

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Jan Oosthoek
U.S. Patent No.: 11,405,669 Attorney Docket No.: 186063.IPR669
Issue Date: August 2, 2022
Appl. Serial No.: 16/762,709
Filing Date: November 10, 2017
Title: SYSTEM FOR SYNCHRONIZED VIDEO PLAYBACK ON
A NUMBER OF PLAYBACK DEVICES

DECLARATION OF DR. MANOS M. TENTZERIS

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

By: / Manos M. Tentzeris /

Manos M. Tentzeris, Ph.D.

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I. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

1. I am currently Ken Byers Professor in the School of Electrical and Computer Engineering at the Georgia Institute of Technology. I received my Bachelor of Science degree in Electrical Engineering from the National Technical University of Athens in Greece in 1992. I received my Master's degree and Ph.D from the University of Michigan at Ann Arbor in 1994 and 1998, respectively. A complete list of my academic positions, activities, and publications is set out in my curriculum vitae, attached as Exhibit 1012.

2. As described in my curriculum vitae, I have more than 30 years of industry and academic experience. I have experience with antennas, fractal RF structures and circuit design for these systems. As a professor of Electrical and Computer Engineering, I have taught courses relating to antenna and electromagnetic technologies. A complete list of my teaching positions, honors, and classes taught is set out in my curriculum vitae. As a professor, I collaborated with over 130 Undergraduate, Masters and Doctoral students, as well as visiting students, post-doctoral fellows, and other researchers.

3. I have served as the Head of the Electromagnetics Technical Interest Group of the School of ECE, Georgia Tech. I have also served as the Georgia Electronic Design Center Associate Director for RFID/Sensors research from 2006-2010 and

as the GT-Packaging Research Center (NSF-ERC) Associate Director for RF research and the leader of the RF/Wireless Packaging Alliance from 2003-2006.

4. I have made extensive contributions to professional societies in my field, including the Institute of Electrical and Electronics Engineers (IEEE). I am the Founder and Chair Emeritus of the IEEE MTT-S (Microwave Theory and Techniques Society) TC-24 (RFID Technologies). I am a member of the technical program committees of IEEE-IMS (International Microwave Symposium), IEEE-AP (Antennas and Propagation Society) and IEEE-ECTC (Electronic Components and Technology Conference) Symposia. I was the General Co-Chair of IEEE APS 2019 (Antennas and Propagation Symposium). I was also the TPC (Technical Program Competitions) Chair for the IMS (International Microwave Symposium) 2008 Conference and the Co-Chair of the ACES (Applied Computational Electromagnetics Society) 2009 Symposium. I was also the Chairman for the 2005 IEEE CEM-TD (Computational Electromagnetics in Time-Domain) Workshop. I was the Chair of IEEE-CPMT TC16 (Components, Packaging, and Manufacturing Technology) (RF Subcommittee) as well as the Chair of IEEE MTT/AP (Microwave Theory and Techniques / Antennas and Propagation) Atlanta Sections for 2003.

5. I have made extensive contributions to professional societies in my field, including the Institute of Electrical and Electronics Engineers (IEEE). I am the Founder and Chair Emeritus of the IEEE MTT-S (Microwave Theory and

Techniques Society) TC-24 (RFID Technologies). I am a member of the technical program committees of IEEE-IMS (International Microwave Symposium), IEEE-AP (Antennas and Propagation Society) and IEEE-ECTC (Electronic Components and Technology Conference) Symposia. I was the General Co-Chair of IEEE APS 2019 (Antennas and Propagation Symposium). I was also the TPC (Technical Program Competitions) Chair for the IMS (International Microwave Symposium) 2008 Conference and the Co-Chair of the ACES (Applied Computational Electromagnetics Society) 2009 Symposium. I was also the Chairman for the 2005 IEEE CEM-TD (Computational Electromagnetics in Time-Domain) Workshop. I was the Chair of IEEE-CPMT TC16 (Components, Packaging, and Manufacturing Technology) (RF Subcommittee) as well as the Chair of IEEE MTT/AP (Microwave Theory and Techniques / Antennas and Propagation) Atlanta Sections for 2003.

6. Throughout my career, I have received a variety of awards. I am a Fellow of IEEE, a member of the MTT-15 Committee, an Associate Member of European Microwave Association (EuMA), a Fellow of the Electromagnetics Academy, and a member of Commission D, URSI and of the Technical Chamber of Greece. I am currently an IEEE C-RFID (Committee on RFIDs) Distinguished Lecturer and I served as an IEEE MTT-Distinguished Microwave Lecturer (DML) from 2010-2012. I have won awards for my contributions in developing various technologies, including numerous multiband antenna topologies operating at different

frequencies and integrated RF modules up to sub-THz frequencies. My achievements include the following:

- IEEE fellow — a distinction reserved for select IEEE members whose extraordinary accomplishments in any of the IEEE fields of interest are deemed fitting of this prestigious grade elevation. IEEE, About the IEEE Fellow Program, <http://www.ieee.org/membership/fellows/>.
- 2021 IEEE Antennas and Propagation Symposium (APS) Best Student Paper Award (co-authored).
- 2019 Humboldt Research Prize.
- 2019 IEEE Antennas and Propagation (APS) Conference Co-Chair.
- 2018 Intel IEEE ECTC 2018 Best Student Paper Award.
- 2015-present IEEE CRFID Distinguished Lecturer.
- 2010-2012 IEEE MTT-S Distinguished Microwave Lecturer.
- 2017 Georgia Tech Outstanding Achievement in Research Program Development Award.
- 2017 Archimedes IP Salon Gold Medal.
- 2016 Bell Labs Prize Third Award.
- 2015 IET Microwaves, Antennas and Propagation Premium Award.
- 2014 Georgia Tech ECE Distinguished Faculty Achievement Award.
- 2014 IEEE RFID-TA Best Student Paper Award.

- 2013 IET Microwaves, Antennas and Propagation Premium Award.
- 2012 Finland Distinguished Professor (Fi.Di.Pro.) Award.
- 2012 Architecture Award of Excellence, Architecture World Summit.
- 2010 IEEE Antennas and Propagation Society Piergiorgio L. E. Uslenghi Letters Prize Paper Award.
- 2010 Georgia Tech Senior Faculty Outstanding Undergraduate Research Mentor Award.
- 2009 IEEE Transactions on Components and Packaging Technologies Best Paper Award.
- 2009 IEEE Antennas and Propagation Symposium (APS) Second Best Student Paper Award.
- 2009 E.T.S. Walton Award from Science Foundation Ireland.
- 2007 IEEE Antennas and Propagation Symposium (APS) Best Student Paper Award.
- 2007 IEEE International Microwave Symposium (IMS) Third Best Student Paper Award.
- 2007 IEEE International Symposium on Antennas and Propagation (ISAP) Poster Presentation Award.
- 2006 Asian-Pacific Microwave Conference (APMC) Award.
- 2006 IEEE-MTT Outstanding Young Engineer Award.

- 2004 IEEE Transactions on Advanced Packaging Commendable Paper Award.
- 2003 NASA Godfrey “Art” Anzic Collaborative Distinguished Publication Award.
- 2003 IBC International Educator of the Year Award.
- 2003 IEEE-CPMT Outstanding Young Engineer Award.
- 2002 International Conference on Microwave and Millimeter-Wave Technology Best Paper Award (Beijing, China).
- 2002 Georgia Tech-ECE Outstanding Junior Faculty Award.
- 2001 ACES Conference Best Student Paper Award.
- 2000 NSF CAREER Award.
- 1999 Technical Program Co-Chair of the 54th ARFTG Conference, Atlanta, GA.
- 1997 Best Paper Award, International Hybrid Microelectronics and Packaging Society.
- 1989 Papastavridios Greek Mathematics Excellence Fellowship.
- 1988-1992 Greek Government Academic Excellence Fellowships.

7. In Google scholar, there are over 27,810 citations to my work and my work has an h-index of 83. An h-index represents the number of papers with the same number of citations, meaning I have over 83 papers with 83 citations.

8. I have authored or contributed to over 30 books and 850 refereed journal and conference papers; spoke in over 140 presentations, many of which relate to antennas, antenna arrays, RFID systems, and other modes of wireless communication and electronics design. A complete list of my publications and conference presentations is included in my *curriculum vitae*.

9. A selection of recent journal publications is as follows:

- H.-R.Ahn and M.M.Tentzeris, “A Novel Wideband, Compact, Microstrip Coupled-Line Ring Hybrid for Arbitrarily High Power-Division Ratios,” IEEE Transactions on Circuits and Systems II, Vol. 64, No. 6, pp. 630-634, June 2017.
- J.G.D.Hester, J.Kimionis and M.M.Tentzeris, “Printed Motes for IoT Wireless Networks: State of the Art, Challenges and Outlooks,” IEEE Transactions on Microwave Theory and Techniques, Vol. 65, No. 5, pp. 1819-1830, May 2017.
- A.Georgiadis and M.M.Tentzeris, “Guest Editorial for the Special Issue on Radio-Frequency Identification (RFID), Sensing and Imaging,” IEEE Transactions on Microwave Theory and Techniques, Vol. 64, No. 7, pp. 2292-2293, July 2016.
- H.Lee, B.S.Cook, K.P.Murali, M.Raj and M.M.Tentzeris, “Inkjet Printed High-Q RF Inductors on Paper Substrate with Ferromagnetic

Material,” IEEE Microwave and Wireless Components Letters, Vol. 26, No. 6, pp. 419- 421, June 2016.

- Y.He, Z.Pan, X.Cheng, J.Qiao and M.M.Tentzeris, “A Novel Dual-Band, Dual-Polarized, Miniaturized and Low-Profile Base Station Antenna,” IEEE Transactions on Antennas and Propagation, Vol.63, No. 12, pp.5399-5408, December 2015.
 - M.Yoo, H.K.Kim, S.Kim, M.Tentzeris and S.Lim, “Silver Nanoparticle-Based Inkjet-Printed Metamaterial Absorber on Flexible Paper,” IEEE Antennas and Wireless Propagation Letters, Vol. 14, pp. 1718- 1721, June 2015.
10. A selection of recent publications in conference proceedings is as follows:
- M.M.Tentzeris, R.A.Bahr, A.D.Papadopoulos and E.N.Glytsis, “Multi-Domain Modeling of 3D Printed, Nanotechnology and Morphing/Origami-Based RF Modules,” Proc. of the 2016 IMS Symposium, San Francisco, CA, May 2016, pp. 1-4.
 - B.K.Tehrani, B.S.Cook and M.M.Tentzeris, “Inkjet-Printed 3D Interconnects for Millimeter-Wave System-on-Package Solutions,” Proc. of the 2016 IMS Symposium, San Francisco, CA, May 2016, pp. 1-4.
 - K.A.Nate, J.Hester, M.Isakov, R.Bahr and M.M.Tentzeris, “A Fully Printed Multilayer Aperture-Coupled Patch Antenna Using Hybrid

3D/Inkjet Additive Manufacturing Techniques,” Proc. of the 2015 EuMW Symposium, September 2015, Paris, FRANCE, pp. 610-613.

11. I am a named inventor on 20 patents in the US and in Europe. In particular, I am a named inventor on patents relating to antenna design, RF systems, and means of reducing signal interference in RF applications. A complete list of my patents and published applications is included in my curriculum vitae.

12. In addition to gaining expertise via my academic training, professional experiences, and research accomplishments described above, I have kept abreast of various sub-disciplines within the antennas space, by reading technical literature, attending and presenting at conferences, and attending and presenting at symposia. I have served as an editor for various journals and participated in the peer review process for various technical journals and conferences, and have reviewed manuscripts submitted by other scholars relating to antenna topologies. I have contributed further to the profession by chairing conference committees and planning conferences and panels. Furthermore, I have collaborated with or have communicated with many of the scholars and engineers in the field of antennas systems.

13. I am not an attorney and offer no legal opinions, but in the course of my work, I have had experience studying and analyzing patents and patent claims from the perspective of a POSITA.

14. I have been retained on behalf of Hanshow America Inc. and Hanshow Technology Co., Ltd. (collectively, “Hanshow” or “Petitioners”) to offer technical opinions relating to U.S. Patent No. 11,405,669 (“the ’669 Patent”) and prior art references relating to its subject matter. I have reviewed the ’669 Patent (Ex.1001), and relevant excerpts of the prosecution history of the ’669 Patent (Ex.1002). I have also reviewed the following prior art and corroborating references:

- Ex.1004 U.S. Pub No. 2016/0134930 (“Swafford”)
- Ex.1005 U.S. Pub No. 2017/0134690 A1 (“Masumoto”)
- Ex.1006 U.S. Pub No. 2017/0171577 (“Kipp”)
- Ex.1007 JP 2011-76222A (“Takashi”)
- Ex.1008 Certified translation of JP 2011-76222A (“Takashi”)
- Ex.1009 WO 2008/073829 A2 (“Clontz”)
- Ex.1010 U.S. Pub No. 2018/0035018 A1 (“Yamada”)

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

16. Counsel has informed me that I should consider these materials through the lens of one of ordinary skill in the art related to the ’669 Patent at the time of the earliest possible priority date of the ’669 Patent, and I have done so during my review of these materials. The application leading to the ’669 Patent was filed November 10, 2017 (“the Critical Date”). Counsel has informed me that the

Critical Date represents the earliest possible priority date to which the Challenged Claims of '669 Patent are entitled, and I have therefore used that Critical Date in my analysis below.

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

18. In writing this declaration, I have considered the following: my own knowledge and experience, including my work experience in the fields of computer science, computer engineering and electrical engineering; my experience in teaching those subjects; and my experience in working with others involved in those fields. In addition, I have analyzed various publications and materials, in addition to other materials I cite in my declaration. My opinions, as explained below, are based on my education, experience, and expertise in the fields relating to the '669 Patent. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in those fields as of the Critical Date, or before. Any figures that appear within this document have been prepared with the assistance of Counsel and reflect my understanding of the '669 Patent and the prior art discussed below.

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

- Claims 1-15 (the “Challenged Claims”) of the ’669 Patent are rendered obvious by Swafford and Masumoto;
- Claims 1-15 of the ’669 Patent are rendered obvious by Masumoto, Kipp, and Takashi.

II. LEGAL STANDARDS

A. Terminology

20. I have been informed by Counsel and understand that the best indicator of claim meaning is its usage in the context of the patent specification as understood by one of ordinary skill. I further understand that the words of the claims should be given their plain meaning unless that meaning is inconsistent with the patent specification or the patent’s history of examination before the Patent Office. Counsel has also informed me, and I understand that, the words of the claims should be interpreted as they would have been interpreted by one of ordinary skill at the time the invention was made (not today). Because I do not know at what date the invention as claimed was made, I have used the earliest possible priority date of the ’669 Patent as the point in time for claim interpretation purposes. That date was November 10, 2017, the Critical Date.

B. Legal Standards for Obviousness

21. I have been informed by Counsel and understand that documents and materials that qualify as prior art can render a patent claim unpatentable as obvious. I am informed by Counsel and understand that all prior art references are to be looked at from the viewpoint of a person of ordinary skill in the art at the time of the invention, and that this viewpoint prevents one from using his or her own insight or hindsight in deciding whether a claim is obvious.

22. I have been informed by Counsel and understand that a claim is unpatentable for obviousness under 35 U.S.C. § 103 (in the AIA form of that statute that applies to the '669 Patent) "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains." I am informed by Counsel and understand that obviousness may be based upon a combination of references. I am informed by Counsel and understand that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. However, I am informed by Counsel and understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.

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

24. I am informed by Counsel and understand that a patent claim composed of several limitations is not proved obvious merely by demonstrating that each of its limitations was independently known in the prior art. I am informed by counsel for the Petitioner and understand that identifying a reason those elements would be combined can be important because inventions in many instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. I am informed by Counsel and understand that it is improper to use hindsight in an obviousness analysis, and that a patent's claims should not be used as a "roadmap."

25. I am informed by Counsel and understand that an obviousness inquiry requires consideration of the following factors: (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) any objective indicia of non-obviousness

cited by the patent owner, such as commercial success, long-felt but unresolved need, failure of others, industry recognition, copying, and unexpected results. I understand that the foregoing factors are sometimes referred to as the “Graham factors.”

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

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

28. I have been informed by Counsel and understand that practical and common sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I have been informed by Counsel and understand that a person of ordinary skill

looking to overcome a problem will often be able to fit together the teachings of multiple prior art references. I have been informed by Counsel and understand that an obviousness analysis therefore takes into account the inferences and creative steps that a person of ordinary skill would have employed at the time of the alleged invention.

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

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

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

provide a reason for combining the elements of multiple prior art references in the claimed manner.

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

C. Level Of Ordinary Skill In The Art

33. In my opinion, a person of ordinary skill in the art (“POSITA”) relating to, and at the time of, the ’669 Patent’s Critical Date would have been someone with at least a Master of Science Degree in an academic area emphasizing electrical engineering, computer engineering, wireless telecommunication systems, or an equivalent field (or a similar technical Master’s Degree, or higher degree). Alternatively, a POSITA would have had a Bachelor’s Degree (or higher degree) in an academic area emphasizing electrical engineering, computer engineering, wireless telecommunication systems, or an equivalent field with two or more years of work experience in electrical engineering, computer engineering, wireless telecommunication systems, or an equivalent field. Additional education in a relevant field, or relevant industry experience may compensate for a deficit in one of the other aspects of the requirements stated above.

34. Based on my knowledge, skill, and experience, I have a good understanding of the capabilities of the POSITA. Indeed, I have taught,

participated in organizations, and worked closely with many such persons over the course of my career. For example, from my industry experience, I am familiar with what an engineer would have known and found predictable in the art. From teaching and supervising my post-graduate students, I also have an understanding of the knowledge that a person with this academic experience possesses. Furthermore, I possess those capabilities myself.

III. THE '669 PATENT

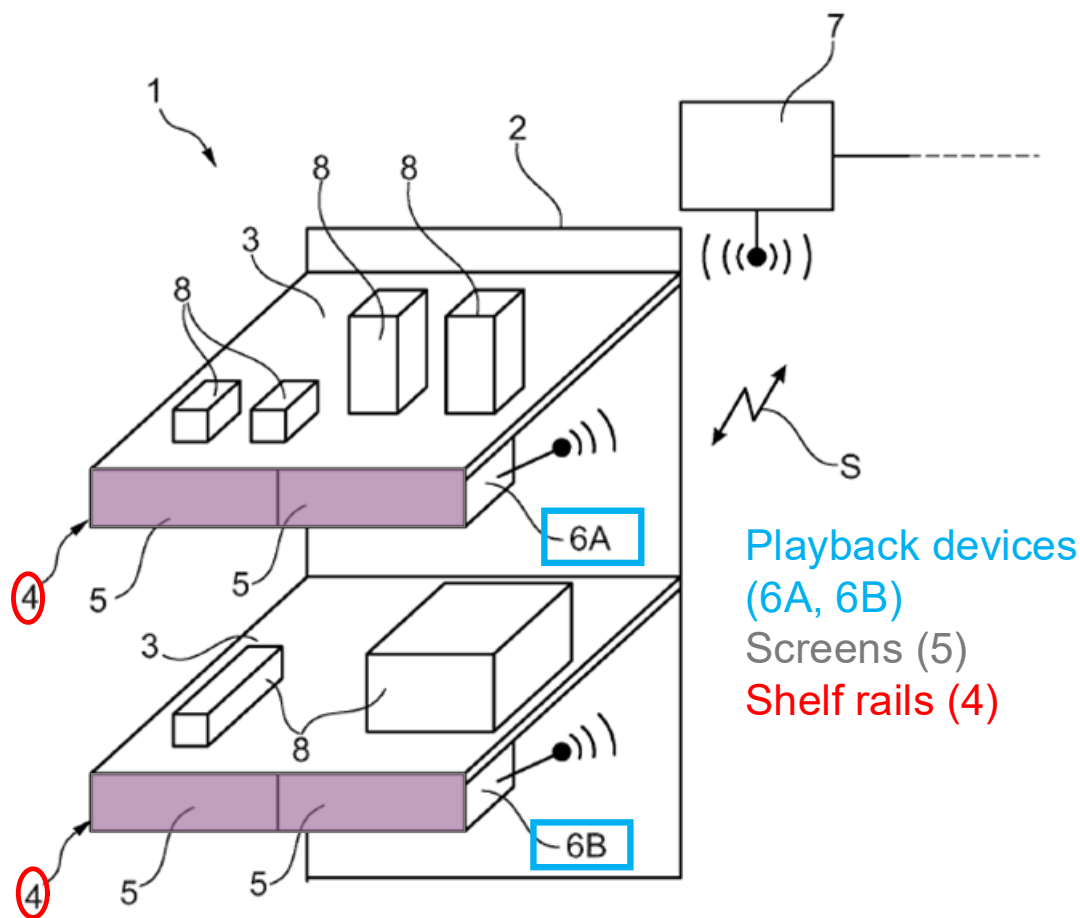
A. Overview of the '669 Patent

35. Prior to the Critical Date of the '669 Patent, numerous products, publications, and patents existed that implemented or described the functionality claimed in the '669 Patent. The methodology of the '669 Patent was therefore well-known in the prior art as of the Critical Date. Further, to the extent there was any problem to be solved in the '669 Patent, it had already been solved in the prior art systems before the Critical Date of the '669 Patent as I discuss below.

36. The '669 patent “relates to a system for synchronized video playback on a number of playback devices.” Ex.1001, 1:15-16. The object of '669 patent is to provide a system “capable of playing back synchronized video on a number of devices comprised of relatively inexpensive hardware.” *Id.*, 1:37-40.

37. Figure 1 (reproduced below) illustrates a “system 1 is installed in a retail shop of which only a shelf 2 is shown,” which has two shelf floors 3. *Id.*, 5:23-25. “[E]ach shelf floors 3 comprises a shelf rail 4 (not shown in detail) to which two video screens 5 are attached along its entire length.” *Id.*, at 5:25-28. “The first

device 6A is connected to the screens 5 on the upper floor 3 and the second device 6B is connected to the screens 5 on the lower floor 3.” *Id.*, 5:29-31. “The video content (film) to be displayed on the screens 5 is supplied by a server 7 via a radio signal to both devices 6A and 6B.” *Id.*, 5:32-34. “The video content is delivered in form of compressed video data that are structured in frames labeled by frame numbers.” *Id.*, 5:34-36.



