limitation is rendered obvious by Nobori for the same reasons discussed above for limitation 1.6.

- f) *12.5 “changing the first image to the first default image in response to the second external device icon being selected,”*

171. This limitation is a method version of apparatus limitation 1.7. As such, this claim limitation is rendered obvious by Nobori for the same reasons discussed above for limitation 1.7.

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- g) 12.6 “wherein the first image is displayed at a position corresponding to an area where the first external device icon is displayed.”

172. This limitation is a method version of apparatus limitation 1.8. As such, this claim limitation is rendered obvious by Nobori for the same reasons discussed above for limitation 1.8.

- B. Claim 13: “The method according to claim 12, further comprising: highlighting the first external device icon in response to the first external device icon being selected; and highlighting the second external device icon in response to the second external device icon being selected.”**

173. This claim is a method version of device claim 2. As such, this claim is rendered obvious by Nobori for the same reasons discussed above for claim 2.

- N. Claim 14: “The method according to claim 12, wherein the first image displayed on the display is simultaneously displayed with the plurality of external device icons while the first external device icon is selected.”**

174. This claim is a method version of device claim 3. As such, this claim is rendered obvious by Nobori for the same reasons discussed above for claim 3.

- O. Claim 15: “The method according to claim 12, wherein the first and second external device icons are selectable via a cursor positioned on the first and second external device icons, respectively.”**

175. This claim is a method version of device claim 4. As such, this claim is rendered obvious over Nobori modified in view of Kinoshita for the same reasons discussed above for claim 4.

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- P. Claim 16: “The method according to claim 15, wherein the cursor is controlled by a remote controller interfacing with the image display device.”**

176. This claim is a method version of device claim 5. As such, this claim is rendered obvious by Nobori in view of Kinoshita for the same reasons discussed above for claim 5.

- Q. Claim 17: “The method according to claim 12, further comprising: displaying a symbol representing that the first external device or the second external device is being connected to the display device on the first external device icon or the second external device icon”**

177. This claim is a method version of device claim 6. As such, this claim is rendered obvious by Nobori in view of Kinoshita for the same reasons discussed above for claim 6.

- R. Claim 18: “The method according to claim 12, further comprising”**

- a) *18.1: “changing the second default image to a second image based on the second image signal in response to the second external device icon being selected if the second external device is connected to the image display device,”*

178. These claim limitations are a method version of device claim 7. As such, this claim limitation is rendered obvious by Nobori for the same reasons discussed above for claim 7.

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- b) 18.2: “wherein the second image is displayed at a position corresponding to an area where the second external device icon is displayed.”

179. This limitation would have been obvious based on Nobori alone, or alternatively Nobori in view of Kinoshita. Nobori teaches that “image information 310A of the selected image input I/F (3RCA) is displayed in the [form] of a thumbnail in the region within the image input I/F display screen 300B.” *Id.* at ¶49, FIG. 3. In particular, for the same reasons that the first image is displayed at a position corresponding to an area where the first image input I/F icon is displayed as discussed above for limitation 1.8, the second image is similarly displayed at a position corresponding to an area where the second image input I/F is displayed (i.e., the region within the image input I/F display screen 300B in which the image input I/F icon is displayed). *Id.*

- S. **Claim 19: "The method according to claim 12, further comprising: transmitting a control command for controlling the first external device to the first external device; and displaying an execution result of the control command on the display."**

180. This claim is a method version of device claim 8. As such, this claim is rendered obvious by Nobori modified in view of Kinoshita and Brown for the same reasons discussed above for claim 8.

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T. Claim 20: “The method according to claim 12, wherein the changed first image is an image which is currently displayed on the first external device.”

181. This claim is a method version of device claim 10. As such, this claim is rendered obvious by Nobori modified in view of Kinoshita and Brown for the same reasons discussed above for claim 10.

U. Claim 21: “The method according to claim 12, further comprising: displaying the first default image although first external device icon is selected if the first external device is not connected to the image display device.”

182. This claim is a method version of device claim 11. As such, this claim is rendered obvious by Nobori for the same reasons discussed above for claim 11.

IX. GROUNDS 2-5: CLAIMS 1-21 OF THE '311 PATENT ARE UNPATENTABLE UNDER 35 U.S.C. §103 OVER NOBORI MODIFIED IN VIEW OF ONE OR MORE OF YOUNG, BROWN, AND KINOSHITA

A. Independent Claim 1

a) **[1.P]: “An image display device comprising:”**

183. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.P].

b) **[1.1]: “a display;”**

184. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.1].

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- a. **[1.2]: “a first external interface configured to receive a first image signal input from a first external device connected to the image display device;”**

185. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.2].

- b. **[1.3]: “a second external interface configured to receive a second image signal input from a second external device connected to the image display device; and”**

186. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.3].

- c. **[1.4]: “a controller coupled with the display, the first external interface and the second external interface, the controller configured to:”**

187. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.4].

- d. **[1.5]: “display a plurality of external device icons, on the display, wherein the plurality of external device icons include a first external device icon and a second external device icon, wherein a first default image corresponding to the first external interface is displayed on the first external device icon and a second default image corresponding to the second external interface is displayed on the second external device icon, and”**

188. As explained in Ground 1, claim 1, limitation [1.5], Nobori discloses “displaying a plurality of external device icons, on the display, wherein the plurality

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of external device icons include a first external device icon and a second external device icon.” Ex. 1004 at ¶¶31, 45, 48, FIGs. 1 & 2. It would have been obvious to a POSITA to modify Nobori to incorporate Young’s teachings of a digital television presenting windows for displaying image contents from signal sources and the names of the signal sources. Ex. 1006 at ¶¶16-17.

189. FIG. 3 shows that the selection of an icon (image input I/F) causes the display of a preview image from the corresponding image input device. *Id.* at ¶¶49-53 & FIG. 3.