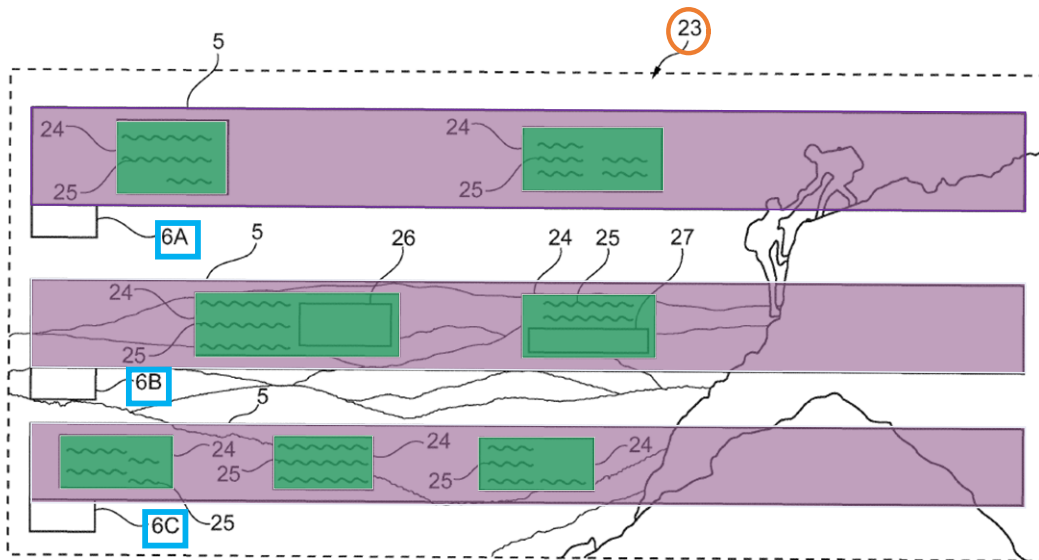
The '669 Patent, Fig. 1 (annotated)

38. The '669 patent further discloses that “[i]n block 10 the server sends out the video to the devices 6A, 6B. In block 11 the devices 6[A], 6B start playing back the video.” *Id.* 5:46-48. “In block 12 each device 6A and 6B attends the

lapse of one second of its own clock. After one second has lapsed, the respective device 6A, 6B transmits the playback progress-data, which represent the frame number of the correctly used frame in the respective device 6A, 6B. The transmission of the playback progress-data of the device 6A is received at the device 6B and vice versa.” *Id.*, 5:46-55. “[T]he devices 6A, 6B compare the received frame number with the frame number currently in use in its own playback process.” *Id.*, 5:56-58. “[T]he device 6A or 6B that detected the difference sends out a synchronization comm[a]nd¹ immediately.” *Id.*, 5:60-62.

39. In Figure 6 (reproduced below), the (background) video 23 is played “in synchronous mode on the different screens 5 (annotated purple).” *Id.*, 7:34-38. The content 24 (annotated green) “is embedded into the video 23 and also supplied by the server 7 to the individual devices 6A-6C.” *Id.*, 7:21-23. “The content 24 may comprise static (textual) information related to product and/or price information indicated by wavy lines 25. The content 24 may also comprise individual video sequences 25 and 26 which are assigned to particular electronic shelf label 24.” *Id.*, 7:23-28.

¹ The '669 Patent recites “the device 6A or 6B that detected the difference sends out a synchronization commend immediately” at 5:60-62. This sentence includes a typo in “commend” which should be “command.”



Video (23)

Playback devices (6A, 6B, 6C)

Electronic shelf label content (of virtual electronic shelf labels) (24)

The '669 Patent, Fig. 6 (annotated)

40. The '669 patent includes 15 claims, of which claim 1 is independent. *Id.*, 8:7-9:28.

B. Prosecution History of the '669 Patent

41. The '669 patent was granted on August 2, 2022. The '669 patent was filed as U.S. national phase application of International Application No. PCT/EP2017/0078844, which was filed on November 10, 2017, with a U.S. Patent Application No. 16/762,709 ("the '709 application"). Ex.1002. The Patent Office issued three office actions during the prosecution of the '709 application. Ex.1002. In the Notice of Allowance, the Examiner stated that "[p]rior art of record fails to teach or reasonably suggest where each playback device transmits

the playback progress data to the other device to determine whether the device is synchronous or asynchronous with the other device where the product information is displayed as virtual shelf labels within a section of a screens display area overlapping with video content or substituting a video content of a section of the screen, when taking the claim as a whole.” Ex.1002. However, as I explain in detail in this declaration, there is nothing new about these features because the prior art and analysis provided herein render obvious the Challenged Claims.

C. Interpretation of the ’669 Patent Claims at Issue

42. For purposes of my analysis in this IPR proceeding, I understand that the terms that appear in the claims of the ’669 Patent should be interpreted according to their plain and ordinary meaning under the *Phillips* standard. In determining the plain and ordinary meaning, I understand that the words of a claim are first given their plain meaning that those words would have had to one of ordinary skill at the time of the alleged invention. I also understand that the structure of the claims, the specification and file history also may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. Moreover, I understand that treatises and dictionaries may be used, albeit under limited circumstances, to determine the meaning attributed by one of ordinary skill to a claim term at the time of filing. I have followed this approach in my analysis, and

for all of the claim terms considered in this declaration, I have applied the plain and ordinary meaning of those terms.

43. I also understand that the words of the claims should be interpreted as they would have been interpreted by one of ordinary skill at the time the invention was made (not today). For purposes of my analysis here, I have used November 10, 2017 as the date of invention. Without exception, however, my understanding of the proper meaning of the recited claim elements (under the *Phillips* standard) in this declaration would be correct if the date of invention was anywhere in the mid-2000s to the mid-2010s.

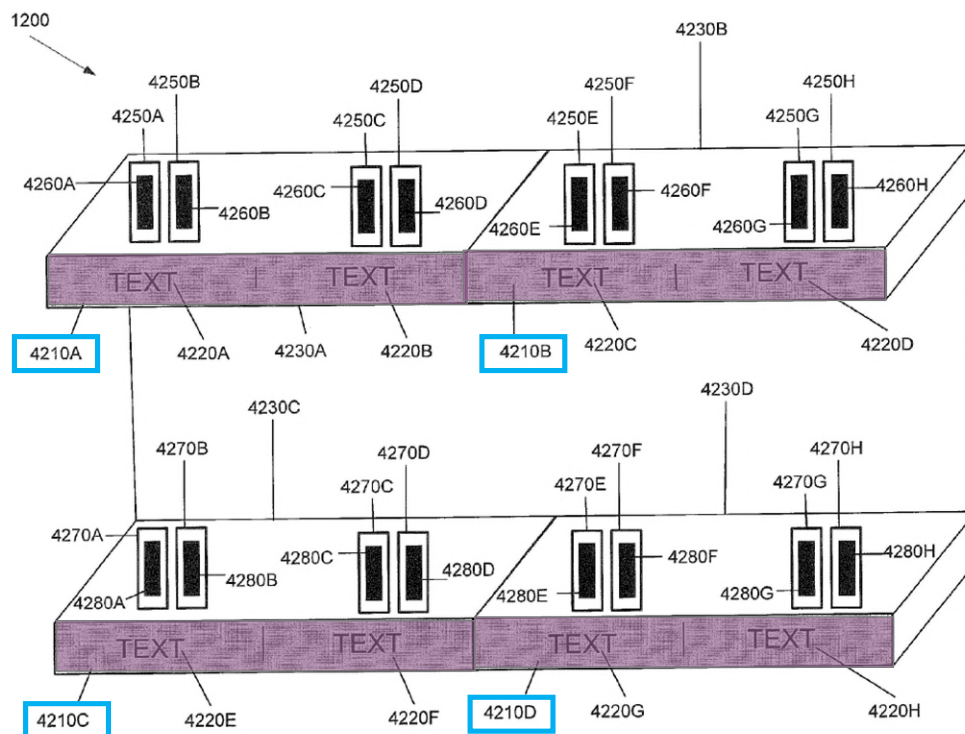
IV. APPLICATION OF PRIOR ART TO THE '669 PATENT CLAIMS

A. GROUND 1: Claims 1-15 are rendered obvious over Swafford in view of Masumoto

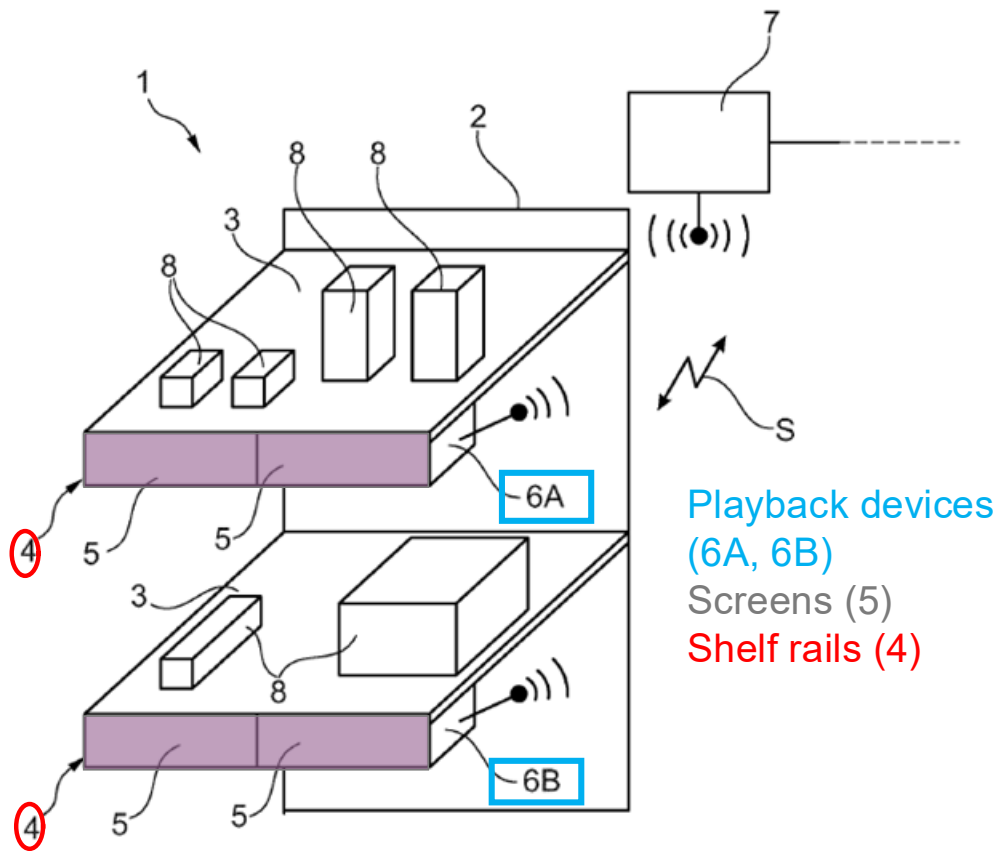
1. Overview of Swafford

44. Swafford relates to “a store intelligence system that can be configured to be used to, for example, provide one or more of interactive electronic price displays, provide marketing messaging, and provide a continuous display across an electronic price display, packages, and/or products.” Ex.1004 (Swafford), [0002]. More specifically, Swafford describes systems “for a merchandizing display related to a continuous display formed by electronic displays embedded along product shelves and on the packages stored on the product shelves.” Ex.1004 (Swafford), Abstract.

45. As shown in Figure 42 (reproduced below), in a system “of multiple continuous display shelf edge label devices (annotated in blue),” “[e]ach continuous display shelf edge label device includes a single display area 4210A-4210D oriented along an entire edge of a shelf 4230A-4230D.” Ex.1004 (Swafford), [0376]-[0377]. Like the ‘669 Patent, Swafford teaches that “an array of continuous display shelf edge label devices may be configured, which can be configured to be combined together display a uniform image or video.” Ex.1004 (Swafford), [0383].



Ex.1004 (Swafford), FIG. 42 (annotated)

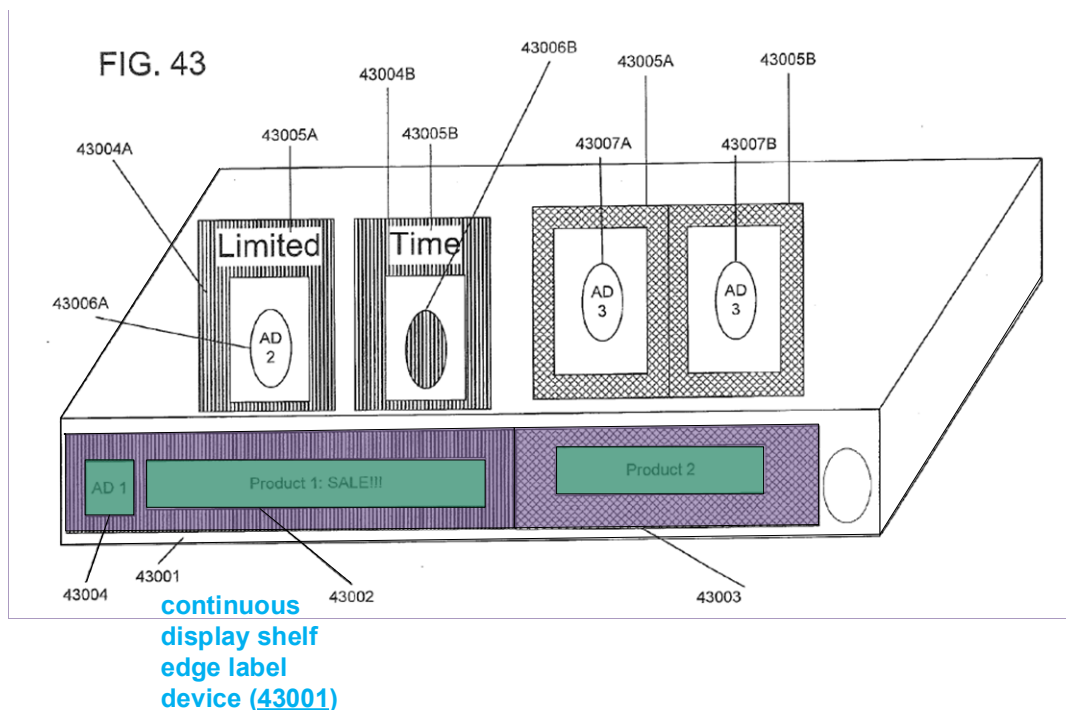


The '669 Patent, Fig. 1 (annotated)

46. In Swafford, “[e]ach of the first electronic label device, the second electronic label device, the first group of electronic displays, and the second group of electronic displays may be configured to simultaneously output a different portion of the streaming video.” Ex.1004, [0243].

47. Swafford describes various embodiments in its disclosure. In FIG. 43 (reproduced below), “[c]ontinuous display shelf edge label device 43001 can be provided with any number of displays” in which, for example, displays 43002 and 43003 (annotated in purple) provide information on products 43006A-B and 43007A-B placed above, display 43002 “may also display a static or

dynamic advertisement 43004 (annotated in green)” and “the backgrounds of displays 43002 and 43003 (annotated in purple) may display additional information, such as static images or streaming video of products 43006A-B and 43007A-B, promotional content, good-will messages, advertisements or any related information.” Ex.1004 (Swafford), [0388].

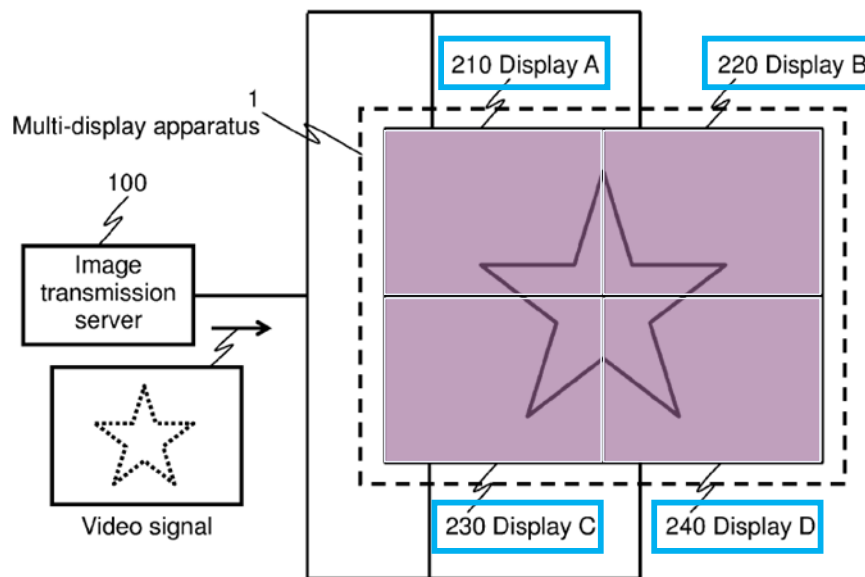


Ex.1004 (Swafford), FIG. 43 (annotated)

2. Overview of Masumoto

48. Masumoto teaches “a multi-display apparatus for displaying a single image by combining a plurality of displays.” Ex.1005 (Masumoto), [0017]. “In FIG. 1 (reproduced below), image transmission server 100 sends an arbitrary

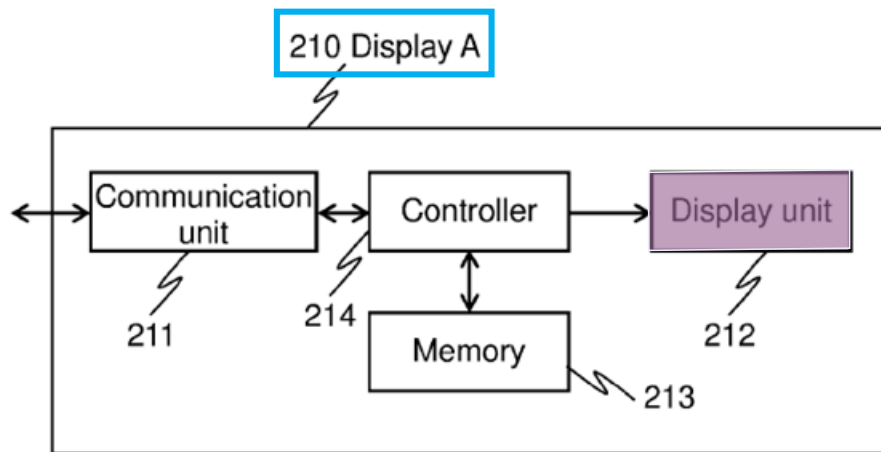
video signal to network-connected display A210, display B220, display C230, and display D240.” Ex.1005 (Masumoto), [0039]. “Image transmission server 100 sends same video signal to each of display A210 to display D240 simultaneously.” Ex.1005 (Masumoto), [0039].



Ex.1005 (Masumoto), FIG. 1 (annotated)

49. “All displays have the same structure.” Ex.1005 (Masumoto), [0040]. Each display includes a display unit 212 to display a video and the display unit 212 includes “a liquid crystal display panel.” Ex.1005 (Masumoto), FIG. 2 (reproduced below). “The controller [in one display] sends a request signal requesting other display to transmit specific information of a video signal displayed on the other display, and receives the specific information from the other display. The controller gives notification of correction to the other display

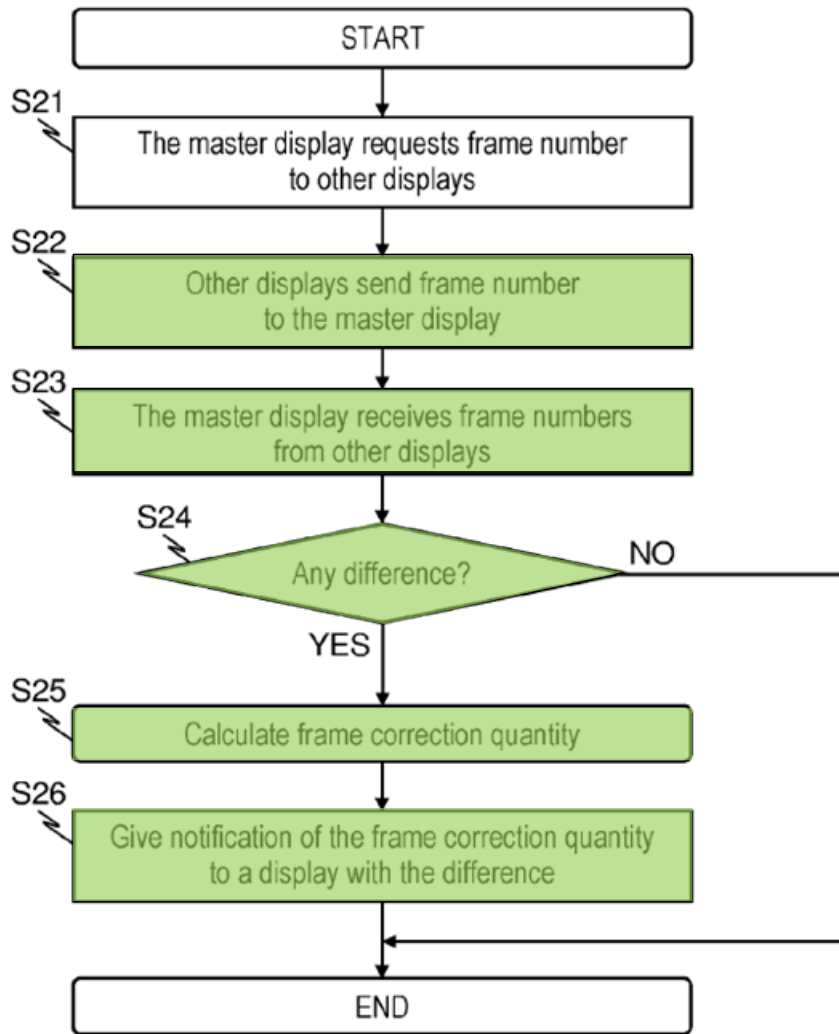
sending the specific information with a difference when the specific information received differs from specific information of a video signal that is supposed to be displayed.” Ex.1005 (Masumoto), [0017].



Ex.1005 (Masumoto), FIG. 2 (annotated)

50. Like the '669 Patent, Masumoto discloses that “the frame number is an example of specific information of the video signal.” Ex.1005 (Masumoto), [0107].

51. In Figure 9 (reproduced below) of Masumoto, a flow chart shows operations of the multiple-display apparatus where the frame number is an example of specific information of the video signal.



Ex.1005 (Masumoto), FIG. 9 (annotated)

52. As described in Figure 9, “[f]irst, one display requests other displays to notify the frame number or time stamp of the video signal displayed on each of other displays (Step S1).” Ex.1005 (Masumoto), [0108]. “Other display A210 to display C230 to which display D240 requests for a notice (Step S21) send a frame number of the video signal displayed in each display A210 to display D240 (Step S22).” Ex.1005 (Masumoto), [0110]. “Next, display D240 receives

a frame number of video signal displayed in each display at specific time from other display A210 to display [C]230 (Step S23).” Ex.1005 (Masumoto), [0112]. “Display D240 calculates a desired frame number at specific time notified in Step S21, and compares its calculation result with the frame number received in step S23 for each display to determine any difference (Step S24).” Ex.1005 (Masumoto), [0113]. “When a frame number different from the desired frame number (difference exists) is detected (Yes in Step S24), display D240 calculates a frame correction quantity (Step S25).” Ex.1005 (Masumoto), [0117]. “Display D240 notifies delayed display A210 of the frame correction quantity calculated in Step S25 (Step S26).” Ex.1005 (Masumoto), [0118]. “If there is no difference (NO in Step S24) in Step S24, controller 214 of display D240 ends without processes in Steps S25 and S26.” Ex.1005 (Masumoto), [0118].

53. As discussed in Masumoto, “[i]n the exemplary embodiment, for convenience, a display requesting this notice is called a master display.” Ex.1005 (Masumoto), [0108]. That is, as shown in FIG. 9, the master display is display D240 requesting for a notice in Step S21. Thus, when any of the different displays starts the request, any of the different displays A210 – D240 may be the master display here for convenience.

3. Analysis

Claim 1

[1.0] A video playback system (1), comprising

54. To the extent the preamble is limiting, each of Swafford and Masumoto discloses [1.0].

55. As discussed in §III.A.1, Swafford discloses systems “for a merchandizing display related to a continuous display formed by electronic displays embedded along product shelves and on the packages stored on the product shelves” and “[a] streaming video may then be apportioned among displays on electronic label devices and the packages. Each of the displays may simultaneously output a different portion of the streaming video.” Ex.1004 (Swafford), Abstract.

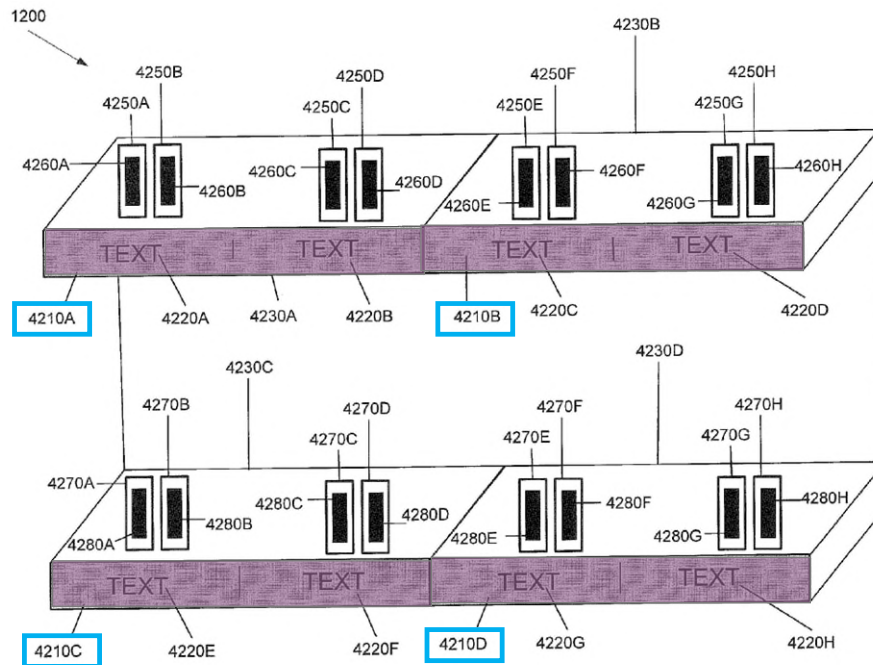
56. As discussed in §III.A.2, in the same field of endeavor (e.g., video playback system), Masumoto describes “a multi-display apparatus for displaying a single image by combining a plurality of displays.” Ex.1005 (Masumoto), [0017].

[1.1] a number of playback devices (6A, 6B) to playback a video on their screens (5),

57. As set forth in detail below, each of Swafford and Masumoto discloses [1.1].

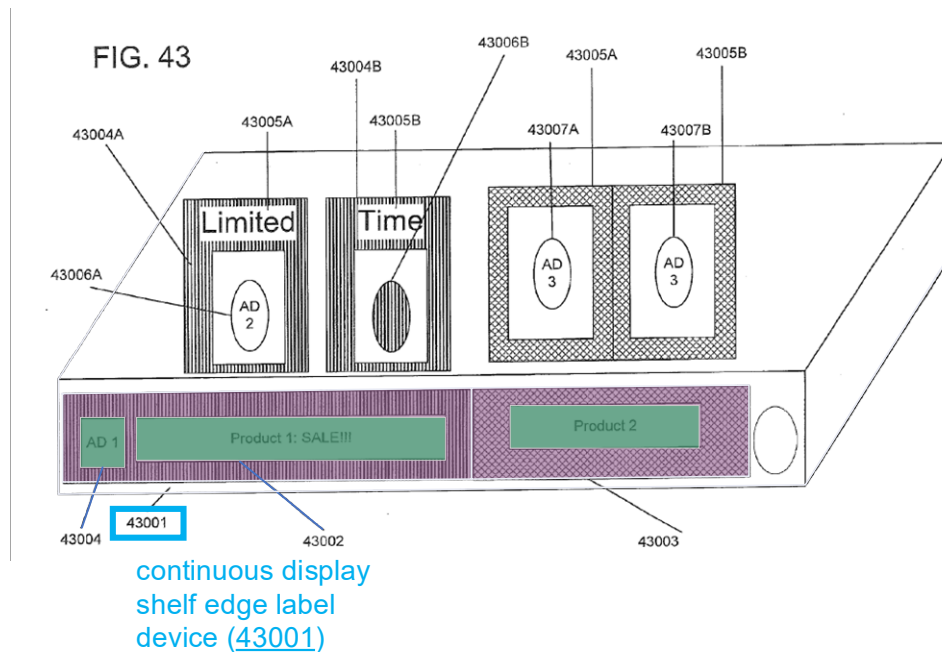
58. As discussed in §III.A1, Swafford teaches that “continuous display shelf edge label devices arranged in side by side (4210A and 4210B or 4210C and

4210D) orientation and stacked on top of each other like shelves (4210A and 4210C or 4210B and 4210D), an array of continuous display shelf edge label devices may be configured, which can be configured to be combined together display a uniform image or video.” Ex.1004 (Swafford), [0383], FIG. 42.



Ex.1004 (Swafford), FIG. 42 (annotated)

59. FIG. 43 (reproduced below) of Swafford shows another example of one continuous display shelf edge label device 43001 which “can be provided with any number of displays.” Ex.1004 (Swafford), [0388], FIG. 43.

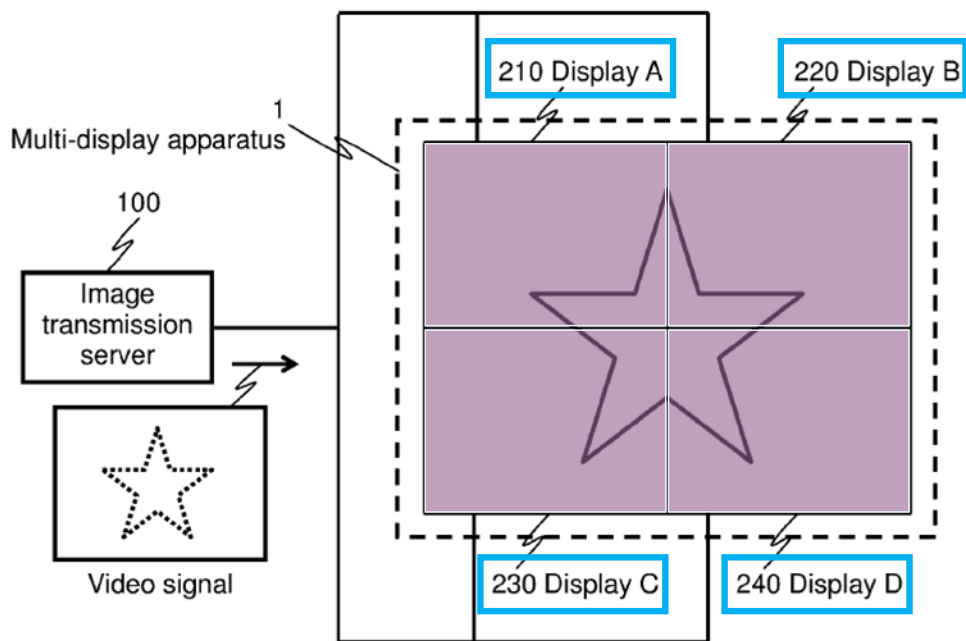


Ex.1004 (Swafford), FIG. 43 (annotated)

60. Therefore, Swafford teaches each continuous display shelf edge label device 4210A - 4210D, 43001 as a playback device and the multiple continuous display shelf edge label devices configured to display a video on their displays.

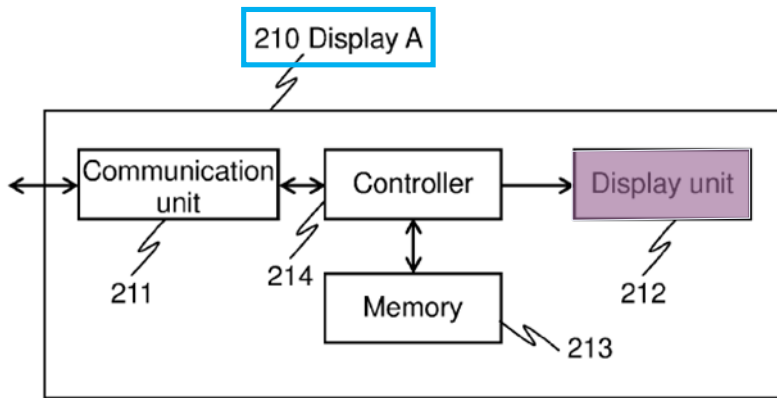
61. As discussed in §III.A2, Masumoto also teaches that “a multi-display apparatus for displaying a single image by combining a plurality of displays.”

Ex.1005 (Masumoto), [0017]. “In FIG. 1, image transmission server 100 sends an arbitrary video signal to network-connected display A210, display B220, display C230, and display D240.” Ex.1005 (Masumoto), [0039]. “Image transmission server 100 sends same video signal to each of display A210 to display D240 simultaneously.” Ex.1005 (Masumoto), [0039].



Ex.1005 (Masumoto), FIG. 1 (annotated)

62. Masumoto further teaches that “[a]ll displays have the same structure.” Ex.1005 (Masumoto), [0040]. “[M]ulti-display apparatus 1 may be used for simultaneously displaying multiple video signal A and video signal B from image transmission server 100.” Ex.1005 (Masumoto), [0094]. Each display includes a display unit 212 to display a video and the display unit 212 includes “a liquid crystal display panel.” Ex.1005 (Masumoto), [0040], FIG. 2.



Ex.1005 (Masumoto), FIG. 2 (annotated)

63. Therefore, Masumoto teaches the plurality of displays A210-D240 as a number of playback devices in [1.1] and the plurality of displays A210-D240 are configured to display a video on their display units.

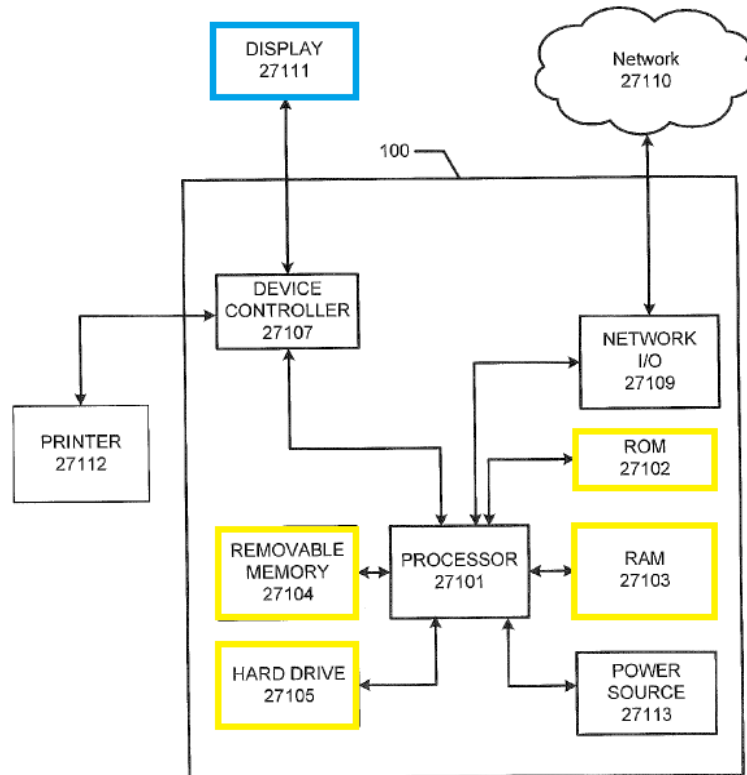
64. Therefore, it is my opinion that each of Swafford and Masumoto teaches each and every limitation of [1.1].

[1.2] each playback device (6A, 6B) comprises a memory to store video data (9) representing said video,

65. As set forth in detail below, Masumoto discloses [1.2].

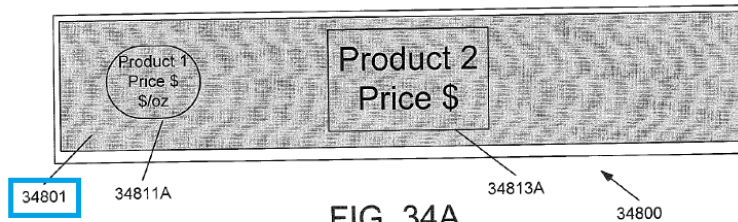
66. First, Swafford discloses that “[o]ne or more memories 27102, 27103, 27104, and/or 27105 may include a stored address location and display data location data” and “[d]isplay data location data may be used by processor 27101 to format data to be displayed on display 27111.” Ex.1004 (Swafford), [0265], FIG. 27. “Although shown in FIG. 27 as being outside of computing device

27100, display 27111 also may be integrated into a same physical housing and/or structure as computing device 27100.” Ex.1004 (Swafford), [0265].



Ex.1004 (Swafford), FIG. 27 (annotated)

67. “As shown illustratively in the examples of FIGS. 29-34B, display 27111 may be configured to be oriented along an entire edge of a shelf of a retailer.” Ex.1004 (Swafford), [0266]. Thus, Swafford discloses that display 27111 may be the continuous display 34801 oriented along an entire edge of a shelf as shown in FIG. 34A.



Ex.1004 (Swafford), FIG. 34A (annotated)

68. Therefore, it is my opinion that Swafford teaches that each continuous display 34801 includes one or more memories to store display data location data that may be used to format data to be displayed on display.

69. Additionally, Masumoto teaches that each display includes a memory to store video data representing the video by disclosing that “[d]isplay A210 includes communication unit 211 for communication via network, display unit 212 including a liquid crystal display panel, memory 213 for storing a range of data, and controller 214 for controlling these communication unit 211, display unit 212, and memory 213.” Ex.1005 (Masumoto), [0040]. “Data stored in memory 213 is specifically a video signal sent from the image transmission server and a video signal for display is generated by cutting out a portion of this video signal.” Ex.1005 (Masumoto), [0040].

70. Therefore, it is my opinion that Masumoto teaches each and every limitation of [1.2].

[1.3] and a communication stage to communicate data with each other, wherein the devices (6A, 6B) are designed:

*to transmit video playback progress-data via the communication stage to the other device (6B, 6A); and,
to determine based on the received progress data whether it is in a synchronous or asynchronous playback progress with the other devices (6B, 6A);*

71. As explained above with respect to [1.0]-[1.2] in §III.A.3 and in sections below, Swafford in view of Masumoto discloses [1.3].

72. Swafford teaches that “[e]ach of the vertically-stacked multiple continuous displays, user interfaces, and packages may then simultaneously output a different part of the message” and “[t]he message may include graphics, text, animations, streaming video, or any combination thereof.” Ex.1004 (Swafford), [0287].

73. Further, Swafford teaches that “a continuous display shelf edge label device may determine or receive data from another continuous display shelf edge label device about a competitive product and/or related product (such as toothpastes to toothbrushes).” Ex.1004 (Swafford), [0315]. “The electronic label devices may be configured to receive a streaming video and apportion the streaming video between the one or more electronic label devices and the plurality of packages.” Ex.1004 (Swafford), [0421].

74. Swafford does not explicitly describe that the video playback progress-data is transmitted from one continuous display shelf edge label device to another continuous display shelf edge label device. This modification would be obvious in view of Masumoto.

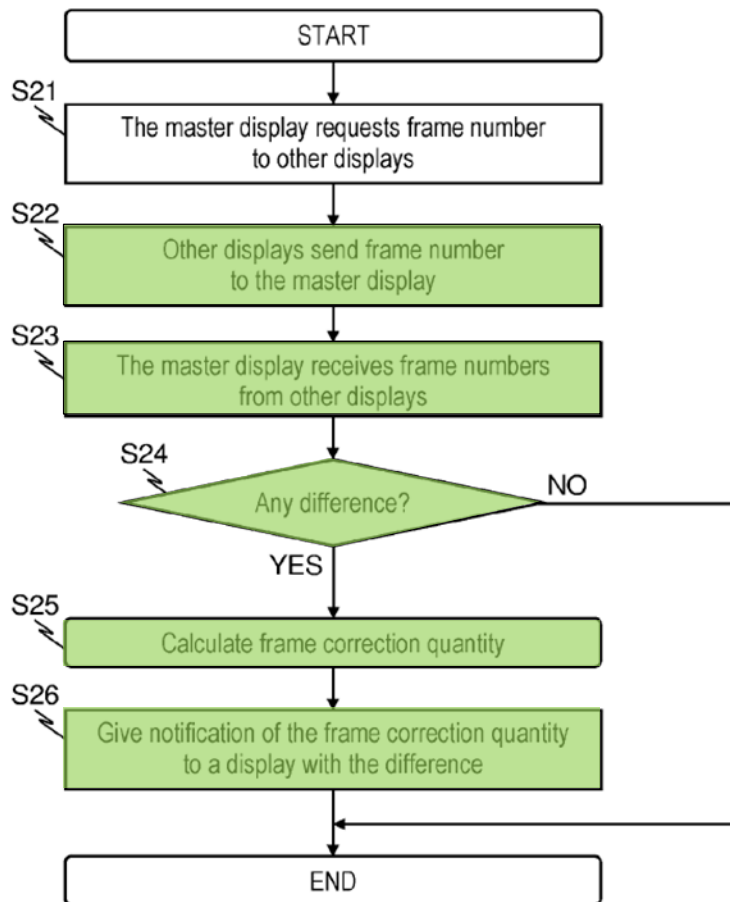
75. Specifically, Masumoto teaches “[t]he multi-display apparatus includes the plurality of displays connected to a network. Each of the plurality of displays includes a communication unit that communicates via the network and a controller. The controller [in one display] sends a request signal requesting other display to transmit specific information of a video signal displayed on the other display, and receives the specific information from the other display. The controller gives notification of correction to the other display sending the specific information with a difference when the specific information received differs from specific information of a video signal that is supposed to be displayed.” Ex.1005 (Masumoto), [0017]. Thus, in Masumoto, displays can communicate data with each other and one display transmits specific information of a video signal displayed on the display to the other display.

76. Therefore, Masumoto teaches that the displays can communicate data with each other and the displays are designed to transmit specific information of a video signal displayed on one display to the other display and to determine synchronization or asynchronization based on the specific information. Masumoto teaches the specific information of a video signal displayed on one display as the video playback progress-data in [1.3].

77. Furthermore, Masumoto teaches that the specific information can be frame number, like the ’669 Patent, or time stamp. “[T]he frame number is an

example of specific information of the video signal, and the time [stamp] is also another example of the specific information of the video signal.” Ex.1005 (Masumoto), [0107].

78. Figure 9 (reproduced below) of Masumoto is a flow chart that shows operations of the multiple-display apparatus where the frame number is an example of specific information of the video signal.



Ex.1005 (Masumoto), FIG. 9 (annotated)

79. As shown in figure 9 (reproduced above), “[f]irst, one display requests other displays to notify the frame number or time stamp of the video signal

displayed on each of other displays (Step S1).” Ex.1005 (Masumoto), [0108]. “Other display A210 to display C230 to which display D240 requests for a notice (Step S21) send a frame number of the video signal displayed in each display A210 to display D240 (Step S22).” Ex.1005 (Masumoto), [0110]. “Next, display D240 receives a frame number of video signal displayed in each display at specific time from other display A210 to display C230 (Step S23).” Ex.1005 (Masumoto), [0112]. “Display D240 calculates a desired frame number at specific time notified in Step S21, and compares its calculation result with the frame number received in step S23 for each display to determine any difference (Step S24).” Ex.1005 (Masumoto), [0113]. “When a frame number different from the desired frame number (difference exists) is detected (Yes in Step S24), display D240 calculates a frame correction quantity (Step S25).” Ex.1005 (Masumoto), [0117]. “Display D240 notifies delayed display A210 of the frame correction quantity calculated in Step S25 (Step S26).” Ex.1005 (Masumoto), [0118]. “If there is no difference (NO in Step S24) in Step S24, controller 214 of display D240 ends without processes in Steps S25 and S26.” Ex.1005 (Masumoto), [0118]. “Controller 214 in each display A210 to display D240 executes the processes in the flow chart. Ex.1005 (Masumoto), [0106].