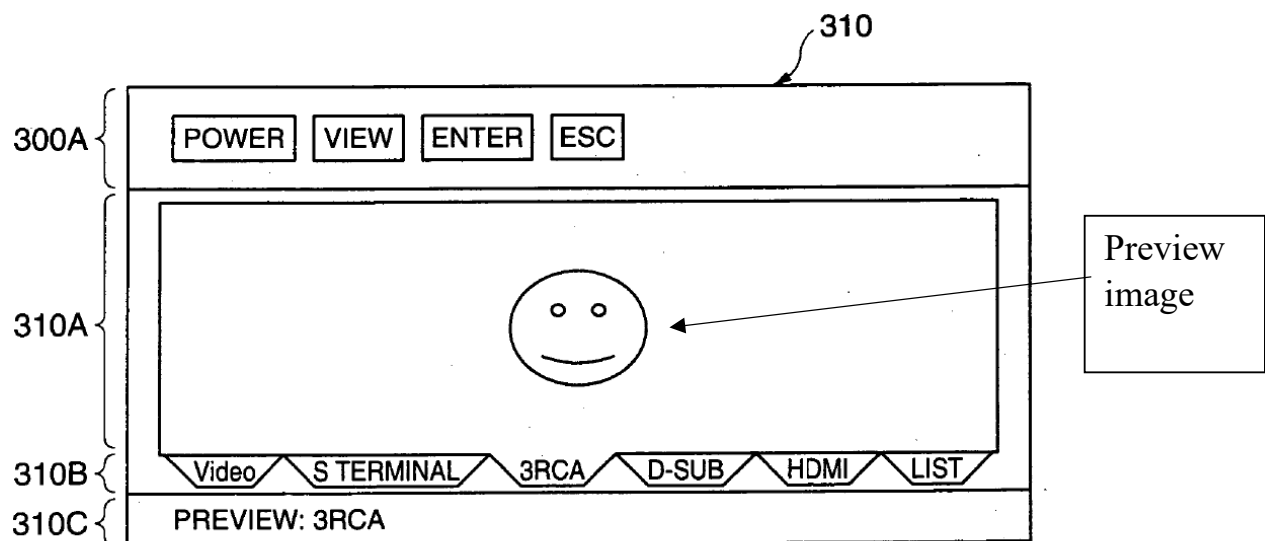


FIG. 3

Ex. 1004 at FIG. 3

190. Nobori explains, “when one desired image input I/F (herein, 3RCA terminal) is selected from the plural image input I/Fs, ... image information 310A

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of the selected I/F (3RCA) is displayed in the [form] of a thumbnail in the region within the image input I/F display screen 300B.” *Id.* at ¶49.

191. FIG. 2 of Young is an exemplary display.

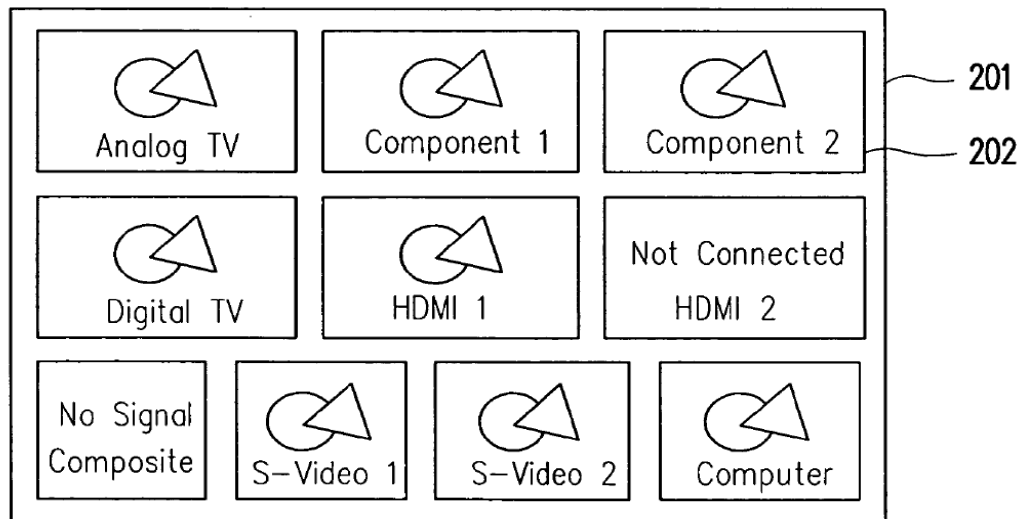


FIG. 2

Ex. 1006 at FIG. 2.

192. The menu for selecting signal sources is displayed as an on-screen display (OSD) on the television. *Id.* at ¶16. FIG. 2 shows the menu 201 having ten windows 202 for displaying image contents of the ten signal sources and names of the signal sources at the same time. *Id.* “The image contents of the signal sources can be either instant extracted static images, namely snapshots, or real-time motion images.” *Id.* Further, for an unconnected device, Young presents a blank image

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content (with the text “Not Connected”) labeled with the interface name, such as HDMI2. *Id.* at ¶17.

193. Specifically, Young discloses displaying an image content for an external device. Ex. 1006 at ¶16. Nobori also teaches displaying image content in the form of a thumbnail for a device corresponding to a selected icon used to represent image input I/Fs to which the image input devices are connected. Ex. 1004 at ¶41.

194. Both Young and Nobori are icon-based user interfaces for selecting video inputs to a display device. Nobori discloses that a preview image of a selected video interface (I/F) is displayed to assist a user of the display to select a video input. A POSITA would have recognized that Young demonstrates that the prior art contemplated the extension of Nobori. That is, Young further assists the user in selecting a desired video input by displaying on a input device icon a thumbnail of the video content for each of the selectable icons. With this understanding from the references, it would have been obvious to replace the more limited use of preview images in Nobori with the expanded use of preview images in Young to further assist a user in deciding which video input to select.

195. A POSITA would have been motivated to combine Nobori with Young. As discussed above, Young, like Nobori, provides an improved interface

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for selecting content from multiple signal sources with the aim of improving user convenience. A POSITA would have recognized that Young's teachings could further improve the degree of convenience to a user. While both Nobori and Young provide improved interfaces, Nobori allows a user to preview the video of a single input interface at a time when selecting a video input. Young is especially concerned with difficulties that arise specifically when multiple external devices are connected via different input terminals. *Id.* Young recognizes the shortcoming of Nobori's one at a time video preview: "[i]nstead of previewing the image contents of each terminal, the users often have to switch among many input terminals one by one to find out what they want." Ex. 1006 at ¶8.

196. Young addresses this problem by providing image contents (video preview) of multiple signal sources and names of the signal sources simultaneously in the windows to assist the user in video input selection. ... The image contents of the signal sources can be either instant extracted static images, namely snapshots, or real-time motion images." Ex. 1006 at ¶16, emphasis added.

197. Nobori teaches receiving inputs from multiple external devices, while previewing video from only one video input at a time, Young provides the solution for extending the benefit of image preview to all available video input sources.

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198. A POSITA would have understood the value of Young’s proposed solution and, with the application of conventional technology disclosed in Young, would have provided the user simultaneous video previews such that a user of Nobori's projector would more select the appropriate input terminal for use with a particular external device. *Id.* The adoption of Young’s improvement into the Nobori projector would have been within the ability of a POSITA and yielded predictable results.