80. Therefore, Masumoto teaches that the Displays (A210-C230) are designed to transmit a frame number of the video signal displayed in each

display at specific time to the display D240. Further, the Display 240 determines based on the received frame number whether the displays (A210-C230) is in a synchronous or asynchronous playback progress with the Display D240.

81. A POSITA would have been motivated to implement Masumoto's displays, in Swafford's system, as described above, for at least the following reasons.

82. First, a POSITA would have been motivated to combine Swafford with Masumoto because Swafford and Masumoto are both designed to achieve the same goal to synchronize a video across multiple displays. *See* Ex.1004 (Swafford), Abstract, [0423] ("Each of the first electronic label device, the second electronic label device, the first group of electronic displays, and the second group of electronic displays may be configured to simultaneously output a different portion of the streaming video"); *see also* Ex.1005 (Masumoto), [0004] ("mutually synchronizing displays to match the frame number contained in the image marker. This enables to display one entire image by multiple displays without a sense of incongruity"). As discussed above, Masumoto teaches transmitting video playback progress-data, such as the frame number or the time stamp, from one display to another display to determine synchronization/asynchronization. As such, a POSITA would have been

motivated and able to incorporate the teaching of Masumoto to Swafford's system, i.e., transmitting video playback progress-data, such as the frame number or the time stamp, from one electronic label device to another electronic label device in order to fulfill Swafford's express objective of "simultaneously output[ting] a different portion of the streaming video." Ex.1004 (Swafford), [0423].

83. Second, it would have been obvious to a POSITA to have looked to Masumoto's disclosure of transmitting video playback progress-data, such as the frame number or the time stamp, from one display to another display because it provides a solution to a well-recognized technical need in synchronizing video displays – a need for low bandwidth and simple, inexpensive hardware. *See* the '669 Patent, 1:28-40 ("capable of playing back synchronized video on a number of devices comprised of relatively inexpensive hardware"); *see also* Ex.1010 (Yamada), [0011] ("[I]ts object is to provide a video information reproduction system that can accurately synchronize a plurality of video signals output from a plurality of video information reproduction devices without making the configuration complex and to provide the video information reproduction device"); *see also* Ex.1006 (Kipp), [0026] ("Playback devices can thus achieve synchronization even when clock drift occurs at the video server or the individual playback devices"); *see also* Ex.1005 (Masumoto), [0079] ("to configure the simple determination step.")

84. Third, a POSITA would have expected that Swafford's system would likely be subjected to the way of transmitting video playback progress-data, such as the frame number or the time stamp, among different displays addressed in Masumoto because of the structural similarity between Swafford's and Masumoto's systems. Swafford discloses that "[t]he display can in one example be LCD display, or any other known display types." Ex.1004 (Swafford), [0330]. Masumoto teaches that "display unit 212 including a liquid crystal display panel," Ex.1005 (Masumoto), [0040], and describes that how different displays communicate with each other to synchronously display a video. Given the structural similarity between Swafford's and Masumoto's devices (e.g., both Swafford and Masumoto are using LCD displays to play videos), a POSITA would have recognized, from Masumoto's teaching, that it would improve Swafford's similar device (*i.e.*, LCD displays) in the same way.

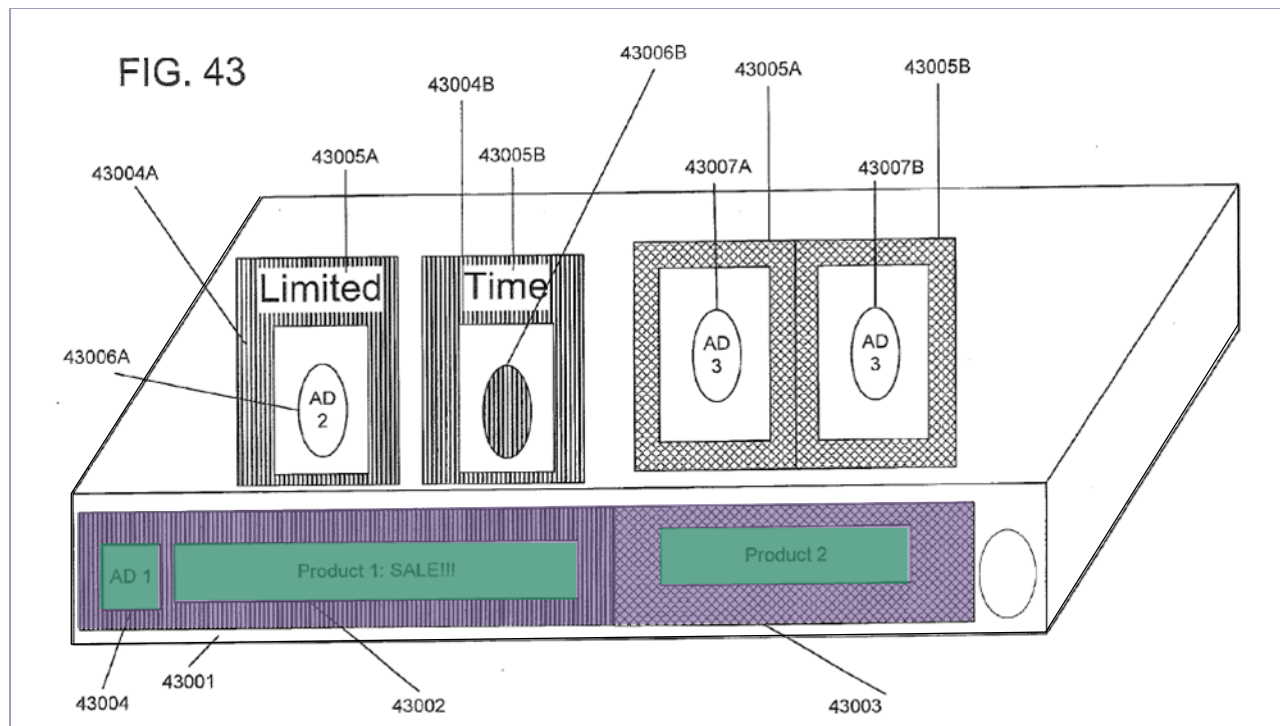
85. Fourth, in my opinion, a POSITA would have been readily able to incorporate Masumoto's displays that transmit video playback progress-data and Masumoto's memory that stores video data representing the video into Swafford's electronic label devices with an expectation of success. Swafford's electronic label devices all play the same role in the '669 Patent as synchronously displaying advertisement videos in the existing art of video playback. Accordingly, it would have been routine for a POSITA to combine or

modify Swafford's electronic label devices to arrive at the purported invention of the '669 Patent.

[1.4] wherein the display devices (6A, 6B) are designed to display product information or product price related information by means of virtual electronic shelf labels displayed within a section of a screen's (5) display area overlapping with a video content or substituting a video content of said section.

86. As explained above with respect to [1.0]-[1.3] §III.A.3 and in sections below, Swafford teaches [1.4].

87. Swafford discloses that the display shelf edge label device 43001 includes different displays area 43002 and 43003 as shown in FIG. 43 (reproduced below). "Display 43002 provides information on products 43006A and 43006B and may also display a static or dynamic advertisement 43004. For example, the background of display 43002 may display the logo representing the manufacturer of products 43006A and 43006B. Display 43003 can provide information on products 43007A and 43007B. Also the background of display 43003 may display the logo representing the manufacturer of products 43007A and 43007B, where the logo displayed on the background of display 43003 may differ from the logo displayed on the background of display 43002. However, it is contemplated that the backgrounds of displays 43002 and 43003 may display additional information, such as static images or streaming video of products 43006A-B and 43007A-B, promotional content, good-will messages, advertisements or any related information." Ex.1004 (Swafford), [0388].



continuous display shelf
edge label device (43001)

Ex.1004 (Swafford), FIG. 43 (annotated)

88. Therefore, Swafford teaches that the display shelf edge label device 43001 is designed to display both static images and streaming video of products. As shown in FIG. 43 (reproduced above), static information about Product 1 or Product 2 (annotated in green) may overlap with a streaming video as a background (annotated in purple). Furthermore, the dynamic advertisement 43004 (annotated in green), information about Product 1 or Product 2 are respectively occupies one section in the displays area 43002 or 43003. The dynamic advertisement 43004 may inherently include same content as the streaming video displayed in the backgrounds of displays 43002 and 43003 by

virtue of “advertisement.” It is my opinion that the dynamic advertisement 43004 teaches the virtual electronic shelf labels because it displays production information or product price related information within a section overlapping with the background video or substituting the background video content of the overlapped section.

89. Moreover, a POSITA would understand that designing substitutive video contents in overlapping display areas is commonly used to “provide additional information to a customer or to attract a customer’s attention.” Ex.1004 (Swafford), [0404].

90. Therefore, it is my opinion that Swafford teaches each and every limitation of [1.4].

Claim 2

***[2.0] The system (1) according to claim 1,
[2.1] comprising a video distribution server (7) for distribution of the video data (9) to the devices (6A, 6B), in particular the entire video data (9) of a video upfront to playback start at the devices (6A, 6B).”***

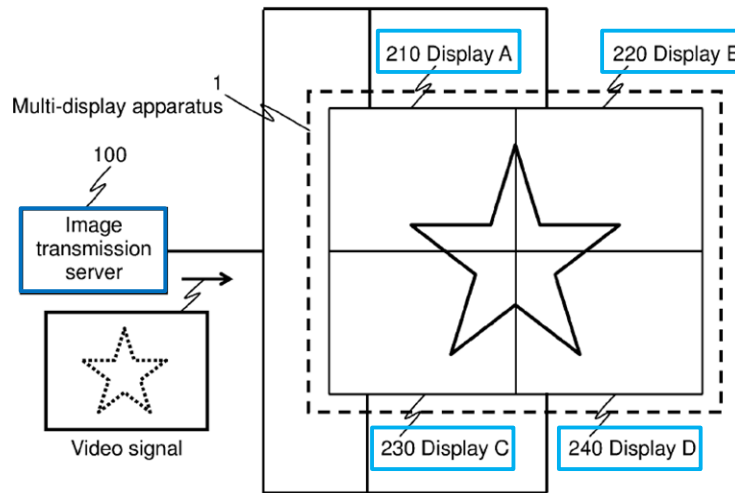
91. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [2.0]. Furthermore, as explained in sections below, Masumoto teaches [2.1].

92. Swafford teaches various servers for distributing video data to end-point devices including the electronic label devices by describing that a plurality of

end-point devices 39202-39210 associated with a product shelf including electronic shelf labels 39208 can be configured to transmit information to the hub 39100 or to receive information from the hub 39100 configured to send and receive information to and from the various servers 39322, 39324, 39326 or the cloud 39320. Ex.1004 (Swafford), [0328].

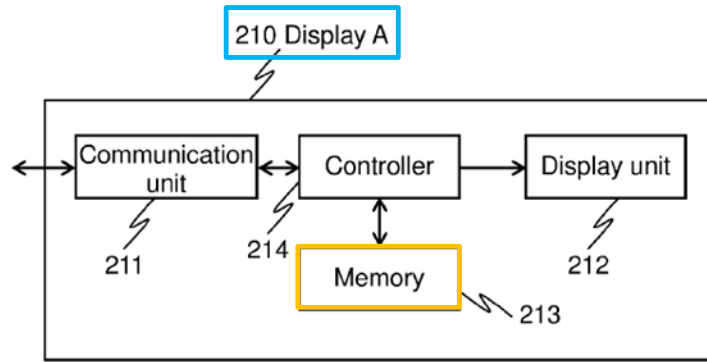
93. Additionally, Masumoto teaches that an image transmission server is configured to distribute video data to the displays, and specifically to distribute the video data to be displayed on a display upfront to the memory of the display.

94. Masumoto “offers a multi-display apparatus that can match an image display timings and image display positions of the entire image by connecting an image transmission server and multiple displays to a network.” Ex.1005 (Masumoto), [0015]. Specifically, Masumoto discloses that “[i]n FIG. 1, image transmission server 100 sends an arbitrary video signal to network-connected display A210, display B220, display C230, and display D240. In general, since a network bandwidth is limited, a video signal sent from image transmission server 100 is compressed to an appropriate size, and then sent via the network.” Ex.1005 (Masumoto), [0039].



Ex.1005 (Masumoto), FIG. 1 (annotated)

95. “Data stored in memory 213 is specifically a video signal sent from the image transmission server and a video signal for display is generated by cutting out a portion of this video signal.” Ex.1005 (Masumoto), [0040]. “In general, a video signal is sent from image transmission server 100 in a streaming format or file format, and stored in each display.” (Masumoto, [0039]). In another embodiment, Masumoto discloses that “[b]y describing in the table in memory 213 to display only odd-numbered or even-numbered display frames, display A210 can display images without any delay.” Ex.1005 (Masumoto), [0058]. Therefore, Masumoto teaches that the transmission server 100 loads the video data upfront to each memory of the displays.



Ex.1005 (Masumoto), FIG. 2 (annotated)

96. It is my opinion that Masumoto teaches that the image transmission server is configured for distributing video data upfront to each memory of the multiple displays so that the multiple displays can display an entire image. Therefore, to display the entire image, Masumoto's image transmission server distributes the entire video data of a video upfront the playback start at the multiple displays, as claimed in [2.0].

Claim 3

[3.0] The system (1) according to claim 1,

[3.1] wherein the devices (6A, 6B) are designed to determine independently from a video distribution server (7) which distributed the video data (9) to the devices (6A, 6B) that they are in a synchronous or asynchronous playback progress.

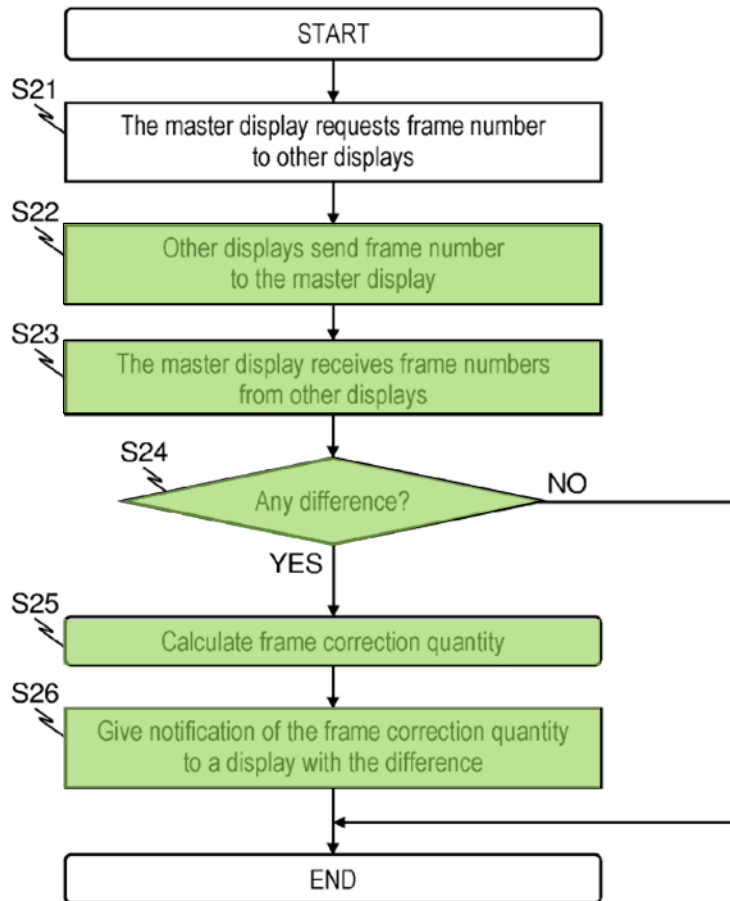
97. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [3.0]. Furthermore, as explained in sections below, Masumoto teaches [3.1].

98. Masumoto teaches that the displays determine synchronous or asynchronous status based on specific information of video signal (e.g., frame

number, time stamp) that is transmitted among the displays, independently from the transmission server.

99. Specifically, as shown in FIG. 9 (reproduced below) of Masumoto, “[f]irst, one display requests other displays to notify the frame number or time stamp of the video signal displayed on each of other displays (Step S1).” Ex.1005 (Masumoto), [0108]. “Other display A210 to display C230 to which display D240 requests for a notice (Step S21) send a frame number of the video signal displayed in each display A210 to display D240 (Step S22).” Ex.1005 (Masumoto), [0110]. “Next, display D240 receives a frame number of video signal displayed in each display at specific time from other display A210 to display C230 (Step S23).” Ex.1005 (Masumoto), [0112]. “Display D240 calculates a desired frame number at specific time notified in Step S21, and compares its calculation result with the frame number received in step S23 for each display to determine any difference (Step S24).” Ex.1005 (Masumoto), [0113]. “When a frame number different from the desired frame number (difference exists) is detected (Yes in Step S24), display D240 calculates a frame correction quantity (Step S25).” Ex.1005 (Masumoto), [0117]. “Display D240 notifies delayed display A210 of the frame correction quantity calculated in Step S25 (Step S26).” Ex.1005 (Masumoto), [0118]. “If there is no difference

(NO in Step S24) in Step S24, controller 214 of display D240 ends without processes in Steps S25 and S26.” Ex.1005 (Masumoto), [0118].



Ex.1005 (Masumoto), FIG. 9 (annotated)

100. Therefore, in Masumoto, the displays determine synchronous or asynchronous status based on specific information of video signal (e.g., frame number, time stamp) that is transmitted among the displays, independently from the transmission server.

101. Therefore, it is my opinion that Masumoto teaches each and every limitation of [3.1].

Claim 4

***[4.0] The system (1) according to claim 1,
[4.1] wherein the devices (6A, 6B) are designed: to playback compressed video data (9) that are structured in frames labeled by frame numbers, and to utilize a frame number that labels the frame that is currently played back as the progress-data to be transmitted.***

102. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [4.0]. Furthermore, as explained in sections below, Masumoto teaches [4.1].

103. Specifically, Masumoto discloses that “[i]n general, since a network bandwidth is limited, a video signal sent from image transmission server 100 is compressed to an appropriate size, and then sent via the network.” Ex.1005 (Masumoto), [0039]. “Display A210 to display D240 receiving a video signal compressed by an arbitrary compression system sent from image transmission server 100 decode and reproduce each signal. General known video signal compression systems include H.264 and MPEG4-AVC.” Ex.1005 (Masumoto), [0045]. In different embodiments of Masumoto, “[a]ll displays have the same structure.” Ex.1005 (Masumoto), [0039]. Thus, the displays in Masumoto are configured to play compressed video data.

104. Additionally, “[t]he controller sends a request signal requesting other display to transmit specific information of a video signal displayed on the other display, and receives the specific information from the other display. The controller gives notification of correction to the other display sending the specific information with a difference when the specific information received differs from specific information of a video signal that is supposed to be displayed.” Ex.1005 (Masumoto), [0017]. “A frame number or time stamp is added as specific information of video signal to each frame or a reference frame in the video signal sent from image transmission server 100. In other words, the frame number is an example of specific information of the video signal, and the time sample is also another example of the specific information of the video signal.” Ex.1005 (Masumoto), [0107]. It is my opinion that Masumoto discloses video displays using frame number as the video playback progress-data in the video signal sent and received by different video displays.

105. Therefore, Masumoto teaches that the displays are configured to play compressed video data that are structured in frames labeled by frame numbers, and to use a frame number that labels the frame as the video playback progress-data that is transmitted among the displays.

106. Therefore, it is my opinion that Masumoto teaches each and every limitation of [4.1].

Claim 5

[5.0] The system (1) according to claim 4,

[5.1] wherein each device (6A, 6B) is designed to compare a frame number received with a frame number of the frame currently played back at the device (6A, 6B) and to determine an asynchronous playback progress if the difference in the frame numbers compared with each other exceeds a pre-determined threshold value.

107. As explained above with respect to [1.0]-[1.4] and [4.1] in §III.A.3, Swafford in view of Masumoto teaches [5.0]. Furthermore, as explained in sections below, Masumoto teaches [5.1].

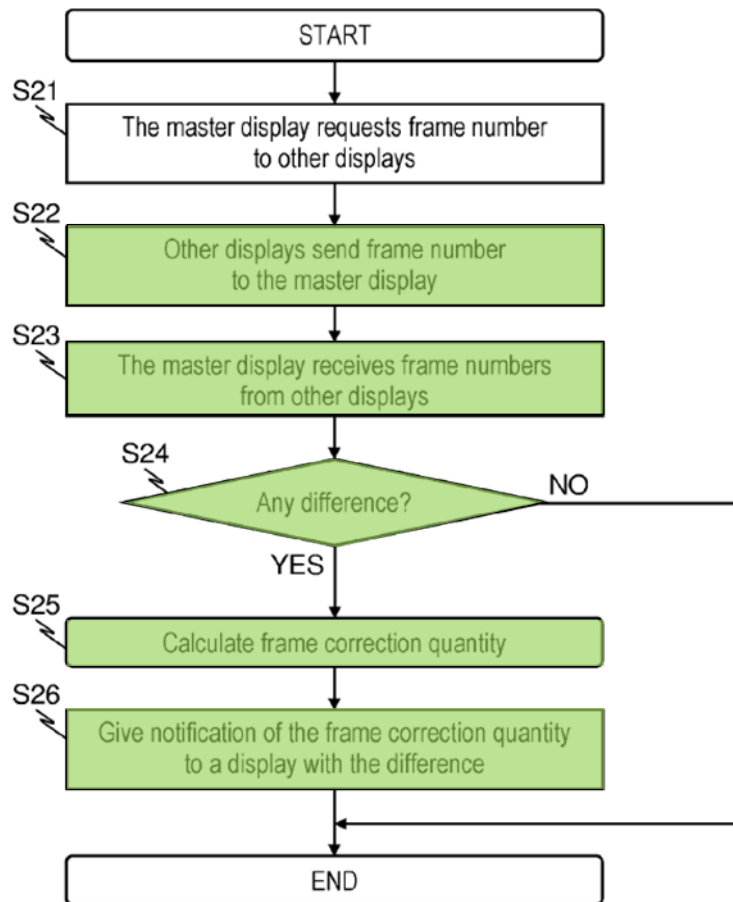
108. Masumoto teaches that the display (D240) is designed to compare difference between a frame number of the video signal displayed in the display (A210; B220; C230) at specific time notified in a request from the Display D240 to the display (A210; B220; C230) and a desired frame number at specific time calculated by the display D240 and to determine that there is asynchronization if the different exists (i.e., exceeding zero).