199. A POSITA would have had a reasonable expectation of success in making this combination because it would amount to no more than the combination of known elements to yield predictable results. *KSR*, 550 U.S. at 415-16 (2007). Nobori discloses the benefit to a user of the projector of using video preview a selected image input I/F. Young demonstrates the usefulness of simultaneously showing previews from multiple video sources (I/Fs). A POSITA would have been readily able to modify these icons to show image contents of the input terminals using known techniques, and expect success. *Id.*

- e. **[1.6]: “change the first default image to a first image based on the first image signal in response to the first external device icon being selected if the first external device is connected to the image display device, and;”**

200. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.6].

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- f. **[1.7]: “change the first image to the first default image in response to the second external device icon being selected”**

201. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.7].

- g. **[1.8]: “wherein the first image is displayed at a position corresponding to an area where the first external device icon is displayed.”**

202. This limitation is taught by Nobori for the reasons discussed above with respect to Ground 1, claim 1, limitation [1.8].

203. Claim 1 is invalid as obvious over the combination of Nobori modified in view of Young.

2. **Claim 2: “The image display device according to claim 1, wherein the controller is further configured to: highlight the first external device icon in response to the first external device icon being selected, and highlight the second external device icon in response to the second external device icon being selected.”**

204. Nobori discloses this limitation for the reasons discussed in Ground 1, claim 2. Therefore, Nobori in combination with Young also renders claim 2 invalid as obvious.

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3. **Claim 3: “The image display device according to claim 1, wherein the first image displayed on the display is simultaneously displayed with the plurality of external device icons while the first external device icon is selected.”**

205. Nobori discloses this limitation for the reasons discussed in Ground 1, claim 3. Therefore, Nobori in combination with Young also renders claim 3 invalid as obvious.

4. **Claim 4: “The image display device according to claim 1, wherein the first and second external device icons are selectable via a cursor positioned on the first and second external device icons, respectively.”**

206. The combination of Nobori with Young discloses this limitation. For example, Young teaches that “[t]he users have several ways for selecting signal sources, such as selecting with corresponding key-presses, numbering the signals (*sic*) sources, and selecting the signals (*sic*) sources according to the numbers, or selecting by moving a cursor.” Ex. 1006 at ¶18 Thus, the combination of Nobori and Young discloses that the first and second external device icons are selectable via a cursor positioned on the first and second external device icons, respectively.

5. **Claim 5: “The image display device according to claim 4, wherein the cursor is controlled by a remote controller interfacing with the image display device.”**

207. Nobori modified in view of Young renders this limitation obvious.. For example, Young teaches that selecting signal sources can be applied on either the display apparatus or a remote control. A moving mode of the cursor for

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selecting signal sources is not limited. It can be a one-dimensional right-and-left moving or a two-dimensional up-and-down and right-and-left moving. Ex. 1006 at ¶18. Thus, the combination of Nobori and Young discloses that the cursor is controlled by a remote controller interfacing with the image display device.

- 6. Claim 6: “The image display device according to claim 1, wherein the controller is further configured to display a symbol representing that the first external device or the second external device is being connected to the display device on the first external device icon or the second external device icon.”**

208. Nobori modified in view of Kinoshita and Young renders this limitation obvious. Nobori seeks to make it more convenient for a user to understand “into which image input I/F an image signal is inputted ... by displaying ... ‘No-Signal’ for the image input I/F that is not connected, or into which no image signal is inputted.” Ex. 1004 at ¶17.

209. FIG. 2 shows a state where the video terminal is currently selected, and “No-Signal” is displayed for the video signal, indicating that no video signal is being inputted.” *Id.* at ¶45.

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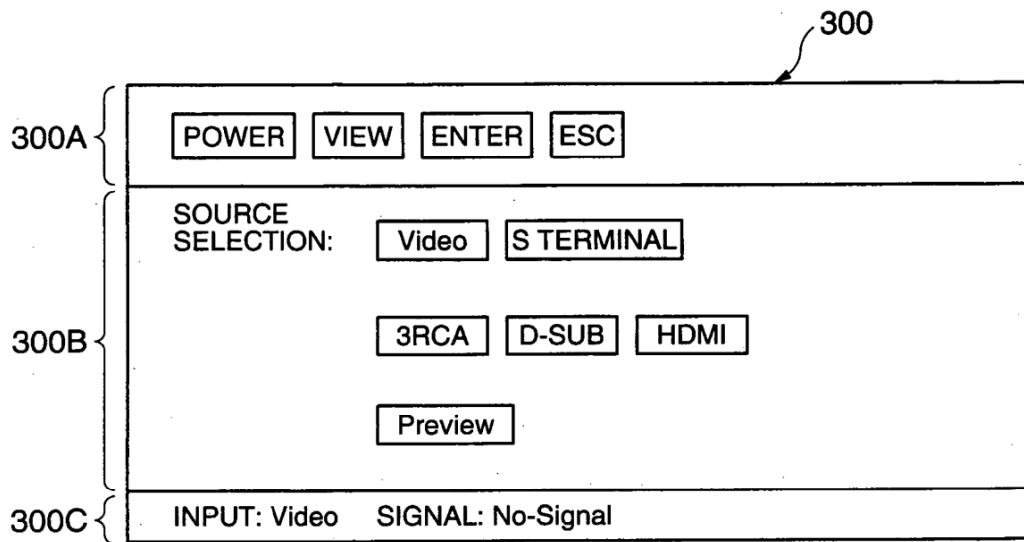


FIG. 2

Ex. 1004 at FIG. 2.

210. As stated in Nobori for “an image input I/F to which the image input device is not connected or an image input I/F into which an image input signal is not inputted, ‘No-Signal’ is displayed.” *Id.* at ¶56 & FIG. 4. By doing this input I/Fs connected to external devices are inherently identified because a user would have understood that an icon displayed without the designation “No-Signal” would be connected because the presence of a signal had been detected from the input I/F.

211. FIG. 2 of Young is an exemplary display indicating that an input, such as HDMI2, is “Not Connected” and that there is no signal from the “Composite” input.

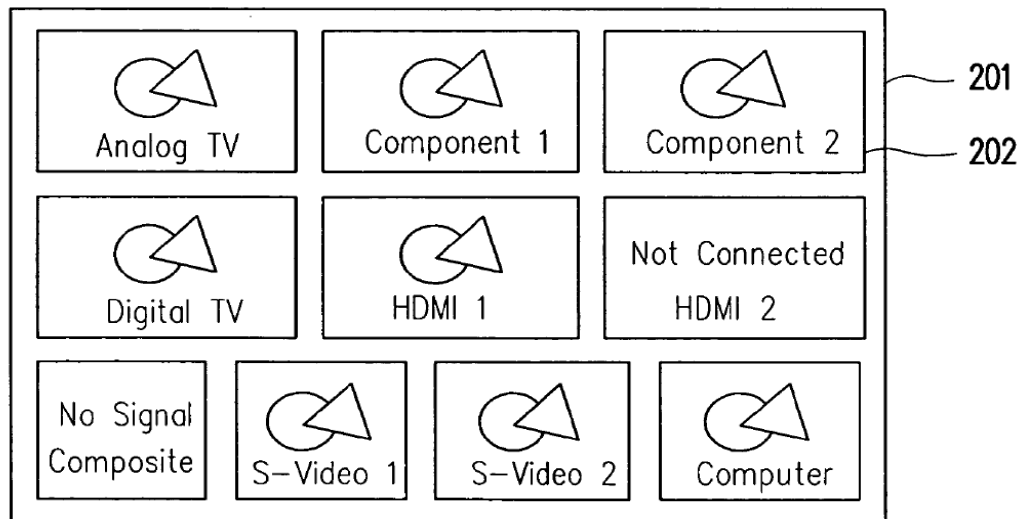


FIG. 2

Ex. 1006 at FIG. 2.

212. Specifically, Kinoshita discloses that “the name of a connected AV device is simply indicated in a color different from the name of an un-connected AV device.” Ex. 1005 at Kinoshita also discloses that to inform a user of connection status the “icon display unit 42 may display the icon of the input terminal not connected to any AV device in a manner different from the icon of the input terminal connected to the AV device. For instance, the display color of icons may be made different, or the tone of display color may be made different. By such different manner of display, the user can recognize only the actually

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connected AV devices as the candidates of input switching, and therefore, operation of input switching is facilitated.” Ex. 1005 at ¶57.

213. Thus, the combination of Nobori modified in view of Young and further modified in view of Kinoshita results in device icons indicating by text the connection status of the associated input device and also by color with the color of the icon being correlated to the connection status of the associated input device. Such modification would have been readily apparent to a POSITA because both Nobori and Young identify the connection status using a text icon to assist the user in understanding which video inputs are connected to the display device. Kinoshita’s use of color to further draw attention to and differentiate the connection status is an additional way to inform a user of the connection status of the input devices which is a concern to both Nobori and Young. Claim 6 is obvious in view of Nobori modified in accordance with Young as for claim 1 and further modified in view of Kinoshita to change the color of an icon associated with a specific external device to indicate that the external device is connected or, alternatively, disconnected.

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7. **Claim 7: “The image display device according to claim 1, wherein the controller is further configured to: change the second default image to a second image signal in response to the second external device icon being selected if the second external device is connected to the image display device.”**

214. Nobori discloses this limitation for the reasons discussed in Ground 1, claim 7.

215. FIG. 5 of Nobori shows that a user can change the selection of I/F. This would be done by the user touching an icon associated with a different I/F. FIG. 5 shows in steps ST 20 and ST 21 the results of such a change in the selection of I/F.

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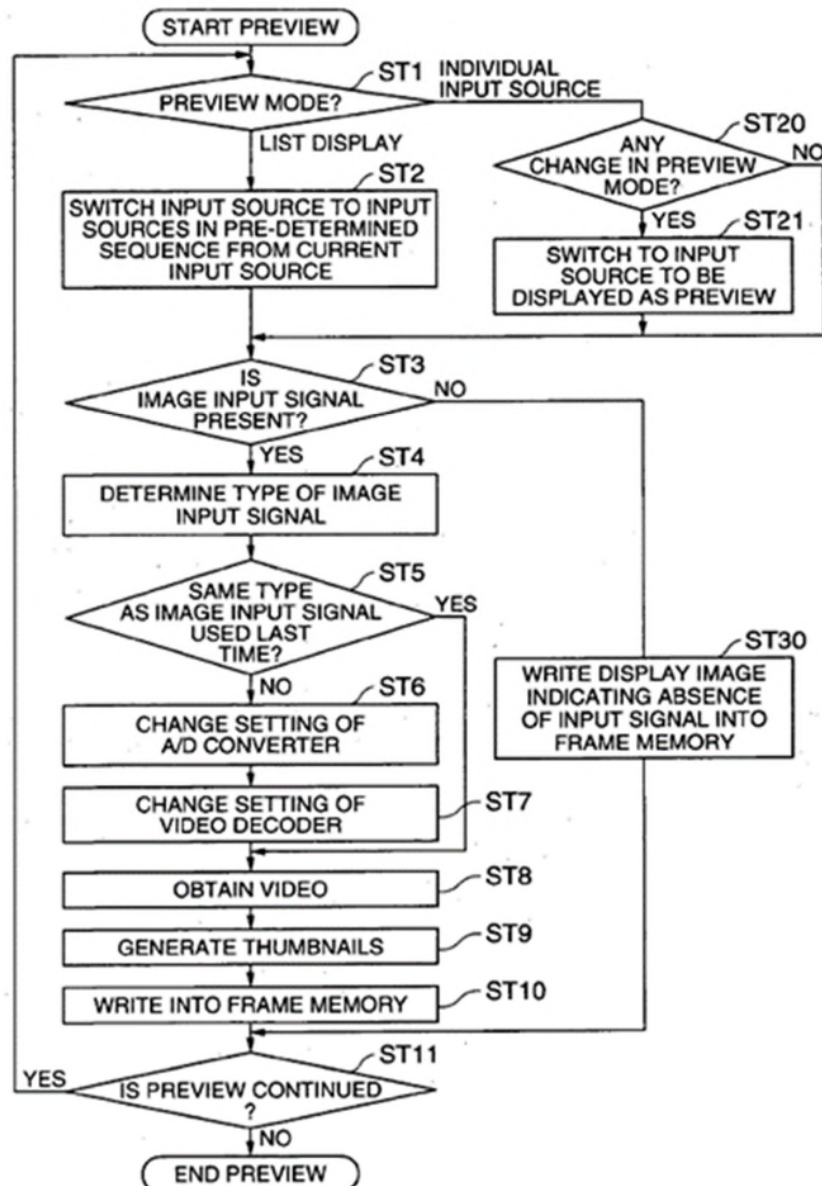


FIG. 5

Ex. 1004 at FIG. 5.

Nobori discloses this as follows:

When an individual image input I/F is selected, whether the display has been changed from the image input I/F already shown as a

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preview is judged in ST20. The flow proceeds to ST3 in the absence of a change. In the presence of a change, the display is switched to the image input I/F (input source) to be displayed on the preview screen 310 in response to the touch-key operation on the display portion of the image input I/Fs on the touch panel 122 (ST21). This example shows a case where "3RCA" is selected.

Ex. 1004 FIG. 3; ¶61.

216. In this manner, Nobori teaches the ability to select another icon to select different input image signal from the one being displayed. When the user selects another icon its default image will be changed to its corresponding input image signal. If the other image input is not connected it will not be able to provide an input image signal so no input signal can be displayed. Thus, Nobori renders obvious the subject matter of claim 7.