109. Specifically, Masumoto illustrates in FIG. 9 and describes that “display D240 receives a frame number of video signal displayed in each display at specific time from other display A210 to display [C]230 (Step S23).” Ex.1005 (Masumoto), [0112]. “Display D240 calculates a desired frame number at specific time notified in Step S21, and compares its calculation result with the frame number received in step S23 for each display to determine any difference (Step S24).” Ex.1005 (Masumoto), [0113].

110. “For example, a desired frame number displayed at 2 minutes and 0 second in a 60-fps video signal is frame No. 7200 according to the next formula.
 $120 \text{ sec} \times 60 \text{ fps} = \text{Frame No. 7200}$. Ex.1005 (Masumoto), [0114]. If the frame number received from display A210 in Step S23 is No. 7190, display on display A210 is delayed from the required value for: $(\text{Frame No. 7200}) - (\text{Frame No. 7190}) = 10 \text{ frames}$, or $10 \text{ frames} \times (1/60 \text{ fps}) = 0.16 \text{ sec}$.” Ex.1005 (Masumoto), [0115]. “When a frame number different from the desired frame number (difference exists) is detected (Yes in Step S24), display D240 calculates a frame correction quantity (Step S25). In the above example, this frame correction quantity will be: $(\text{Frame No. 7200}) - (\text{Frame No. 7190}) = 10 \text{ frames}$.” Ex.1005 (Masumoto), [0117].

111. “Display D240 notifies delayed display A210 of the frame correction quantity calculated in Step S25 (Step S26). In Step S26, display A210 receiving the frame correction quantity displays a video signal of the frame number after skipping the frame correction quantity received. For example, in the above example, when display A210 is displaying the video signal of frame No. 8600, next frame number to be displayed is supposed to be No. 8601. However, the above frame correction quantity is applied according to the next formula, and frame No. 8611 is displayed. $(\text{Frame No. 8601}) + (\text{Frame correction quantity: } 10 \text{ frames}) = \text{Frame No. 8611}$.” Ex.1005 (Masumoto), [0118].

112. “There are various correction methods, such as correction of two frames for five times, so as to suppress the number of frames skipped at once for reducing a sense of incongruity of viewers watching multi-display apparatus 1. If there is no difference (NO in Step S24) in Step S24, controller 214 of display D240 ends without processes in Steps S25 and S26.” Ex.1005 (Masumoto), [0119].



Ex.1005 (Masumoto), FIG. 9 (annotated)

113. Therefore, in Masumoto, the display (D240) is designed to compare difference between a frame number of the video signal displayed in the display (A210; B220; C230) at specific time and a desired frame number at the specific time calculated by the display D240 and to determine that there is asynchronization if the different exists, i.e., exceeding a pre-determined threshold value of zero.

114. Therefore, it is my opinion that Masumoto teaches comparing frame numbers to be displayed at the same specific time to determine synchronization. Based on such teaching, for the same purpose of determining synchronization or asynchronization, a POSITA would have been motivated to try to compare difference between the received frame number and a frame number currently played back at the same time to determine synchronization or asynchronization.

Claim 6

[6.0] The system (1) according to claim 1,

[6.1] wherein each device (6A, 6B) is designed to repeatedly transmit the progress-data, preferred in a periodic manner, more preferred every second.

115. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [6.0]. Furthermore, as explained in sections below, Masumoto teaches [6.1].

116. Masumoto teaches that “the controller of each of the plurality of displays conducts mutual time synchronization periodically.” Ex.1005 (Masumoto),

claim 8. Designing every second in a periodic manner setting would be one of commonly used techniques. For example, in Masumoto, in a 60-fps video signal, each second of video shows 60 frames. Ex.1005 (Masumoto), [0114]. For another example, in Kipp, “[p]layback of the segmented video stream may occur at 30 frames per second (fps).” Ex.1006 (Kipp), [0025]. Therefore, in Kipp, each second of video shows 30 frames.

117. In my opinion, a POSITA would obviously to try one second periodically so as to perceive smooth motion in synchronization and practicality.

Claim 7

[7.0] The system (1) according to claim 1,

[7.1] wherein each device is designed to broadcast adjustment data for adjusting the playback progress of the devices (6A, 6B) over its communication stage if it detects an asynchronous playback progress.

118. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [7.0]. Furthermore, as explained in sections below, Masumoto teaches [7.1].

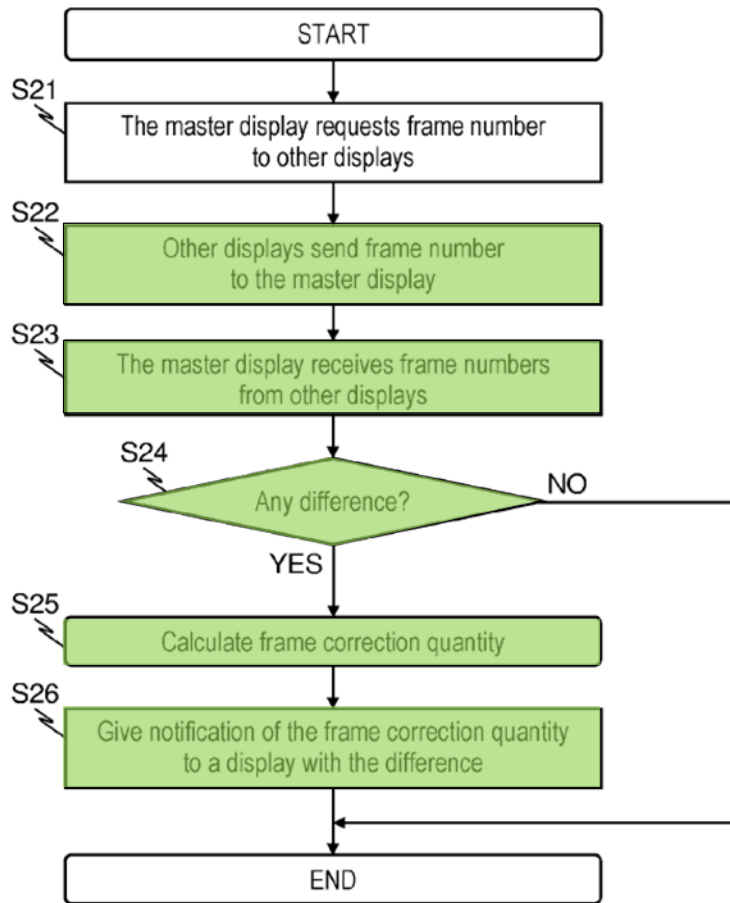
119. Masumoto teaches that the display D240 is configured to broadcast a frame correction quantity as the adjustment data in [7.1] for correcting the playback progress of delayed display (A210; B220; C230) when frame number difference is detected.

120. Specifically, Masumoto discloses that “[w]hen a frame number different from the desired frame number (difference exists) is detected (Yes in Step S24),

display D240 calculates a frame correction quantity (Step S25). In the above example, this frame correction quantity will be: (Frame No. 7200) – (Frame No. 7190) = 10 frames.” Ex.1005 (Masumoto), [0117].

121. “Display D240 notifies delayed display A210 [(B220; C230)] of the frame correction quantity calculated in Step S25 (Step S26). In Step S26, display A210 receiving the frame correction quantity displays a video signal of the frame number after skipping the frame correction quantity received. For example, in the above example, when display A210 is displaying the video signal of frame No. 8600, next frame number to be displayed is supposed to be No. 8601. However, the above frame correction quantity is applied according to the next formula, and frame No. 8611 is displayed. (Frame No. 8601) + (Frame correction quantity: 10 frames) = Frame No. 8611.” Ex.1005 (Masumoto), [0118].

122. “There are various correction methods, such as correction of two frames for five times, so as to suppress the number of frames skipped at once for reducing a sense of incongruity of viewers watching multi-display apparatus 1. If there is no difference (NO in Step S24) in Step S24, controller 214 of display D240 ends without processes in Steps S25 and S26.” Ex.1005 (Masumoto), [0119].



Ex.1005 (Masumoto), FIG. 9 (annotated)

123. Therefore, in Masumoto, the display D240 is configured to broadcast a frame correction quantity as the adjustment data for correcting the playback progress of delayed display (A210; B220; C230) when frame number difference is detected.

124. Therefore, it is my opinion that Masumoto teaches each and every limitation of [7.1].

Claim 8

[8.0] The system (1) according to claim 7,

[8.1] wherein each device (6A, 6B) is designed to embed the adjustment data in a synchronization command.

125. As explained above with respect to [1.0]-[1.4] and [7.1] in §III.A.3, Swafford in view of Masumoto teaches [8.0]. Furthermore, as explained in sections below, Masumoto teaches [8.1].

126. Masumoto discloses that “[d]isplay D240 notifies delayed display A210 of the frame correction quantity calculated in Step S25 (Step S26). In Step S26, display A210 receiving the frame correction quantity displays a video signal of the frame number after skipping the frame correction quantity received.” Therefore, Masumoto inherently teaches that the display D240 transmits a notification, as a synchronization command, which has frame correction quantity, as the adjustment data in [8.0], embedded.

127. Therefore, it is my opinion that Masumoto teaches each and every limitation of [8.1].

Claim 9

***[9.0] The system (1) according to claim 8,
[9.1] wherein each device (6A, 6B) is designed to receive the adjustment data and to adjust its playback progress according to the adjustment data, in particular to continue its playback of compressed video data that are structured in frames labeled by frame numbers with the frame number received in the broadcast of the adjustment data.***

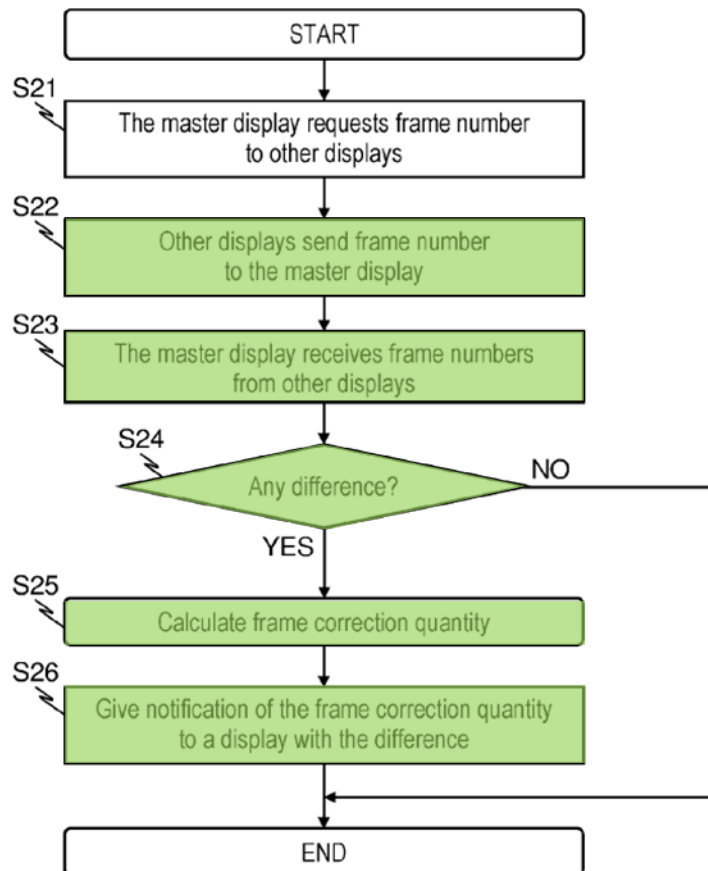
128. As explained above with respect to [1.0]-[1.4], [7.1], and [8.1] in §III.A.3, Swafford in view of Masumoto teaches [9.0]. Furthermore, as explained in sections below, Masumoto teaches [9.1].

129. Masumoto teaches that the display (A210; B220; C230) is configured to receive the frame correction quantity and correct its playback progress according to the frame correction quantity by applying the frame correction quantity to the frame number to be displayed on the display.

130. Specifically, Masumoto discloses that “[d]isplay D240 notifies delayed display A210 [(B220; C230)] of the frame correction quantity calculated in Step S25 (Step S26). In Step S26, display A210 receiving the frame correction quantity displays a video signal of the frame number after skipping the frame correction quantity received. For example, in the above example, when display A210 is displaying the video signal of frame No. 8600, next frame number to be displayed is supposed to be No. 8601. However, the above frame correction quantity is applied according to the next formula, and frame No. 8611 is displayed. (Frame No. 8601) + (Frame correction quantity: 10 frames) = Frame No. 8611.” Ex.1005 (Masumoto), [0118].

131. “There are various correction methods, such as correction of two frames for five times, so as to suppress the number of frames skipped at once for reducing a sense of incongruity of viewers watching multi-display apparatus 1.

If there is no difference (NO in Step S24) in Step S24, controller 214 of display D240 ends without processes in Steps S25 and S26.” Ex.1005 (Masumoto), [0119].



Ex.1005 (Masumoto), FIG. 9 (annotated)

132. Therefore, in Masumoto, the display (A210; B220; C230) is configured to receive the frame correction quantity and correct its playback progress according to the frame correction quantity by applying the frame correction quantity to the frame number to be displayed on the display.

133. Therefore, it is my opinion that Masumoto teaches each and every limitation of [9.1].

Claim 10

[10.0] The system (1) according to claim 7,

[10.1] wherein each device (6A, 6B) is designed: to receive the adjustment data; and to adjust its playback progress according to the adjustment data, in particular to continue its playback of compressed video data that are structured in frames labeled by frame numbers with the frame number received in the broadcast of the adjustment data.

134. [10.1] recites the same feature as [9.1]. As explained above with respect to [1.0]-[1.4], [7.1], and [9.1] in §III.A.3, Swafford in view of Masumoto teaches [10.0]-[10.1].

Claim 11

[11.0] The system (1) according to claim 1,

[11.1] wherein the communication stage is designed to use UDP multicast data packets for the communication.

135. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [11.0].

136. Swafford discloses that “[a]lthough illustratively shown as a wireless communication, the transmission path between continuous display shelf edge label devices 28200A-200C and products 28201A-201C may be a wired communication path, through network 28210.” Ex.1004 (Swafford), [0274].

137. User Datagram Protocol (UDP) is a well-known communication protocol for time-sensitive applications like gaming or playing videos. For example,

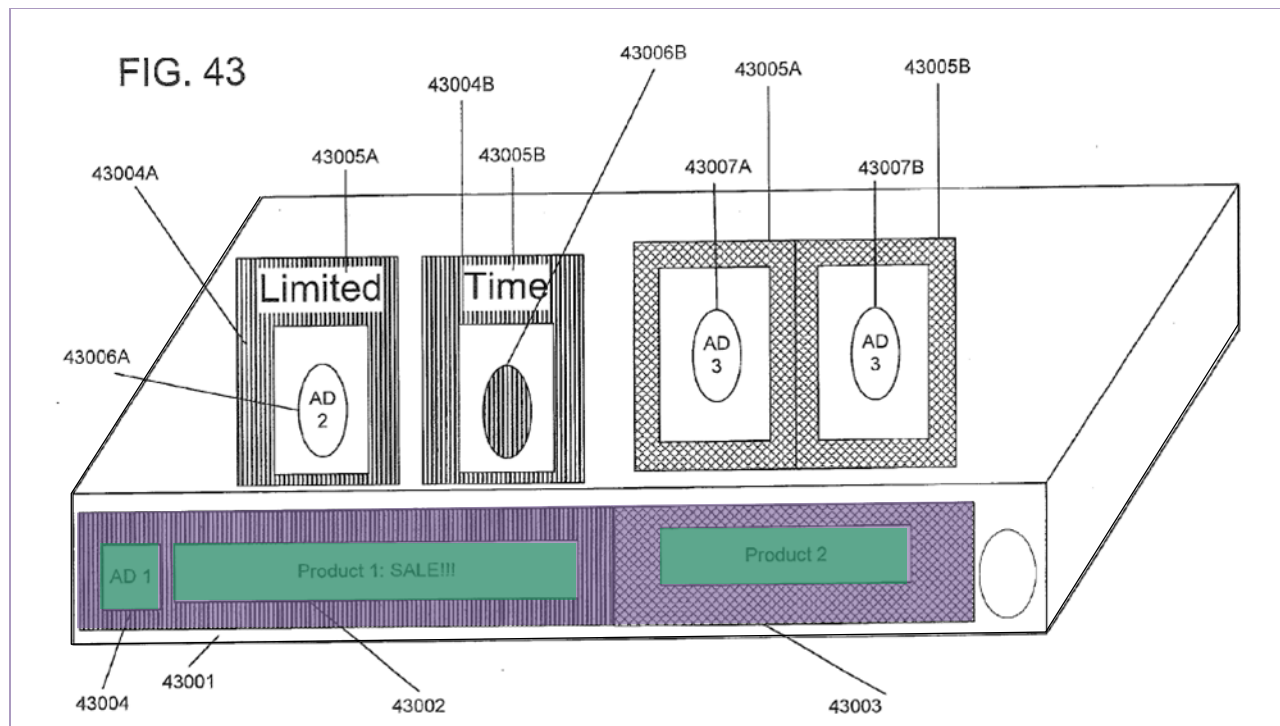
Kipp discloses that “some examples of network communication protocols that may be employed to deliver video fragments from a video server to a playback device include TCP/IP, HTTP/1.1, HTTP/2.0, and QUIC (Quick UDP Internet Connections).” Ex.1006 (Kipp), [0129]. Therefore, a POSITA would understand to use UDP multicast data packets for the communication in Swafford.

Claim 12

***[12.0] The system (1) according to claim 1,
[12.1] wherein each display device (6A, 6B):
comprises its screen (5) or a number of screens (5), or is connected to its external
screen (5) or a number of screens (5) to be controlled by it.***

138. As explained above with respect to [1.0]-[1.4], and §III.A.1-2 and in sections below, Swafford in view of Masumoto renders obvious [12.0]-[12.1].

139. Swafford discloses that the “[c]ontinuous display shelf edge label device 43001 can be provided with any number of displays.” Ex.1004 (Swafford), [0388]. The displays 43002 and 43003 are configured to “display additional information, such as static images or streaming video of products 43006A-B and 43007A-B, promotional content, good-will messages, advertisements or any related information.” Ex.1004 (Swafford), [0388]. Therefore, Swafford teaches that each continuous display shelf edge label device has its screen or multiple screens.



continuous display shelf
edge label device (43001)

Ex.1004 (Swafford), FIG. 43 (annotated)

140. Furthermore, Swafford teaches that a display 27111 oriented along an entire edge of a shelf of a retailer may be controlled by a device controller 27107. Ex.1004 (Swafford), [0267]. As shown in FIG. 43, the entire edge of the shelf may have multiple displays like 43002, 43003. It is my opinion that Swafford teaches the continuous display shelf edge label device is connected to its external display or multiple displays to be controlled by it.

Claim 13

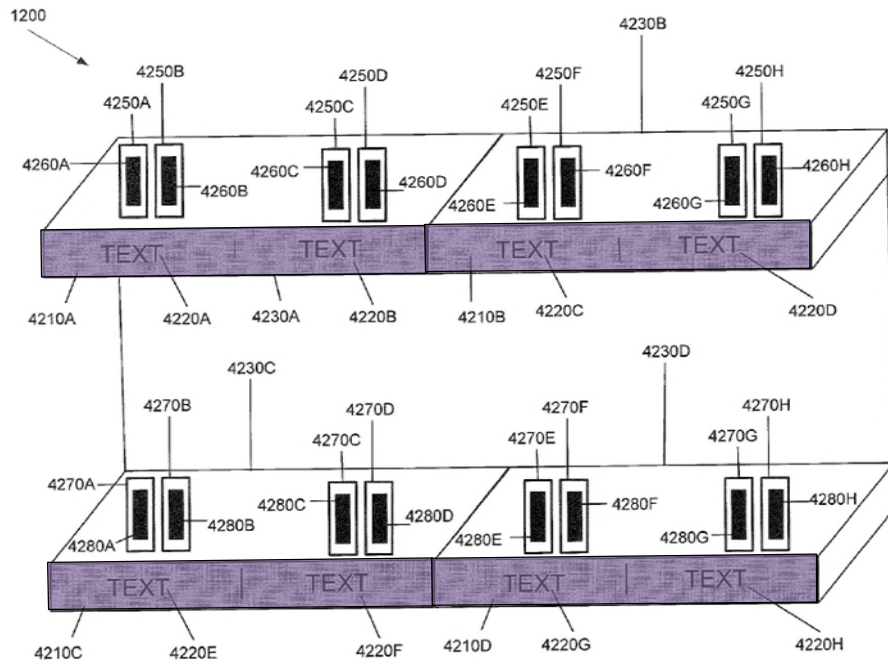
[13.0] The system (1) according to claim 1,

[13.1] wherein said screen (5) is designed to realize a shelf rail (4) or part of it, or to cover a front of a shelf rail (4) or a part of it to which it is attachable.

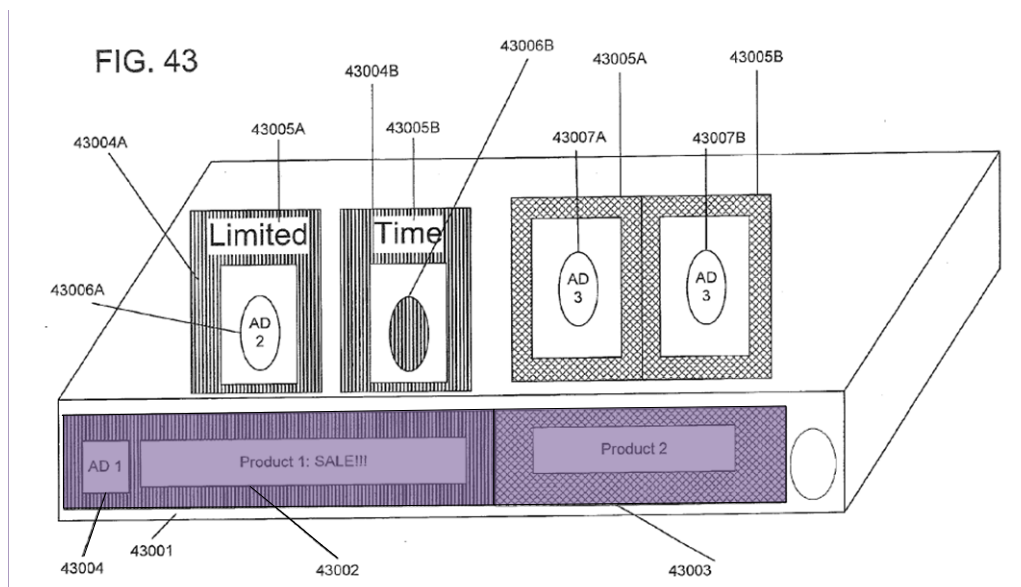
141. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [13.0]. Furthermore, as explained in sections below, Swafford teaches [13.1].