8. Claim 8: “The image display device according to claim 1, wherein the controller is further configured to: transmit a control command for controlling the first external device to the first external device, and display an execution result of the control command on the display.”

217. Brown discloses this limitation for the reasons discussed in Ground 1, claim 8 and ¶¶150-156, *supra*. More specifically Brown teaches “[i]n an example where personal computer control is initiated, the television is set to the personal computer input and the user watches personal computer-based content. The user presses a personal computer related button, such as channel up. The television

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system sends the command to the personal computer. The personal computer responds to the remote control command.” Ex. 1007 at ¶80; see also ¶¶68-70, 74-75, 79.

218. A POSITA would have been motivated to modify Nobori in view of Kinoshita and Young because it would have obvious advantages, including providing the viewer the ability to use a single remote control to transition a television system among multiple, attached devices such as a personal computer or console device and to control the displayed content of personal computer or other devices. *See also*, ¶¶150-156, *supra*.

9. Claim 9: “The image display device according to claim 1, wherein the first default image is an image identifying the first external interface and the second default image is an image identifying the second external interface.”

219. Nobori in view of Young discloses this limitation. Specifically, the combination of Nobori with Young results in icons that include images and names of input terminals. Young teaches that displaying icons including image contents of signal sources and names of the signal sources allows a user to easily identify the input terminal to which the device supplying the video signal is connected. Ex. 1006 at ¶16. For example, Young describes that “the signal sources can be either the input terminals of a display apparatus or a plurality of program channels received by the display apparatus such as channels provided by cable TV service

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suppliers. The image contents of the signal sources can be either instant extracted static images, namely snapshots, or real-time motion images.” *Id.* Thus, the image contents of the signal sources identify their respective input interfaces.

Accordingly, the first and second default images identify the first and second external interfaces, respectively. *Id.* Nobori modified in view of Young renders claim 9 invalid as obvious. *Id.*

10. Claim 10: “The image display device according to claim 1, wherein the changed first image is an image which is currently displayed on the first external device.”

220. Brown discloses this limitation for the reasons discussed in Ground 1, claim 10. Moreover, a POSITA would have understood that Nobori modified in view of Young and further modified in view of Brown would provide the ability to select as the first image the computer-based input to display a preview image from a PC on the television screen to meet the additional limitation of claim 10.

11. Claim 11: “The image display device according to claim 1, wherein the controller is further configured to display the first default image although the first external device icon is selected if the first external device is not connected to the image display device.”

221. As discussed in Ground 1, this limitation would have been obvious based on Nobori. Alternatively, Nobori in combination with Young discloses this limitation. A POSITA would have been motivated to combine Young’s image and text identifying interfaces with Nobori’s text representing image input I/Fs. Young

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further teaches continuing to display an image containing the interface name even when there is no external device connected. Ex. 1006 at ¶¶11, 16-17. For example, Young explains that “[t]he menu displays not only image contents of the signal sources but also statuses thereof, for example, a second HDMI (HDMI 2) being a status of Not Connected and a composite being at a status of No Signal.” *Id.* at ¶17, FIG. 2.

222. FIG. 2 shows a menu having windows for selecting signal sources of a display apparatus:

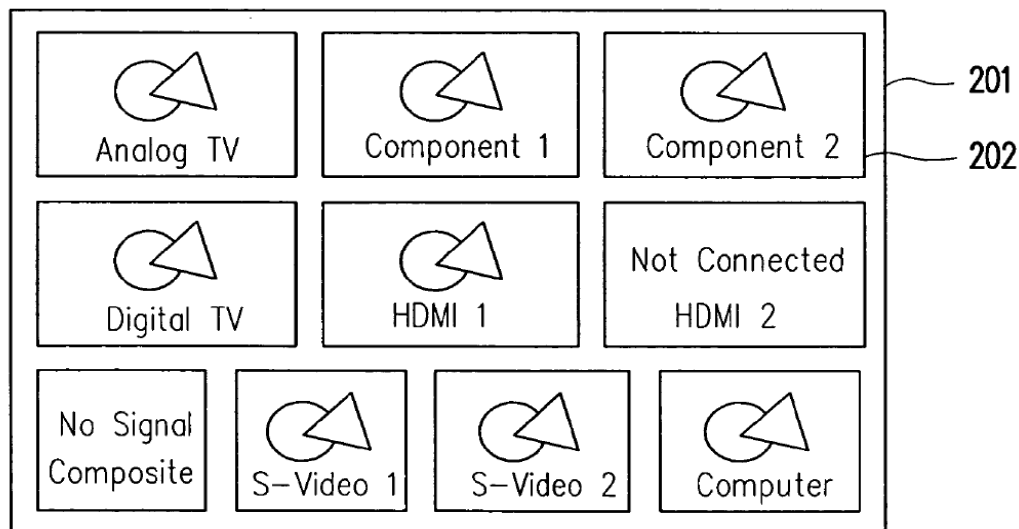


FIG. 2

Ex. 1006 at FIG. 2.

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223. Accordingly, the combination of Nobori and Young satisfies this limitation because the external device icon would continue to display the default image even if the selected device is not connected. A POSITA would have been motivated to incorporate this teaching from Young into Nobori for the same reasons discussed above for Ground 2, limitation 1.5 and for Ground 1, claim 11. *Id.*

12. Independent Claim 12

- a. **[12.P]: “A method of an image display device, the method comprising:”**

224. This is a method version of apparatus limitation addressed in Ground 2, claim 1, limitation 1.P, and is taught by the prior art for the reasons discussed for that limitation.

- b. **[12.1]: “receiving, by a first external interface, a first image signal input from a first external device connected to the image display device;”**

225. This a method version of apparatus limitation addressed in Ground 2, claim 1, limitation 1.2, and is taught by the prior art for the reasons discussed for that limitation.

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- c. **[12.2]: “receiving, by a second external interface, a second image signal input from a second external device connected to the image display device;”**

226. This is a method version of apparatus limitation addressed in Ground 2, claim 1, limitation 1.3, and is taught by the prior art for the reasons discussed for that limitation.

- d. **[12.3]: “displaying a plurality of external device icons, on a display, wherein the plurality of external device icons include a first external device icon and a second external device icon, wherein a first default image corresponding to the first external interface is displayed on the first external device icon and a second default image corresponding to the second external interface is displayed on the second external device icon;”**

227. This is a method version of apparatus limitation addressed in Ground 2, claim 1, limitation 1.5, and is taught by the prior art for the reasons discussed for that limitation.

- e. **[12.4]: “changing the first default image to a first image based on the first image signal in response to the first external device icon being selected if the first external device is connected to the image display device; and”**

228. This is a method version of apparatus limitation addressed in Ground 2, claim 1, limitation 1.6, and is taught by the prior art for the reasons discussed for that limitation.

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- f. **[12.5]: “changing the first image to the first default image in response to the second external device icon being selected,”**

229. This is a method version of apparatus limitation addressed in Ground 2, claim 1, 1.7, and is taught by the prior art for the reasons discussed for that limitation.

- g. **[12.6]: “wherein the first image is displayed at a position corresponding to an area where the first external device icon is displayed”**

230. This is a method version of apparatus limitation addressed in Ground 2, claim 1, limitation 1.8, and is taught by the prior art for the reasons discussed for that limitation.

- 13. Claim 13: “The method according to claim 12, further comprising: highlighting the first external device icon in response to the first external device icon being selected; and highlighting the second external device icon in response to the second external device icon being selected.”**

231. Claim 13 is a method version of apparatus claim 2, and is taught by the prior art for the reasons discussed for Ground 2, claim 2.

- 14. Claim 14: “The method according to claim 12, wherein the first image displayed on the display is simultaneously displayed with the plurality of external device icons while the first external device icon is selected.”**

232. Claim 14 is a method version of apparatus claim 3, and is taught by the prior art for the reasons discussed for Ground 2, claim 3.

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- 15. Claim 15: “The method according to claim 12, wherein the first and second external device icons are selectable via a cursor positioned on the first and second external device icons, respectively.”**

233. Claim 15 is a method version of apparatus claim 4, and is taught by the prior art for the reasons discussed for Ground 2, claim 4.

- 16. Claim 16: “The method according to claim 15, wherein the cursor is controlled by a remote controller interfacing with the image display device.”**

234. Claim 16 is a method version of apparatus claim 5, and is taught by the prior art for the reasons discussed for Ground 2, claim 5.

- 17. Claim 17: “The method according to claim 12, further comprising: displaying a symbol representing that the first external device or the second external device is being connected to the display device on the first external device icon or the second external device icon.”**

235. Claim 17 is a method version of apparatus claim 6. As such, this claim is rendered obvious by Nobori in view of Young and Kinoshita for the reasons discussed for Ground 2, claim 6.

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18. Claim 18

- a. **[18.1]: “The method according to claim 12, further comprising: changing the second default image to a second image signal in response to the second external device icon being selected if the second external device is connected to the image display device,”**

236. This limitation is a method version of apparatus claim 7, and is taught by the prior art for the reasons discussed for Ground 2, claim 7.

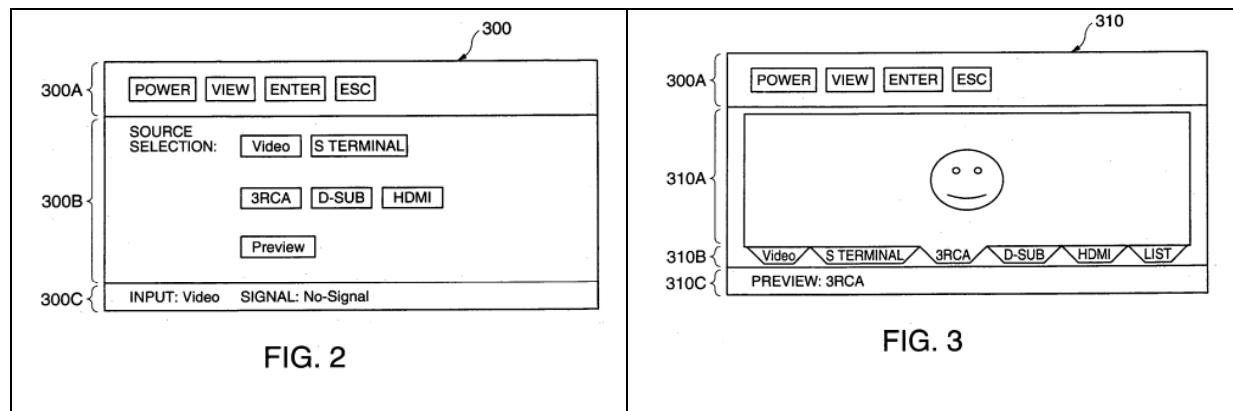
- b. **[18.2]: “wherein the second image is displayed at a position corresponding to an area where the second external device icon is displayed.”**

237. This limitation, which relates to the location of the second image, would have been obvious based on Nobori for the same reasons that the first image is displayed at a position corresponding to an area where the first image input I/F icon is displayed as discussed above for Ground 2, claim 1, limitation [1.8].

238. As shown in the following juxtaposition FIG.2 and FIG. 3, a second image is similarly displayed at a position corresponding to an area where the second image input I/F is displayed (i.e., the region within the image input I/F display screen 300B in which the image input I/F icon is displayed). *Id.*

FIG. 2, Ex. 1004	FIG. 3, Ex. 1004
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Ex. 1004 at Figs 2 and 3.

239. For example, Nobori teaches that when first image input I/F icon (e.g., 3RCA terminal) is selected, first thumbnail image is displayed in the region within the image input I/F display screen 300B, and when second image input I/F icon other than 3RCA is selected, second thumbnail image is displayed in the region within the image input I/F display screen 300B. Ex. 1004 at ¶¶49, 52, 54. This is the case for the display of image data corresponding to the second external device icon or image data corresponding to the first external device icon.

19. Claim 19: “The method according to claim 12, further comprising: transmitting a control command for controlling the first external device to the first external device, and displaying an execution result of the control command on the display.”

240. This claim is a method version of apparatus claim 8 and is rendered obvious by Brown for the reasons discussed for Ground 2, claim 8.

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- 20. Claim 20: “The method according to claim 12, wherein the changed first image is an image which is currently displayed on the first external device.”**

241. This is a method version of apparatus claim 10 and is rendered obvious by Brown for the reasons discussed for Ground 2, claim 10.

- 21. Claim 21: “The method according to claim 12, further comprising: displaying the first default image although first external device icon is selected if the first external device is not connected to the image display device.”**

242. Claim 21 is a method version of apparatus claim 11, and is taught by the prior art for the reasons discussed for Ground 2, claim 11.

X. CONCLUSION

243. For at least the reasons addressed above, it is my opinion that every claim of the ‘311 patent is invalid as obvious.

244. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

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

246. I declare under penalty of perjury that the foregoing is true and correct.

Executed on: Nov 21st, 2022



Immanuel Freedman

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Appendix A

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IMMANUEL FREEDMAN, Ph. D, SMIEEE, MInstP, CPhys

942 Clubhouse Drive
Harleysville, PA 19438
215-527-1779

SUMMARY OF EXPERIENCE

Systems, Signals and Algorithms Consultant with over 30 years experience of video, imaging, modeling, simulation, and systems analysis, design, development, and testing. He has served as expert consultant providing technical analysis related to patent infringement, patent validity, and the research tax credit.