142. Swafford discloses that “[e]ach continuous display shelf edge label device includes a single display area 4210A-4210D oriented along an entire edge of a shelf 4230A-4230D.” Ex.1004 (Swafford), [0377], FIG. 42. Further, “continuous display shelf edge label device 43001 can be provided with any number of displays” covering the front of shelf as shown in FIG. 43. “[T]he displays 4210A-4210D can be embedded into their respective shelves 4230A-4230D.” Ex.1004 (Swafford), [00378]. Thus, Swafford discloses that the display is designed to be integrated into a shelf or part of it, or to cover the front of the shelf or part of it.

143. Therefore, it is my opinion that Masumoto teaches each and every limitation of [13.1].



Ex.1004 (Swafford), FIG. 42 (annotated)



Ex.1004 (Swafford), FIG. 43 (annotated)

Claim 14

[14.0] The system (1) according to claim 1,

[14.1] wherein the system realizes a video playback enabled electronic shelf label system.

144. As explained above with respect to [1.0]-[1.4] in §III.A.3, Swafford in view of Masumoto teaches [14.0]. Furthermore, as explained in sections below, Swafford teaches [14.1].

145. Swafford discloses that “continuous display shelf edge label devices arranged in side by side (4210A and 4210B or 4210C and 4210D) orientation and stacked on top of each other like shelves (4210A and 4210C or 4210B and 4210D), an array of continuous display shelf edge label devices may be configured, which can be configured to be combined together display a uniform image or video.” Ex.1004 (Swafford), [0383].

146. Therefore, Swafford’s system realizes a video playback enabled electronic shelf label system, as claimed in [14.1].

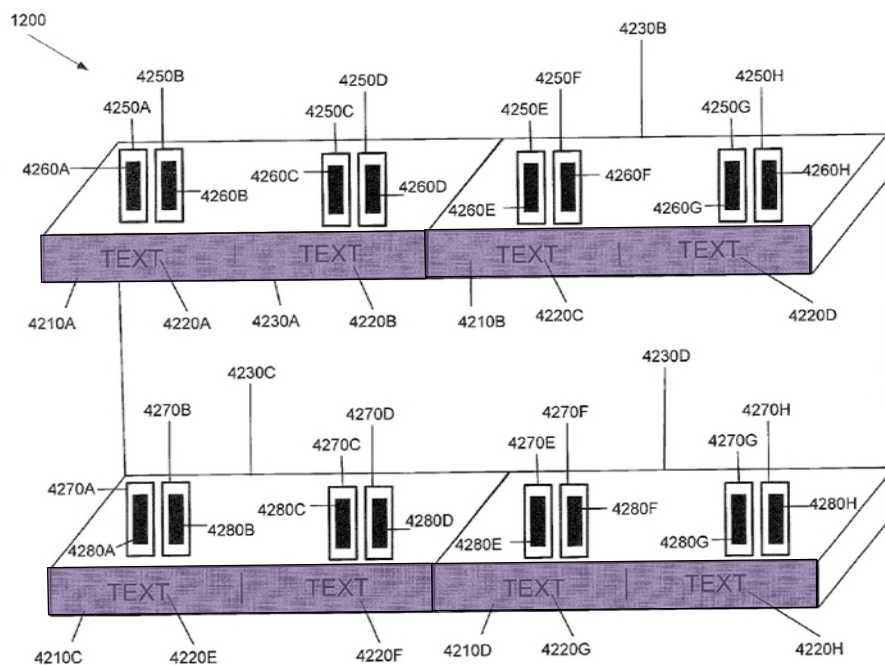
Claim 15

[15.0] A use of the system (1) according to claim 1 as video playback enabled electronic shelf label system for the playback of synchronized video content for a number of shelf rails (4),

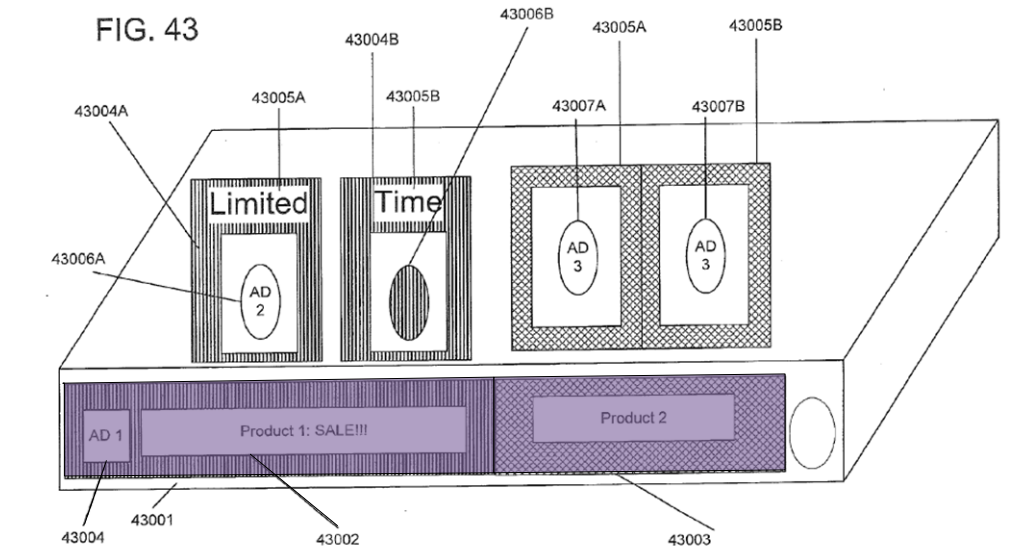
[15.1] wherein each of said shelves rails (4) is realized by a screen (5) or carries a screen (5).

147. As explained above with respect to [1.0]-[1.4], and [14.1] in §III.A.3, Swafford in view of Masumoto teaches [15.0]. Furthermore, as explained in sections below, Swafford teaches [15.1].

148. Swafford discloses that “[e]ach continuous display shelf edge label device includes a single display area 4210A-4210D oriented along an entire edge of a shelf 4230A-4230D.” Ex.1004 (Swafford), [0377], FIG. 42. Further, “continuous display shelf edge label device 43001 can be provided with any number of displays” covering the front of shelf as shown in FIG. 43. “[T]he displays 4210A-4210D can be embedded into their respective shelves 4230A-4230D.” Ex.1004 (Swafford), [00378]. Thus, Swafford discloses that the display is designed to be integrated into a shelf or part of it, or to cover the front of the shelf or part of it. Therefore, Swafford teaches that each of the shelves is realized by a display or carries a display.



Ex.1004 (Swafford), FIG. 42 (annotated)



Ex.1004 (Swafford), FIG. 43 (annotated)

4. Combination of Swafford and Masumoto

149. As discussed above with respect to §III.A.1-3 and for the reasons provided below, a POSITA would have found it obvious to apply multiple displays communicating video playback progress-data (e.g., the frame number, the time stamp) with each other, as taught in Masumoto, in Swafford's system.

150. Swafford's "electronic label devices may be configured to receive a streaming video and apportion the streaming video between the one or more electronic label devices and the plurality of packages." Ex.1004 (Swafford), [0421].

151. Similar to Swafford, Masumoto describes each "[t]he multi-display apparatus includes the plurality of displays connected to a network. Each of the

plurality of displays includes a communication unit that communicates via the network and a controller.” Ex.1005 (Masumoto), [0017].

152. A POSITA would have been motivated to implement Masumoto’s display displays, in Swafford’s system, as described above, for the following reasons.

153. First, a POSITA would have been motivated to combine Swafford with Masumoto because Swafford and Masumoto are designed to achieve the same goal to synchronize a video across multiple displays. *See*. Ex.1004 (Swafford), Abstract, [0423] (“Each of the first electronic label device, the second electronic label device, the first group of electronic displays, and the second group of electronic displays may be configured to simultaneously output a different portion of the streaming video”); *see also* Ex.1005 (Masumoto), [0004] (“mutually synchronizing displays to match the frame number contained in the image marker. This enables to display one entire image by multiple displays without a sense of incongruity”).

154. Specifically, Masumoto teaches that “[t]he controller [in one display] sends a request signal requesting other display to transmit specific information of a video signal displayed on the other display, and receives the specific information from the other display. The controller gives notification of correction to the other display sending the specific information with a difference

when the specific information received differs from specific information of a video signal that is supposed to be displayed.” Ex.1005 (Masumoto), [0017]. As such, a POSITA would have been motivated and able to use the teaching of Masumoto modify Swafford in order to fulfill Swafford’s express objective of “simultaneously output[ting] a different portion of the streaming video.” Ex.1004 (Swafford), [0423].

155. Second, it would have been obvious to a POSITA to have looked to Masumoto’s disclosure of transmitting video playback progress-data from one display to another display because it provides a solution to a well-recognized need in synchronizing video displays – a need for low bandwidth and simple, inexpensive hardware, as identified in Yamada, Kipp, Masumoto, and the ’669 Patent. *See* Ex.1001 (the ’669 Patent), 1:28-40 (“capable of playing back synchronized video on a number of devices comprised of relatively inexpensive hardware”); *see also* Ex.1010 (Yamada), [0011] (“[I]ts object is to provide a video information reproduction system that can accurately synchronize a plurality of video signals output from a plurality of video information reproduction devices without making the configuration complex and to provide the video information reproduction device”); *see also* Ex.1006 (Kipp), [0026] (“Playback devices can thus achieve synchronization even when clock drift

occurs at the video server or the individual playback devices”); *see also* Ex.1005 (Masumoto), [0079] (“to configure the simple determination step.”)

156. Third, a POSITA would have expected that Swafford’s system would likely be subjected to the way of transmitting video playback progress-data, such as the frame number or the time stamp, among different displays addressed in Masumoto, because of the structural similarity between Swafford’s and Masumoto’s devices. Swafford discloses that “[t]he display can in one example be LCD display, or any other known display types.” Ex.1004 (Swafford), [0330]. Masumoto teaches that “display unit 212 including a liquid crystal display panel,” Ex.1005 (Masumoto), [0040], and describes details of how different displays communicate with each other (e.g., transmitting specific information of a video signal displayed on the display at specific time, using frame numbers as the specific information, broadcasting the frame correction quantity to implement synchronization, loading the video data upfront to play, transmitting the video data as compressed data, transmitting the specific information repeatedly, embedding the frame correction quantity in a synchronization command) to synchronously display a video. Ex.1005 (Masumoto), [0017], [0107]-[00118]. Given the structural similarity between Swafford’s and Masumoto’s devices (e.g., both Swafford and Masumoto are using LCD displays to play videos), a POSITA would have understood, from Masumoto’s

teaching, that different electronic label devices including the LCD displays would likely to be designed to transmit the video playback progress-data between each other. Furthermore, as details of how different displays communicate with each other to synchronously display a video (e.g., transmitting specific information of a video signal displayed on the display at specific time, using frame numbers as the specific information, broadcasting the frame correction quantity to implement synchronization, loading the video data upfront to play, transmitting the video data as compressed data, transmitting the specific information repeatedly, embedding the frame correction quantity in a synchronization command) have been used in Masumoto's displays, a POSITA would recognize that it would improve Swafford's similar device (i.e., electronic label device including the LCD displays) in the same way.

157. Fourth, in my opinion, a POSITA would have been readily able to incorporate Masumoto's displays that transmit video playback progress-data (e.g., frame numbers) and Masumoto's memory that stores video data representing the video into Swafford's electronic label devices with an expectation of success. Swafford's electronic label devices all play the same role in the '669 Patent as synchronously displaying advertisement videos in the existing video playback art. Accordingly, it would have been routine for a

POSITA to combine or modify the Swafford's electronic label devices to arrive at the purported invention of the '669 Patent.

158. For at least the above reasons, a POSITA would have found it obvious to incorporate Masumoto's teaching in Swafford's system so as to transmit the video playback progress-data from one electronic label device to another electronic label device.

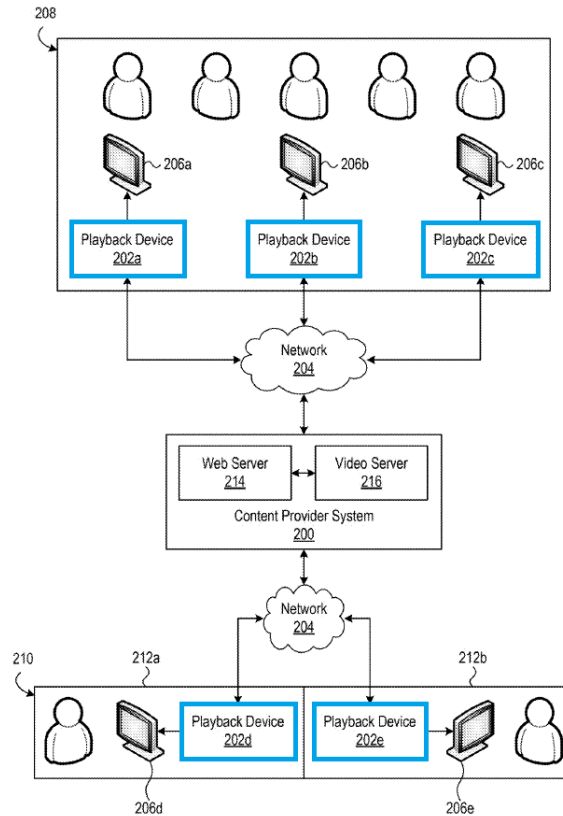
B. GROUND 2: Claims 1-15 are rendered obvious over Masumoto in view of Kipp and Takashi

1. Overview of Kipp

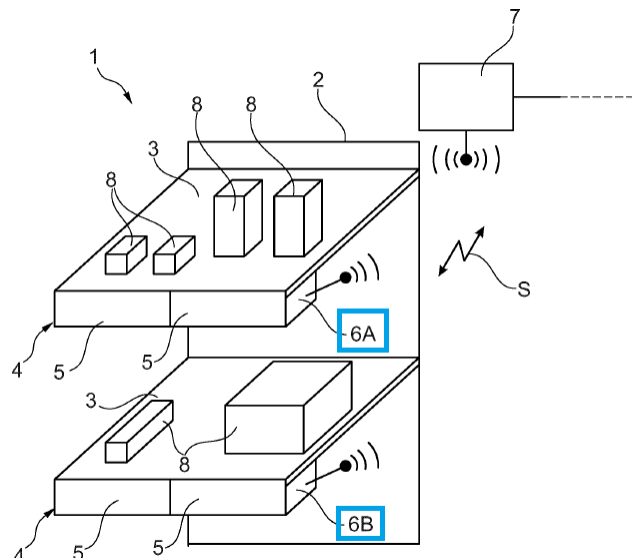
159. Kipp relates to “a system for synchronizing segmented video streams across multiple playback devices.” Ex.1006 (Kipp) at [0012], FIG. 2.

160. “As seen in FIG. 2 (reproduced below; FIG. 1 of the '669 Patent is reproduced below for comparison), a content provider system 200 is in signal communication with multiple playback devices 202a-e (collectively 202) via a network 204. Each playback device 202a-e is connected to a respective display device 206a-e (collectively 206).” Ex.1006 (Kipp) at [0035]. “As also seen in FIG. 2, some of the playback devices are co-located with one another. For example, playback devices 202a, 202b, and 202c are co-located at a site 208, and playback devices 202d and 202e are similarly co-located with each other at a site 210” and “[s]uch arrangements may be found, for example, at sports bars, classrooms, meeting rooms, and other locations where it may be desirable to have multiple

display devices presenting the same content.” Ex.1006 (Kipp) at [0036]. Kipp’s approach of “multiple display devices presenting the same content” can be extended to different content that needs to be synchronized such as in Masumoto.



Ex.1006 (Kipp), FIG. 2(annotated)



The '669 Patent, Fig. 1 (annotated)

161. “An example premise 102a, such as a home, may include an interface 120. The interface 120 can include any communication circuitry needed to allow a device to communicate on one or more links 101 with other devices in the network.” Ex.1006 (Kipp), [0034]. “Playback devices may synchronize playback of a segmented video stream regardless of the clock time at the video server or the respective clock times of the playback devices” and “a playback device estimates the live-point time of the video server in terms of its own clock time. A playback device similarly schedules playback of the video fragments in terms of its own clock time. Playback devices can thus achieve synchronization even when clock drift occurs at the video server or the individual playback devices.” Ex.1006 (Kipp), [0026].

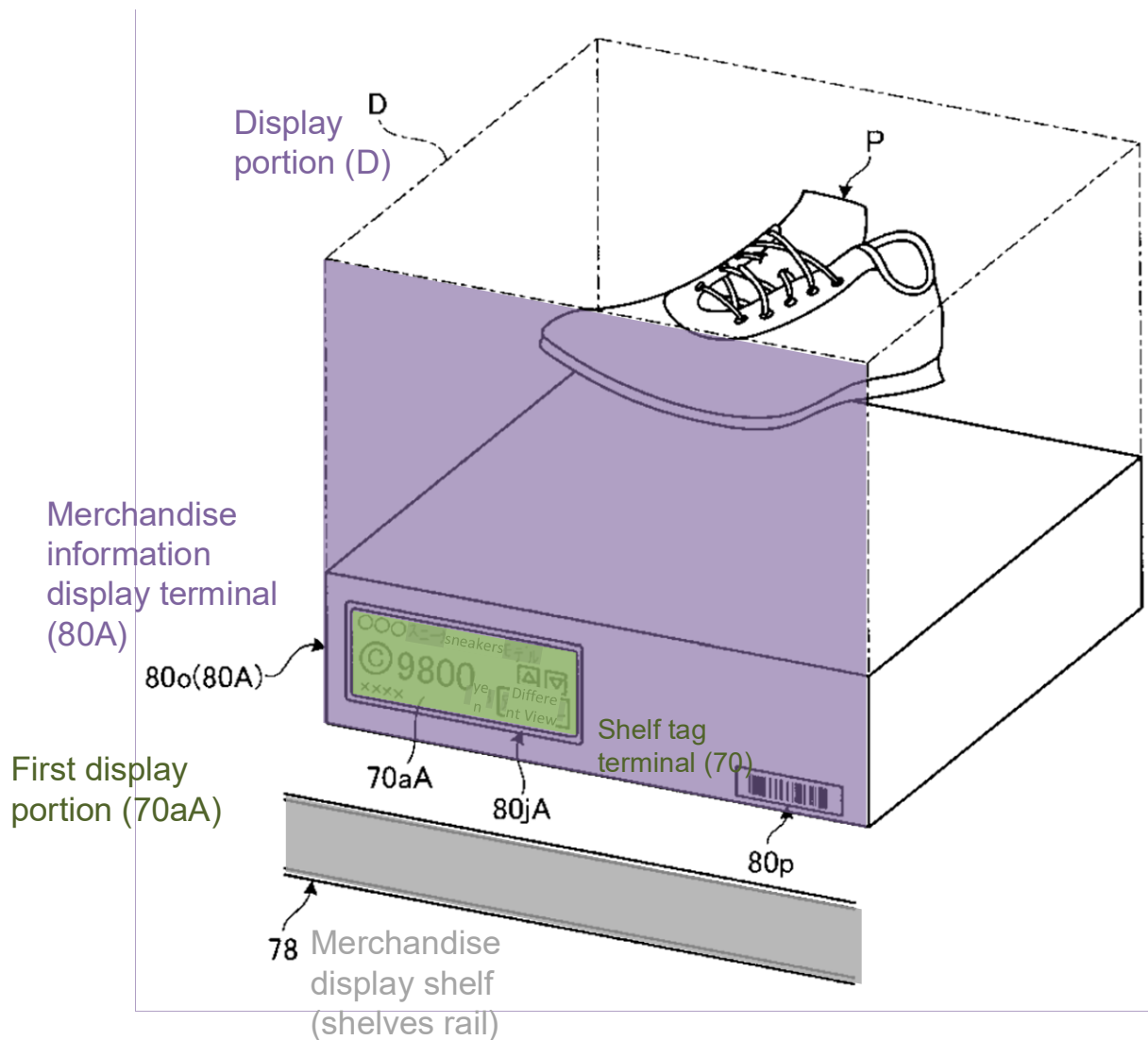
162. Furthermore, the segmented video stream that is played on the playback devices may include “advertisements” that is formatted and inserted “in a video stream being transmitted to the premises 102.” Ex.1006 (Kipp), [0033]. “Some example scenarios of on-demand or scheduled playback include selecting sports highlights for playback on multiple display screens at a sports bar, selecting music videos for playback on multiple display screens at a nightclub, selecting

advertisements for playback on multiple digital billboards.” Ex.1006 (Kipp), [0124].

2. Overview of Takashi

163. Takashi relates to a “merchandise information display system” that is “provided with a shelf tag terminal 70 as merchandise information display terminal.” Ex.1008 (Takashi), Abstract.

164. “[A]s shown in FIG. 14 (reproduced below), the merchandise information display system 1 may include a merchandise information display terminal 80A having a first display portion 70aA that mainly displays text information about the merchandise, and a display portion D serving as a second display portion that has a display portion larger than the first display portion 70aA and mainly displays images about the merchandise.” Ex.1008 (Takashi), [0051]. “This can be said to be an integral combination of the shelf tag terminal 70 and the image display terminal 80 (i.e., 80A in FIG. 14).” (Takashi), [0051]. “[T]he image display terminal 80 (i.e., 80A in FIG. 14) may display not only the appearance of the merchandise, but also cross-sections and other images, display still images, and display videos such as usage and commercial video.” Ex.1008 (Takashi), [0051].



Ex.1008 (Takashi), FIG. 14 (annotated)

165. Takashi further discloses that “the shelf tag terminal is not limited to what is illustrated in the above embodiments” and “the image display terminal [80; 80A] or the second display unit [D] may display text information about the merchandise along with images relating to the merchandise.” Ex.1008 (Takashi), [0052].