EDUCATION

Ph. D., Physics, University of Durham, England, 1986
B.Sc. (Honors), Physics, University of Durham, England, 1979

LICENSES

Registered Patent Agent #51,704

EXPERIENCE

Takeda Pharmaceuticals	Cambridge, MA	Mar '22-present
Clinical Pharmacology Director		

Dr. Freedman provides mathematical modeling of systems, signals, and images.

Freedman Patent	Harleysville, PA	Oct '21-present
Sole Proprietor		

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He provides consulting and expert witness services to industry and the legal profession.

State University of New York at Buffalo Buffalo, NY Jun '17-present
Volunteer Researcher

Praxis Precision Medicines Boston, MA Aug '21-Sep '21
Senior Director, Pharmacometrics

Dr. Freedman provided mathematical modeling of systems, signals, and images.

Daiichi Sankyo, Inc. Basking Ridge, NJ Nov '20-Aug '21
Director, Modeling and Simulation

Dr. Freedman provided mathematical modeling of systems, signals, and images.

Freedman Patent Harleysville, PA Jun '16-Nov '20
Sole Proprietor

He provided consulting and expert witness services to industry and the legal profession. In particular, he provided requirements analysis and design for a precision dosing system Graphical User Interface.

GlaxoSmithKline, Inc. Upper Merion, PA Aug '07-Jun '16
Manager, Clinical Pharmacology

Dr. Freedman provided mathematical modeling of systems, signals and images and participated in technical due diligence activities on demand.

Freedman Patent Harleysville, PA Jul '05-Aug '07
Sole Proprietor

He provided consulting and expert witness services to industry and the legal profession. In particular, he provided requirements analysis and design for a precision dosing system Graphical User Interface.

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distribution via Video On Demand or Near Video On Demand systems to customer's homes.

Replay Networks, Inc.

Mountain View, CA

Dec'99-Jan '00

Contractor

Dr. Freedman researched and developed a method of porting an application developed for a Digital Video Recorder in the embedded C software language to standard set top box (STB) middleware to eliminate high development and maintenance costs associated with developing custom STBs. He optimized bit rate and encoder chip parameters to yield high-quality time-shifted MPEG-2 streams controlled by VCR-like consumer controls.

Sun Microsystems, Inc.

Cupertino, CA

Mar '99-Nov '99

Software Engineer (Contractor)

Dr. Freedman researched and developed a Distributed Component Object Model (DCOM) software interface between a TV Control Graphical User Interface and the Microsoft Broadcast Application Programming Interface (API) to improve the visual quality of interactive TV displays derived from UDP/IP datagrams synchronized with MPEG-2 audio/video packet data.

The software interface additionally resolved discontinuities in Presentation Timestamp according to a Normal Play Time defined by a Digital Storage Media –Command and Control standard.

He designed and implemented an API written in the pJava and Visual C++ software languages under the Windows CE operating system for the Motorola DCT 5000+ DTV Set Top Box based on the Advanced Television Systems Committee digital television standard.

Rockwell Collins, Inc.

Pomona, CA

Oct '98-Mar '99

Lead Systems Engineer (Contractor)

As Lead Systems Engineer with a two-engineer span of control, Dr. Freedman timely delivered harmonized requirements for an MPEG-2 in-flight entertainment system similar to a cable television system based on an advanced intranet implemented on an aircraft.

He trained his team to use a Rational Unified software development process based on a Spiral Development Model implemented in the Universal Modeling Language using the Rational/Rose 98i Computer Aided Software Engineering tool.

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Stratagene, Inc.

La Jolla, CA

Aug '98-Oct '98

Engineer (Contractor to Permanent)

Dr. Freedman evaluated frame grabber hardware for resolution and quality of time-integrated imagery and specified algorithms including cluster analysis and trending, further developing a user interface for a digital image processing system supporting gene-cloning science.

United Advanced Technologies, Inc.

Long Beach, CA

Feb '98-Aug '98

Firmware Engineer (Contractor)

Dr. Freedman analyzed and developed a nine-camera remote surveillance system with a Graphical User Interface developed in the Visual C++ software language under a Microsoft Windows operating system host and firmware developed in the embedded C software language implemented on Analog Devices' ADV601 wavelet video hardware.

He researched and developed Video for Windows parameters and on-chip settings for video quality control to deliver full-frame video over Plain Old Telephone Service telephone lines at quality acceptable to retail store security services.

KeyInfo Services, Inc.

Spring Valley, CA

Mar '98-May '98

Database Consultant

Dr. Freedman administered a database for providing web-based information developed in the Sybase SQL software language.

Mitek Systems, Inc.

San Diego, CA

Aug '97-Jan '98

Engineer (Contractor)

Dr. Freedman researched and developed an Intelligent Character Recognition digital image processing system based on neural nets implemented in the C software language to read handwritten checks and paper forms with about 80% accuracy on a real-time system deployed throughout the banking industry.

He researched and developed algorithms based on mathematical morphology implemented via neural nets to verify handwritten signatures on printed checks.

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Symbionics Ltd.

Cambridge, England UK Aug '97

Principal Engineer (Temporary)

Dr. Freedman analyzed manpower estimates for design, development and testing of an MPEG-2 interactive television set-top box based on an OpenTV interactive television standard implemented for the "Open...." television commerce system deployed Spring 1999 in the United Kingdom.

VideoActive/HCR, Inc.

Yorba Linda, CA

Jan '97-Dec '97

Contractor

Dr. Freedman reviewed, analyzed and developed proprietary disk layout software coded in the Visual C++ software language for a Near Video on Demand system delivering movies over telephone systems such as Asymmetric Digital Subscriber Lines (ADSL).

Dr. Immanuel Freedman, Inc.

Harleysville, PA

Mar '96-Jan '16

President

He provided technical consulting services to industry.

Anugraha

La Jolla, CA

Jan '96-Jan '97

Sole Proprietor

Dr. Freedman researched and developed algorithms and processes to compress fine art photography at image quality acceptable to artists based on the JPEG imaging standard implemented with image pre-processing and adaptive quantization.

Armor Safe Technologies, Inc.

Vista, CA

Sep '95-Mar '96

Firmware Engineer (Contractor)

Dr. Freedman developed an ARINC RS422/RS485 serial link communications software component written in the embedded C software language for a major confidential client specialized in retail store security. His timely software delivery enabled the client to capture a firm order with additional future potential.

Comstream, Inc.

San Diego, CA

Jul '96-Aug '96

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Firmware Engineer (Contractor)

Dr. Freedman integrated a MPEG-2 set top box with OpenTV interactive television middleware programmed in the Microtec C language ported to a Motorola 68340 processor under the pSOS operating system. He implemented native bindings of the middleware for the On-Screen Display (Graphical User Interface) and communications stack.