3. Analysis

Claim 1

[1.0] A video playback system (1), comprising

166. To the extent the preamble is limiting, each of Masumoto, Kipp, and Takashi discloses [1.0]. Ex.1005 (Masumoto), [0017]; Ex.1006 (Kipp), [0012]; Ex.1008 (Takashi), [0051], FIG. 14.

167. As discussed in §III.B.1, Masumoto discloses “a multi-display apparatus for displaying a single image by combining a plurality of displays.” Ex.1005 (Masumoto), [0017].

168. As discussed in §III.B.2-3, in the same field of endeavor (e.g., video playback system), Kipp discloses a system for synchronizing segmented video streams across multiple playback devices and Takashi also discloses an electronic shelf tag system in which multiple display units are used to display information including a video relating to a product. Ex.1006 (Kipp), [0012]; Ex.1008 (Takashi), [0051], FIG. 14.

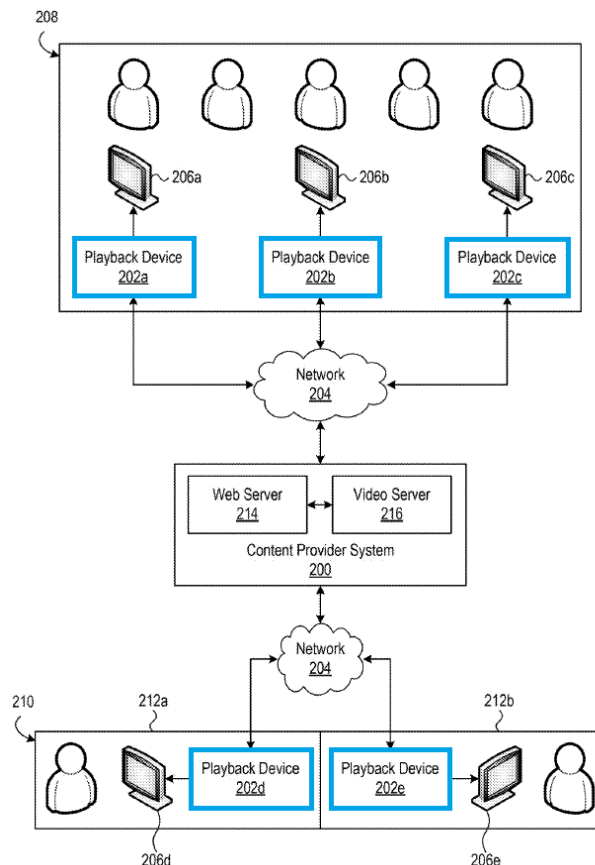
[1.1] a number of playback devices (6A, 6B) to playback a video on their screens (5),

169. As explained above with §III.A.2 and §III.B.1 and in sections below, each of Masumoto and Kipp teaches [1.1].

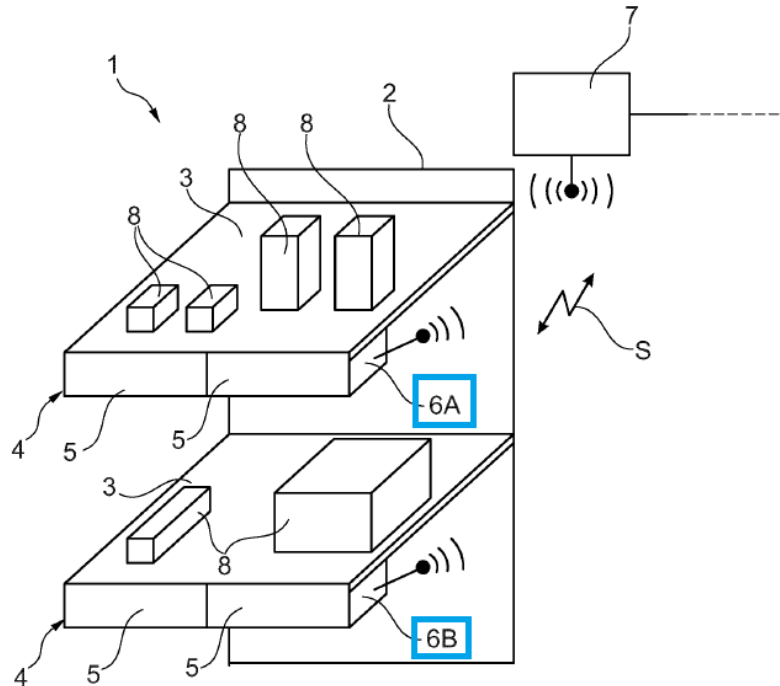
170. As explained above with respect to [1.1] in §III.A.3 and in sections below, Masumoto discloses [1.1]. Ex.1005 (Masumoto), [0017], [0039], [0040], [0094], FIG. 2.

171. Additionally, Kipp discloses that “[a]s seen in FIG. 2, a content provider system 200 is in signal communication with multiple playback devices 202a-e (collectively 202) via a network 204. Each playback device 202a-e is connected to a respective display device 206a-e (collectively 206).” (Kipp, [0035], FIG. 2). Thus, Kipp also teaches the multiple playback devices 202a-e (collectively 202) as “a number of playback devices (6A, 6B)” that playback a video on their respective display device 206a-e (collectively 206) in [1.1].

172. Therefore, it is my opinion that each of Masumoto and Kipp teaches each and every limitation of [1.1].



Ex.1006 (Kipp), FIG. 2 (annotated)



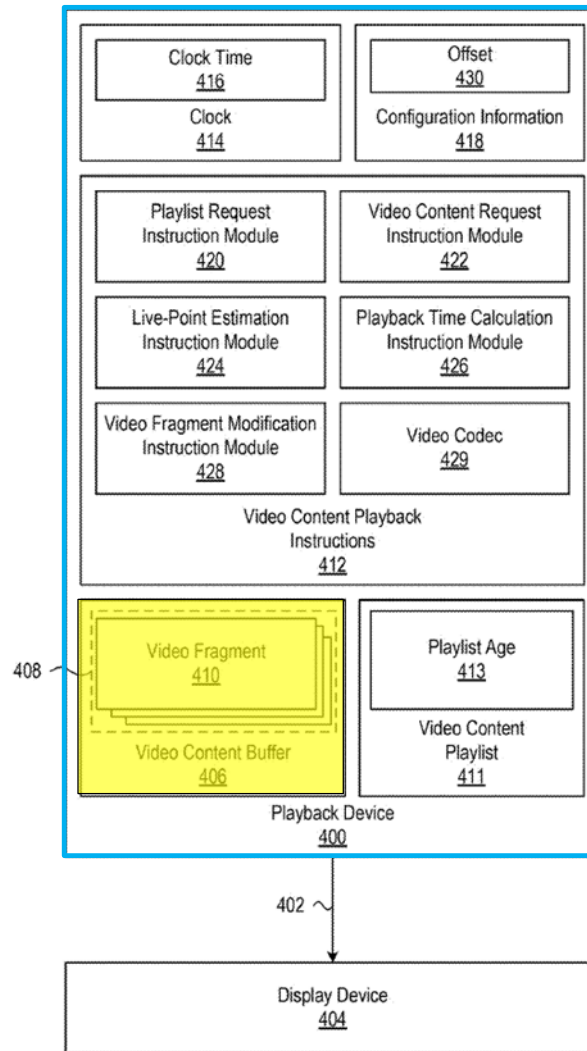
Ex.1001 (the '669 Patent), FIG. 1 (annotated)

[1.2] each playback device (6A, 6B) comprises a memory to store video data (9) representing said video,

173. As explained above with respect to [1.2] in §III.A.3 above, Masumoto teaches [1.2]. Ex.1005 (Masumoto), [0040].

174. Kipp also teaches [1.2] because Kipp discloses that “[t]he playback device 400, in this example, includes a video content buffer 406 configured to store a set 408 video fragments 410, a video content playlist 411 that includes the age 413 of the video content playlist, video content playback instructions 412, a clock 414 that provides a clock time 416 for the playback device, and configuration information 418.” (Kipp, [0056], FIG. 4). Thus, Kipp also teaches the video content buffer 406 as the “memory” in [1.2].

175. Therefore, it is my opinion that each of Masumoto and Kipp teaches each and every limitation of [1.2].



Ex.1006 (Kipp), FIG. 4 (annotated)

***[1.3] and a communication stage to communicate data with each other, wherein the devices (6A, 6B) are designed:
to transmit video playback progress-data via the communication stage to the other device (6B, 6A); and,
to determine based on the received progress data whether it is in a synchronous or asynchronous playback progress with the other devices (6B, 6A);***

176. As explained above with respect to [1.3] in §III.A.3 and in sections below, Masumoto teaches [1.3].

177. As discussed above with respect to [1.3] in §III.A.3, Masumoto teaches that the displays can communicate data with each other and are designed to transmit specific information of a video signal displayed on the display (corresponding to the video playback progress-data), such as the frame number or the time stamp, to the other display and to determine synchronization or asynchronization based on the video playback progress-data. Ex.1005 (Masumoto), [0017], [0107], FIG. 9, [0108], [0110], [0112], [0113], [0117], [0118].

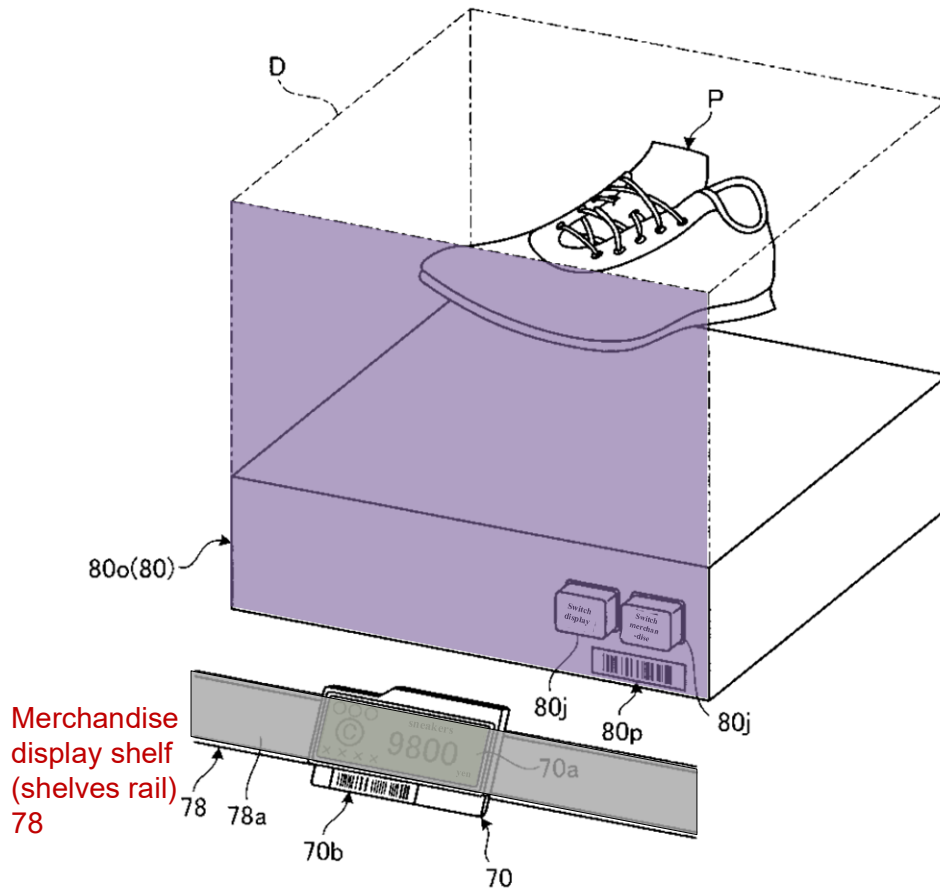
[1.4] wherein the display devices (6A, 6B) are designed to display product information or product price related information by means of virtual electronic shelf labels displayed within a section of a screen's (5) display area overlapping with a video content or substituting a video content of said section.

178. Kipp and Takashi teach [1.4]. Kipp discloses that the video content displayed on the multiple playback devices may include various content to the users at their premises. For example, “[t]his content may be, for example, video on demand movies, television programs, songs, text listings, etc.” Ex. 1006 (Kipp), [0032]. The premises may include “for example, at sports bars, classrooms, meeting rooms, and other locations where it may be desirable to have multiple display devices presenting the same content.” Ex. 1006 (Kipp), [0036]. Kipp’s approach of “multiple display devices presenting the same content” can be extended to different content that needs to be synchronized such as in Masumoto. In Kipp, the segmented video stream that is played on the

multiple playback devices may include “advertisements” that is formatted and inserted “in a video stream being transmitted to the premises 102.” Ex. 1006 (Kipp), [0033]. “Some example scenarios of on-demand or scheduled playback include selecting sports highlights for playback on multiple display screens at a sports bar, selecting music videos for playback on multiple display screens at a nightclub, selecting *advertisements* for playback on multiple digital billboards.” Ex. 1006 (Kipp), [0124]. Thus, Kipp teaches that the multiple playback devices may display advertisement video contents associated with the premise to the users. Therefore, a POSITA would understand that in a business premise, such as a retail store setting, the content associated with the premise will include product information.

179. Furthermore, Takashi discloses an electronic shelf tag system in which multiple display units are used to display information including a video relating to a product. Ex.1008 (Takashi), Abstract. “As shown in FIG. 5, the image display terminal 80 is provided with a display area D that is larger than the display portion 70a of the shelf tag terminal 70, and this display area D displays images P relating to the merchandise. FIG. 5 illustrates a case in which the display device is configured as a display device which displays a three-dimensional image (the image P) showing the appearance of the merchandise.” Ex.1008 (Takashi), [0020]. “It is also possible to configure the image display

terminal 80 as a known display device (e.g., a cathode ray tube (CRT) or liquid crystal display (LCD)) that displays two-dimensional images of the merchandise. In such cases, the display area D is flat.” (Takashi, [0020]. “Note that the image display terminal 80 may display not only the appearance of the merchandise, but also cross-sections and other images, display still images, and display videos such as usage and commercial video.” Ex.1008 (Takashi), [0021], FIG. 5. “[T]he shelf tag terminal 70 is provided with a display portion 70a that displays information including text information relating to merchandise such as merchandise name and price on the front side of the thin plate (label-shaped) housing.” Ex.1008 (Takashi), [0019], FIG. 5. Thus, FIG. 5 of Takashi teaches the shelf tag terminal 70 including display portion 70a displaying product information or product price related information and the image display terminal 80 including display area displaying display videos such as usage and commercial video.

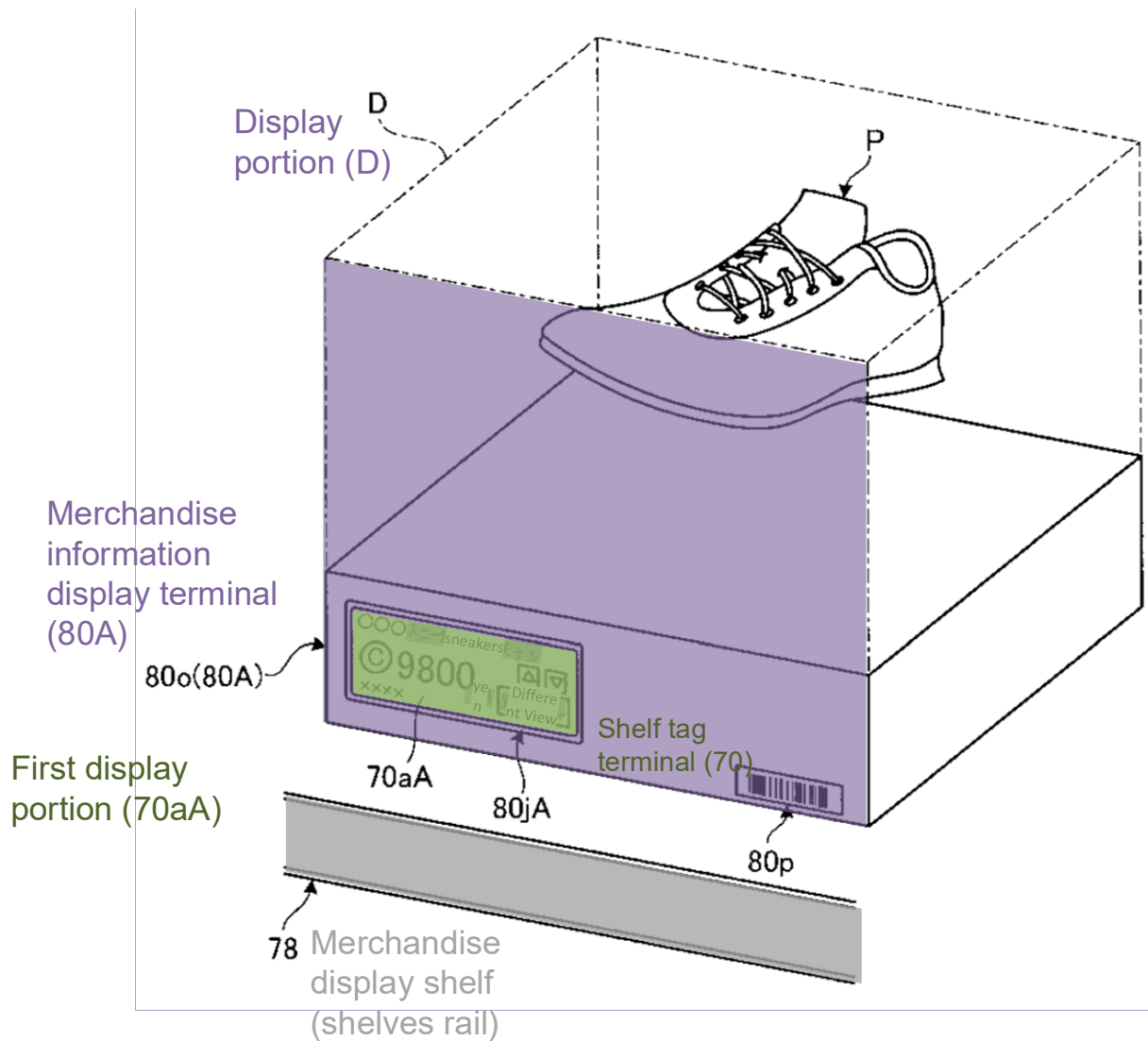


Ex.1008 (Takashi), FIG. 5 (annotated)

180. In another embodiment, as shown in FIG. 14 (reproduced below), “the merchandise information display system 1 may include a merchandise information display terminal 80A having a first display portion 70aA that mainly displays text information about the merchandise, and a display portion D serving as a second display portion that has a display portion larger than the first display portion 70aA and mainly displays images about the merchandise” and “[t]his can be said to be an integral combination of the shelf tag terminal 70 and the image display terminal 80.” Ex.1008 (Takashi), [0051], FIG. 14. The

display portion D of the image display terminal 80 may display video as well.

Ex.1008 (Takashi), [0021]. Therefore, it is my opinion that the first display portion 70aA corresponds to a virtual electronic shelf label within a section of the display portion D overlapping the video in [1.4].



Ex.1008 (Takashi), FIG. 14 (annotated)

181. Takashi further discloses that “the shelf tag terminal is not limited to what is illustrated in the above embodiments” and “the image display terminal [80;

80A] or the second display unit [D] may display text information about the merchandise along with images relating to the merchandise.” (Takashi, [0052]. Thus, a section that displays text information about the merchandise in the image display terminal [80; 80A] and a section in the second display unit [D] that displays text information about the merchandise can be considered the virtual electronic shelf labels in [1.4]. Therefore, it is my opinion that Takashi teaches that the image display terminal is configured to display text information about the merchandise via virtual electronic shelf labels displayed within a section of the display area of the merchandise information display terminal 80; 80A that is overlapping with the video displayed, as featured in [1.4].

182. Moreover, a POSITA would understand that designing substitutive video content in overlapping display areas is commonly used to “provide additional information to a customer or to attract a customer’s attention.” Ex.1004 (Swafford), [0404].

183. A POSITA would have been motivated to implement the video content displayed on Kipp’s multiple playback devices and the product content displayed on Takashi’s image display terminal, in Masumoto’s multiple displays when applying Masumoto’s multiple-display apparatus in a specific business premise, as described above, for at least the following reasons.

184. First, a POSITA would have been motivated to combine Masumoto with Kipp because Masumoto and Kipp are designed to achieve the same goal to synchronize a video across multiple displays. Masumoto's multiple-display apparatus is capable of "mutually synchronizing displays to match the frame number contained in the image marker. This enables to display one entire image by multiple displays without a sense of incongruity." Masumoto, [0004]. Kipp recognizes that "[t]herefore a need exists for synchronizing video streams across multiple playback devices." Kipp, [0003].

185. Second, it would have been obvious to a POSITA to have looked to Kipp's disclosure of synchronously displaying advertisement content associated with a premise where the multiple playback devices are co-located when applying Masumoto's multiple-display apparatus in a specific business premise, e.g., a retail store, to solve a well-recognized need in a business premise – a need for synchronously providing clients with promotional information or advertisement. *See* the '669 Patent, 1:28-40, 7:29-38 ("playing back synchronized video [e.g., advertisement video] on a number of devices comprised of relatively inexpensive hardware"); *see also* Ex.1006 (Kipp), [0023], [0124] ("playback devices deployed to a common location (e.g., a sports bar, a residence, etc.) may synchronize a segmented video stream presented to viewers on multiple displays at that location" and "selecting advertisements for

playback on multiple digital billboards”); *see also* Ex.1009 (Clontz), [0032] (the shelf may be implemented with “connected” displays that “run the same ads all the time”).

186. Third, a POSITA would have expected using Masumoto’s multiple displays to display an advertisement video as in Kipp and Kipp’s approach of presenting the same content can be extended to different content that needs to be synchronized as in Masumoto. Kipp’s display devices may “be any type of device configured to receive a video signal and output visual images corresponding to that video signal,” including “televisions, computer monitors, computer screens, touchscreens, video projectors, head-up displays, head-mounted displays, digital billboards, and other types of devices configured to generate visual images from a video signal received.” Ex.1006 (Kipp), [0041]. Masumoto’s display receives video signals from the image transmission server and displays images from the video signals that are received and the display unit in the display can be a liquid crystal display panel. Ex.1005 (Masumoto), [0039]. Therefore, both Kipp’s display devices and Masumoto’s displays are used to receive video signals and display video images. A POSITA would have recognized, from Kipp’s teaching, that it would improve Masumoto’s similar device (i.e., displays) as displaying an advertisement video and presenting

different video contents that needs to be synchronized in multiple displays, when applying Masumoto's device in a business place, e.g., retail store.