General Instrument, Inc.

San Diego, CA

Dec '95-May '96

Senior Staff Engineer

Dr. Freedman reviewed and evaluated methodologies, design and development and performance models for the DigiCipher 2 cable television conditional access system. He migrated a subscriber authorization system written in the C++ language from a DEC Alpha computing platform under the OpenVMS operating system to a Sun SPARCstation computing platform under the Solaris operating system.

Optivision, Inc.

Davis, CA

Mar '95-Sep '95

Consultant

Dr. Freedman researched and developed rate control algorithms and software based on MPEG -2 Test Model 5 for the OPTIVideo MPEG-2 video encoder written in the Visual C++ and C software languages.

He researched and developed adaptive quantization algorithms based on a JPEG-3 draft standard for possible inclusion in the draft National Imagery Transmission Format imaging standard.

He researched and developed algorithms to improve the quality of gray scale image compression for the medical imaging DICOM Standard by providing a lossless hybrid algorithm encoding image residuals with a diagonal Golomb code based on an Enhanced Universal Trellis Coded Quantization algorithm.

Federal National Mortgage Association Washington, DC

Jul '94-Jan '95

Software Engineer (Contractor)

Dr. Freedman designed and developed a Graphical User Interface to monitor and validate loan servicer input for the Loss Mitigation Project. He developed the software in the C software language for a Sun SPARCstation 2 platform under a UNIX operating system.

Hughes STX Corporation

Greenbelt, MD

Sep '88-Jun '94

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Senior Systems Engineer

As Spacecraft and Attitude Analyst for a mission to map the relict radiation from the Big Bang at near infrared, far infrared and microwave wavelengths, Dr. Freedman developed, simulated and calibrated the Cosmic Background Explorer (COBE) Attitude Determination System to yield a stable solution for the spacecraft orientation at a quality factor of 2 above customer's expectation. This solution included a quaternion estimator implemented via an Extended Kalman Filter.

He developed, calibrated and simulated the COBE spacecraft subsystem and provided graphical and statistical analysis of the spacecraft telemetry-word database. When a gyroscope failed during the Launch and Early orbit mission phase, he responded rapidly by plotting graphs of the thermal subsystem telemetry until he found a possible cause of failure.

Dr. Freedman developed a spatially referenced database based on a quad-tree data structure, which stored scientific data for comparison of sky maps from COBE with sky maps from other missions that served as a diagnostic user interface for the Diffuse Infrared Background Experiment.

For the COBE mission, he led the systems engineering and end-to-end development of a novel system for compressing data that combined scientific modeling with statistical data compression. He proposed the system concept and prepared the system level specification, design and project schedule. With a team of two engineers, Dr. Freedman tuned the compression system performance to yield a throughput greater than uncompressed data processing with a compression factor of 22-90%. He further designed and developed evaluation tools to ensure the user- transparent system-wide compression of a 380GB dynamic data base at image quality acceptable to scientists.

**University of Maryland
Research Associate**

College Park, MD

Jun '87-Sep '88

Dr. Freedman researched and developed digital image methods to process terrain models for a combat information processor sponsored by Battelle. It was developed in the C software language on Sun Microsystems workstation for porting to a supercomputer under a UNIX operating system.

He designed low-complexity algorithms for filtering, segmenting, clustering, and path planning based on digital images organized by quad-tree data structures.

**University College London
Research Assistant**

London, England UK

Sep '86-Jun '87

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Dr. Freedman developed digital image processing algorithms to improve image and stereo-matching quality for a digital terrain modeling system based on satellite data.

As part of a UK Government Fifth Generation computing project (Alvey MMI-237) in collaboration with Thorn EMI, Royal Signals and Radar Establishment, and Laser Scan Ltd., he developed software and algorithms for affine transformation, edge filtering, kriging interpolation and image stereo matching with sub-pixel acuity.

Laser-Scan Ltd.

Cambridge, England UK Sep '85-Sep '86

Software Engineer

Dr. Freedman researched and developed algorithms based on the mathematics of tessellation for efficient manipulation of spatially referenced data on serial computers and transputer arrays for a UK Government Fifth Generation computing project (Alvey MMI-237) in collaboration with Thorn EMI, Royal Signals and Radar Establishment, and Laser Scan Ltd.

National Coal Board

Nuneaton, England UK Nov '82-Sep '84

Scientist (Management Grade 7)

For a Health and Safety project, Dr. Freedman developed and validated a microcomputer system to detect coalmine fires and heatings. Based on stochastic and temporal analysis of infrared data obtained via a tube bundle system, and telemetry data from underground thermocouples, the system detected growing trends of carbon monoxide concentration in the presence of noise from underground events such as blasting, diesel engine fumes, ventilation changes, and seismic activity.

PUBLICATIONS

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Freedman, I. (2015), “On MA.NA EN.NUN in ^{mul} APIN,” NABU 2015-2 Nr. 50

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Freedman, I. (2012), "Translating Clinical and Pre-Clinical Information into Success," invited talk, in 3rd World PK/PD Summit, March 27-29, 2012, Boston: MA

Freedman, I. (2012), "Improving Integration of PK/PD Modeling into the Drug Development Process," invited panelist, in 3rd World PK/PD Summit, March 27-29, 2012, Boston: MA

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PROFESSIONAL AWARDS

Takeda Recognition Award (2022)

Daiichi Sankyo Recognition Award (2021)

Funaro Award (2015, 2018)

GlaxoSmithKline R&D Recognition Award (2012, 2013, 2016)

NASA Group Achievement Award (1990, 1992)

***Declaration of Immanuel Freedman
In Support of Petition for Inter Partes Review of
U.S. Patent No. 10,334,311***

Hughes STX Achievement Award (1990)

IBM Fulcrum Award (1988)

PROFESSIONAL AFFILIATIONS

Institute of Electrical and Electronic Engineers (Senior Member; Chair, Communications & Information Theory Section, Philadelphia Chapter; 2018/2019 Vice-Chair, P2673 and Trusted Analytic Exchange Sub-Group Chair, P2795 Standards Working Group)

Institute of Physics (Chartered Physicist)

American Association of Pharmaceutical Scientists (Chair, Pharmaco-Imaging Community; 2017 Member, Predictive Modeling Task Force)

International Society of Pharmacometrics (Standards and Best Practices Committee Member–Model Evaluation Group)

Regulatory Affairs Professionals Society

Drug Industry Information Association (Adaptive Designs Scientific Working Group Member)

International Biometric Society (Eastern North American Region)

International Association for Assyriology

National Coalition of Independent Scholars

Ronin Institute for Independent Scholarship

Royal Society of Medicine (Fellow)

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