187. Fourth, in my opinion, a POSITA would have had have been readily able to combine Masumoto's displays with Kipp's display devices that display information related to a premise and Takashi's manner of displaying production information and advertisement with an expectation of success. The displays in Masumoto, the multiple display devices in Kipp, and the image display terminal which may be a CRT or an LCD in Takashi all play the same role as displaying video content in the existing video playback art. Accordingly, it would have been routine for a POSITA to combine or modify the existing prior art features to arrive at the purported invention of the '669 Patent.

188. Fifth, a POSITA would also have looked to Takashi for displaying promotion content related to products in a business premise, e.g., a retail store. It is a universal, obvious goal of all such systems to display promotion content related to the premise where the systems are located. Both Kipp and Takashi disclose that, the video content displayed on the multiple playback devices or the image display terminal may include various content to the users at their premises. Ex.1006 (Kipp), [0032], [0036]; Ex.1008 (Takashi) [0020], [0042]. A POSITA reading Masumoto and Kipp naturally would have looked to

Takashi for additional details regarding how to display advertisement contents in a business premise such as a retail store.

189. Furthermore, a POSITA would have understood that to attract customers (e.g., Ex.1004 (Swafford), [0404] - “provide additional information to a customer or to attract a customer’s attention”), designing other promotion content to substitute a part of an advertisement video is a commonly used promotional strategy in a business premise, e.g., a retail store.

190. Thus, it would be obvious to a POSITA, in view of Takashi, to use the multiple displays in the combination of Masumoto and Kipp to display the product information in the similar manner (e.g., displaying product information or product price related information by means of virtual electronic shelf labels displayed within a section of a screen’s display area overlapping with a video content) as Takashi in the premise of a retail store.

191. For at least the above reasons, a POSITA would have found it obvious to incorporate Kipp’s synchronously displaying advertisement content associated with a premise where the multiple playback devices are co-located and Takashi’s manner of displaying promotion content of the product in Masumoto’s system.

Claim 2

[2.0] The system (1) according to claim 1,

[2.1] comprising a video distribution server (7) for distribution of the video data (9) to the devices (6A, 6B), in particular the entire video data (9) of a video upfront to playback start at the devices (6A, 6B)."

192. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [2.0]. Furthermore, as explained in section below, Masumoto teaches [2.1].

193. As discussed above with respect to [2.1] in §III.A.3, Masumoto discloses that an image transmission server is configured to distribute video data to the displays, and specifically to distribute the video data to be displayed on a display upfront to the memory of the display.

194. Therefore, it is my opinion that Masumoto teaches each and every limitation of [2.1].

Claim 3

***[3.0] The system (1) according to claim 1,
[3.1] wherein the devices (6A, 6B) are designed to determine independently from a video distribution server (7) which distributed the video data (9) to the devices (6A, 6B) that they are in a synchronous or asynchronous playback progress.***

195. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [3.0]. Furthermore, as explained in sections below, Masumoto teaches [3.1].

196. As discussed above with respect to [3.1] in §III.A.3, Masumoto discloses that the displays determine synchronous or asynchronous status based on

specific information of video signal (e.g., frame number, time stamp) that is transmitted among the displays, independently from the transmission server.

197. Therefore, it is my opinion that Masumoto teaches each and every limitation of [3.1].

198. Additionally, Kipp discloses that “playback devices may synchronize playback of a segmented video stream *regardless of* the clock time at the video server or the respective clock times of the playback devices” and “a playback device estimates the live-point time of the video server in terms of its own clock time. A playback device similarly schedules playback of the video fragments in terms of its own clock time. Playback devices can thus achieve synchronization even when clock drift occurs at the video server or the individual playback devices.” (Kipp, [0026]. “Synchronization across the multiple playback devices occurs as a result of each playback device scheduling playback of the video fragments based on their estimations of the live point time of the video server and modifying their respective video fragments until the actual playback times of the video fragments align with the scheduled playback times.” (Kipp, [0061])).

Claim 4

[4.0] The system (1) according to claim 1,

[4.1] wherein the devices (6A, 6B) are designed: to playback compressed video data (9) that are structured in frames labeled by frame numbers, and to utilize a frame number that labels the frame that is currently played back as the progress-data to be transmitted.

199. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [4.0]. Furthermore, as explained in section below, Masumoto teaches [4.1].

200. As discussed above with respect to [4.1] in §III.A.3, Masumoto discloses that the displays are configured to play compressed video data that are structured in frames labeled by frame numbers, and to use a frame number that labels the frame as the video playback progress-data that is transmitted among the displays. Ex.1005 (Masumoto), [0017], [0039], [0045], [0107].

201. Therefore, it is my opinion that Masumoto teaches each and every limitation of [4.1].

Claim 5

***[5.0] The system (1) according to claim 4,
[5.1] wherein each device (6A, 6B) is designed to compare a frame number received with a frame number of the frame currently played back at the device (6A, 6B) and to determine an asynchronous playback progress if the difference in the frame numbers compared with each other exceeds a pre-determined threshold value.***

202. As explained above with respect to [1.0]-[1.4], [4.1] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [5.0]. Furthermore, as explained in [5.1] in §III.A.3, Masumoto teaches [5.1].

Claim 6

***[6.0] The system (1) according to claim 1,
[6.1] wherein each device (6A, 6B) is designed to repeatedly transmit the progress-data, preferred in a periodic manner, more preferred every second.***

203. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [6.0]. Furthermore, as explained in [6.1] in §III.A.3, Masumoto teaches [6.1].

Claim 7

***[7.0] The system (1) according to claim 1,
[7.1] wherein each device is designed to broadcast adjustment data for adjusting the playback progress of the devices (6A, 6B) over its communication stage if it detects an asynchronous playback progress.***

204. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [7.0]. Furthermore, as explained in [7.1] in §III.A.3, Masumoto teaches [7.1].

Claim 8

***[8.0] The system (1) according to claim 7,
[8.1] wherein each device (6A, 6B) is designed to embed the adjustment data in a synchronization command.***

205. As explained above with respect to [1.0]-[1.4], [7.1] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [8.0]. Furthermore, as explained in [8.1] in §III.A.3, Masumoto teaches [8.1].

Claim 9

***[9.0] The system (1) according to claim 8,
[9.1] wherein each device (6A, 6B) is designed to receive the adjustment data and to adjust its playback progress according to the adjustment data, in particular to continue its playback of compressed video data that are structured in frames labeled by frame numbers with the frame number received in the broadcast of the adjustment data.***

206. As explained above with respect to [1.0]-[1.4], [7.1], [8.1] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [9.0]. Furthermore, as explained in [9.1] in §III.A.3, Masumoto teaches [9.1].

Claim 10

***[10.0] The system (1) according to claim 7,
[10.1] wherein each device (6A, 6B) is designed: to receive the adjustment data;
and to adjust its playback progress according to the adjustment data, in
particular to continue its playback of compressed video data that are structured
in frames labeled by frame numbers with the frame number received in the
broadcast of the adjustment data.***

207. [10.1] recites the same feature as [9.1]. As explained above with respect to [7.0]-[7.1] and [9.1] in §III.B.3, Masumoto in view of Kipp and Takashi renders obvious [10.0]-[10.1].

Claim 11

***[11.0] The system (1) according to claim 1,
[11.1] wherein the communication stage is designed to use UDP multicast data
packets for the communication.***

208. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [11.0]. Furthermore, as explained in sections below, Kipp teaches [11.1].

209. UDP is a well-known communication protocol. For example, Kipp discloses that “some examples of network communication protocols that may be employed to deliver video fragments from a video server to a playback

device include TCP/IP, HTTP/1.1, HTTP/2.0, and QUIC (Quick UDP Internet Connections).” Ex.1006 (Kipp), [0129].

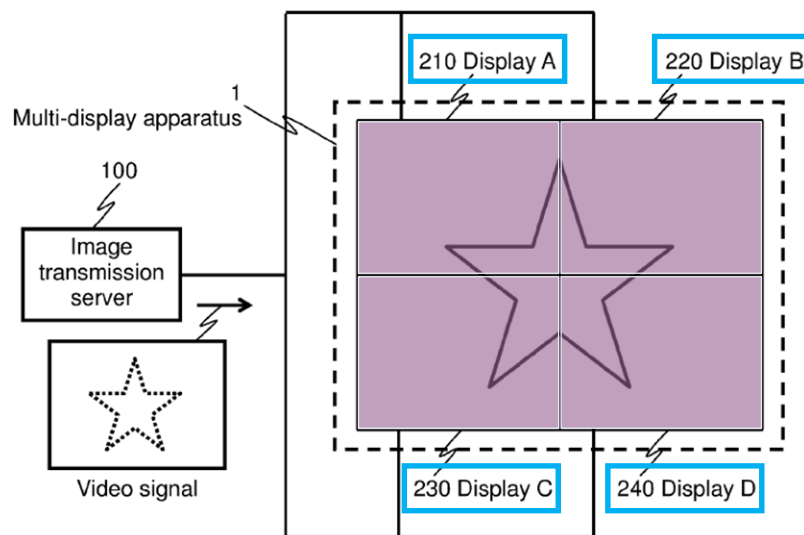
210. A POSITA would understand to use UDP multicast data packets for the communication among the displays in Masumoto.

Claim 12

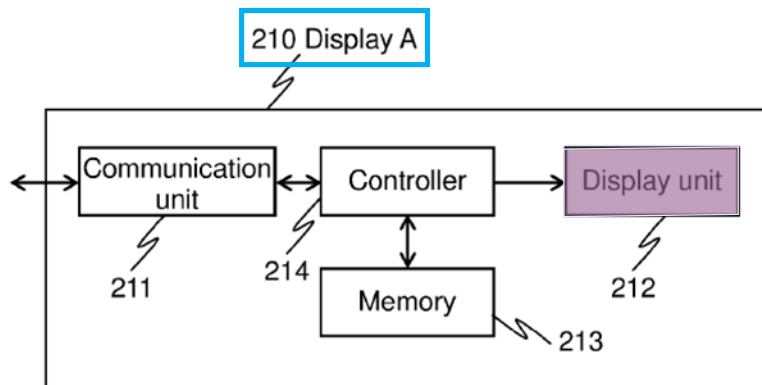
***[12.0] The system (1) according to claim 1,
[12.1] wherein each display device (6A, 6B):
comprises its screen (5) or a number of screens (5), or is connected to its external
screen (5) or a number of screens (5) to be controlled by it.***

211. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [12.0]. Furthermore, as explained in sections below, Masumoto, Kipp and Takashi teach [12.1].

212. Masumoto discloses that each display has a display unit “including a liquid crystal display panel.” (Masumoto, FIG. 2, [0004]).



Ex.1005 (Masumoto), FIG. 1 (annotated)



Ex.1005 (Masumoto), FIG. 2 (annotated)

213. Kipp also discloses that “each display device comprises its screen.” (Kipp, [0041]-[0042], FIG. 2). Kipp discloses that “although the playback devices 202 are shown to be separate from their respective display devices 206, this need not be the case. In example implementations, a single device may incorporate both the playback device and the display device.” (Kipp, [0042]. Thus, Kipp

teaches that each display device comprises its screen or is connected to its external screen.

214. Additionally, Takashi discloses that the image display terminal 80 may include the first display unit 70aA and the second display unit D (corresponding to a number of screens in [12.1]. Thus, Takashi also teaches that the image display terminal 80 comprises a number of screens. Moreover, it would be obvious for a POSITA to try connecting to multiple external screens as taught in Takashi.

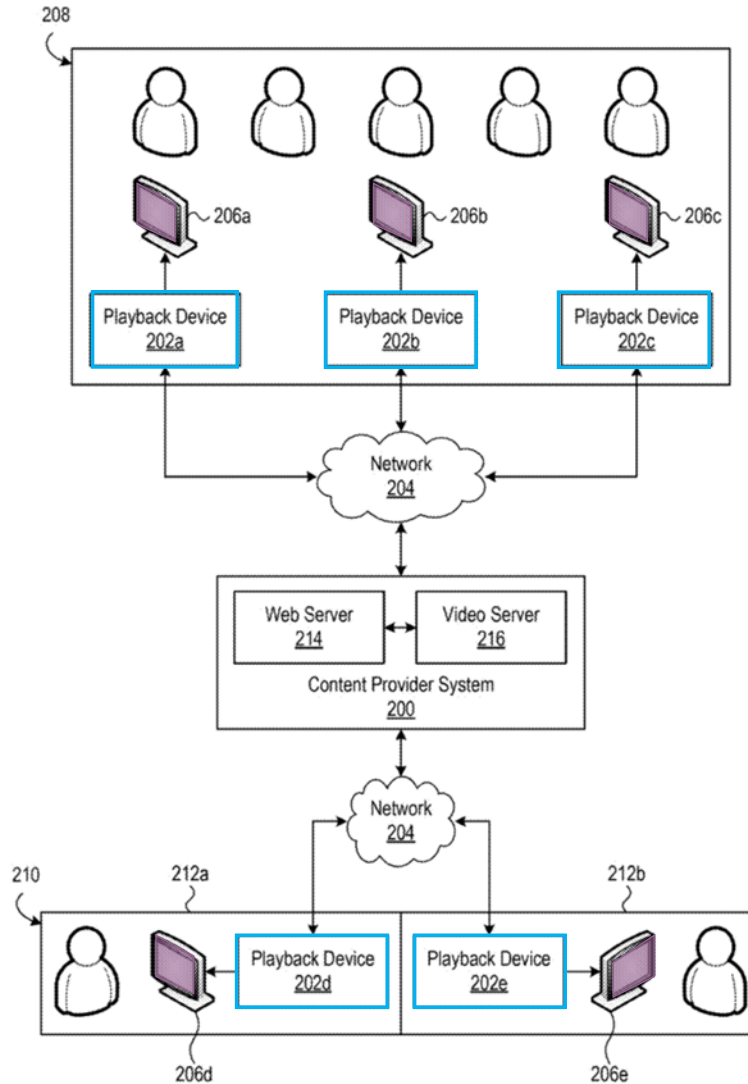


FIG. 2

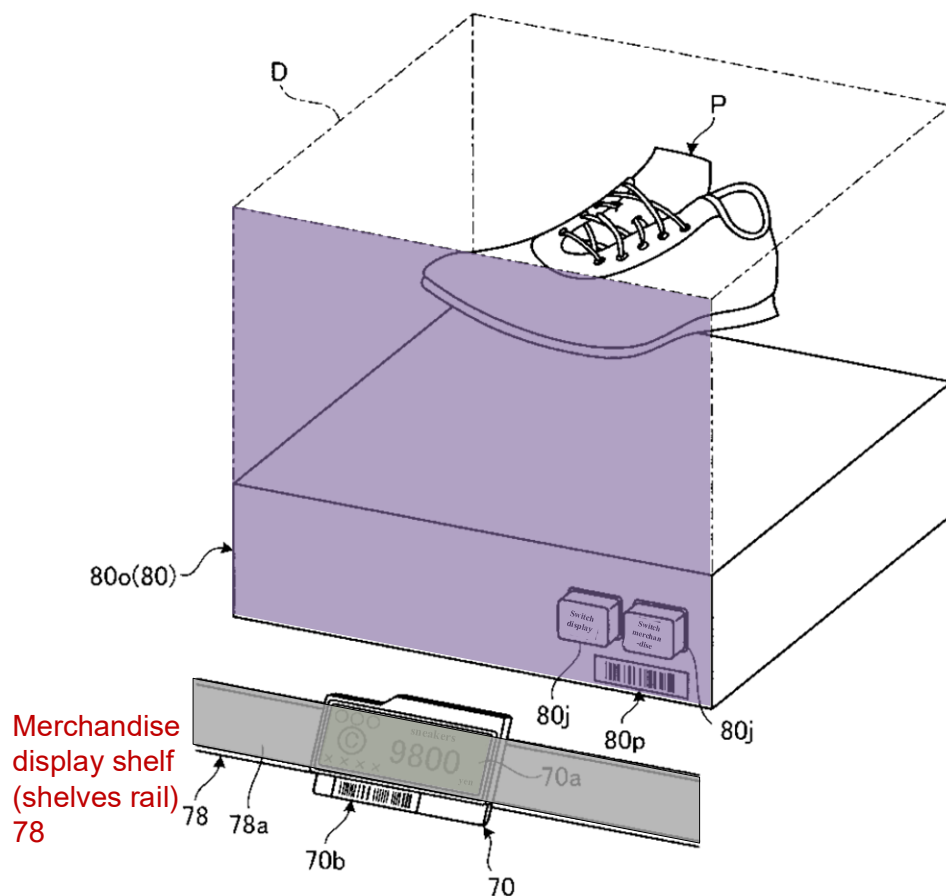
Ex.1006 (Kipp), FIG. 2 (annotated)

Claim 13

[13.0] The system (1) according to claim 1,
[13.1] wherein said screen (5) is designed to realize a shelf rail (4) or part of it,
or to cover a front of a shelf rail (4) or a part of it to which it is attachable.

215. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [13.0]. Furthermore, as explained in sections below, Takashi teaches [13.1].

216. Takashi discloses that “[t]he shelf tag terminal 70 is provided at an edge 78a, etc., of a merchandise display shelf 78 in the store.” (Takashi, FIG. 5). Thus, Takashi teaches that shelf tag terminal 70 having the first display portion 70a is designed to realize part of the merchandise display shelf 78 and covers part of the edge of the merchandise display shelf 78.



Ex.1008 (Takashi), FIG. 5 (annotated)

217. Furthermore, a POSITA would understand to enlarge the screen size, e.g., design a whole shelf rail with screen or cover the whole rail front, for the purpose to attract customers, as taught in Takashi.

218. It is a universal, obvious goal of all such systems to attract customers' attention but less intrusive in a business premise. *See* Ex.1009 (Clontz), [0008] ("Electronic components, such as a video display device, audio speakers, a printer or a wireless transmitting device used to deliver content to shoppers in the vicinity of the shelf can be housed securely within the enclosure of the shelf"). Takashi describes placing the shelf tag terminal 70 and the image display terminal 80 on or close to shelves. (Takashi, FIG. 5.) A POSITA reading Masumoto and Kipp would have been motivate to apply the shelf tag terminal 70 and the image display terminal 80/80A to the combination of Masumoto and Kipp.

Claim 14

[14.0] The system (1) according to claim 1,

[14.1] wherein the system realizes a video playback enabled electronic shelf label system.

219. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [14.0].

220. Furthermore, Takashi teaches [14.1] because Takashi discloses a video playback enabled electronic shelf label system. (Takashi, FIGS. 5, 14).

Claim 15

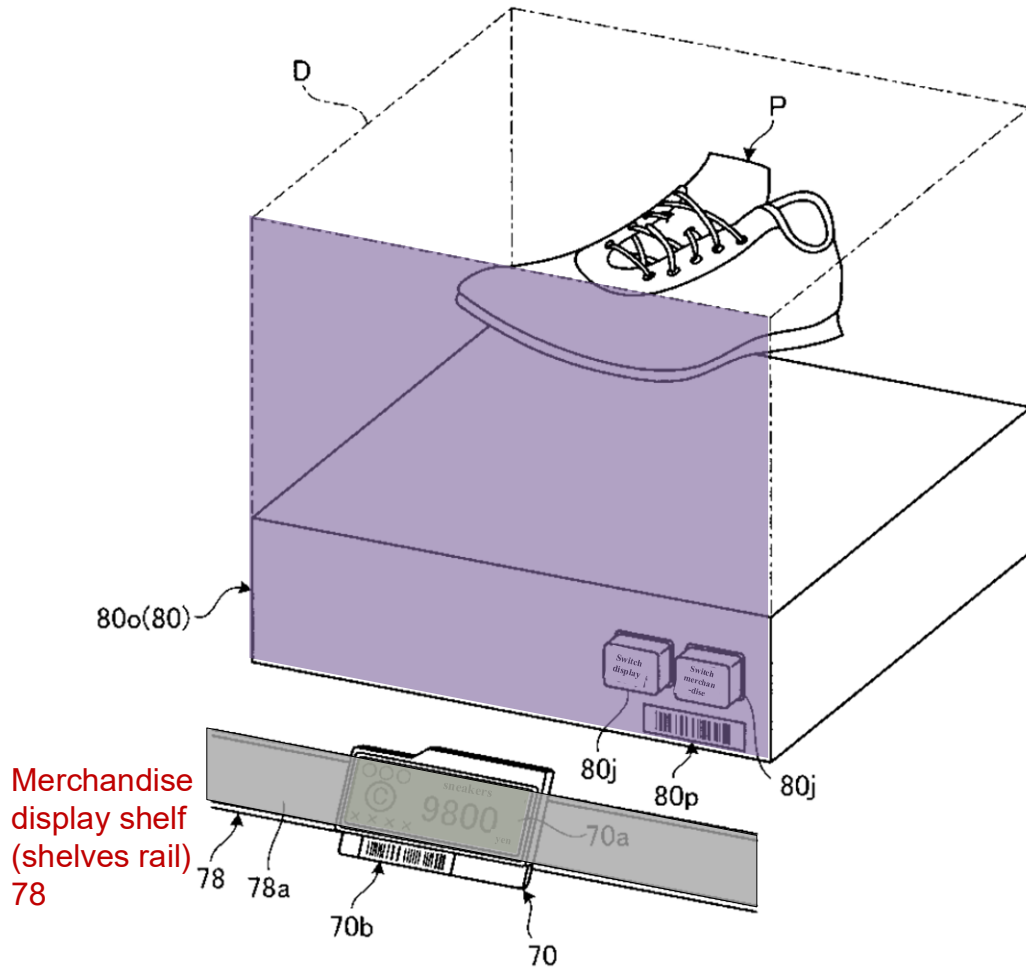
[15.0] A use of the system (1) according to claim 1 as video playback enabled electronic shelf label system for the playback of synchronized video content for a number of shelf rails (4),

[15.1] wherein each of said shelves rails (4) is realized by a screen (5) or carries a screen (5).

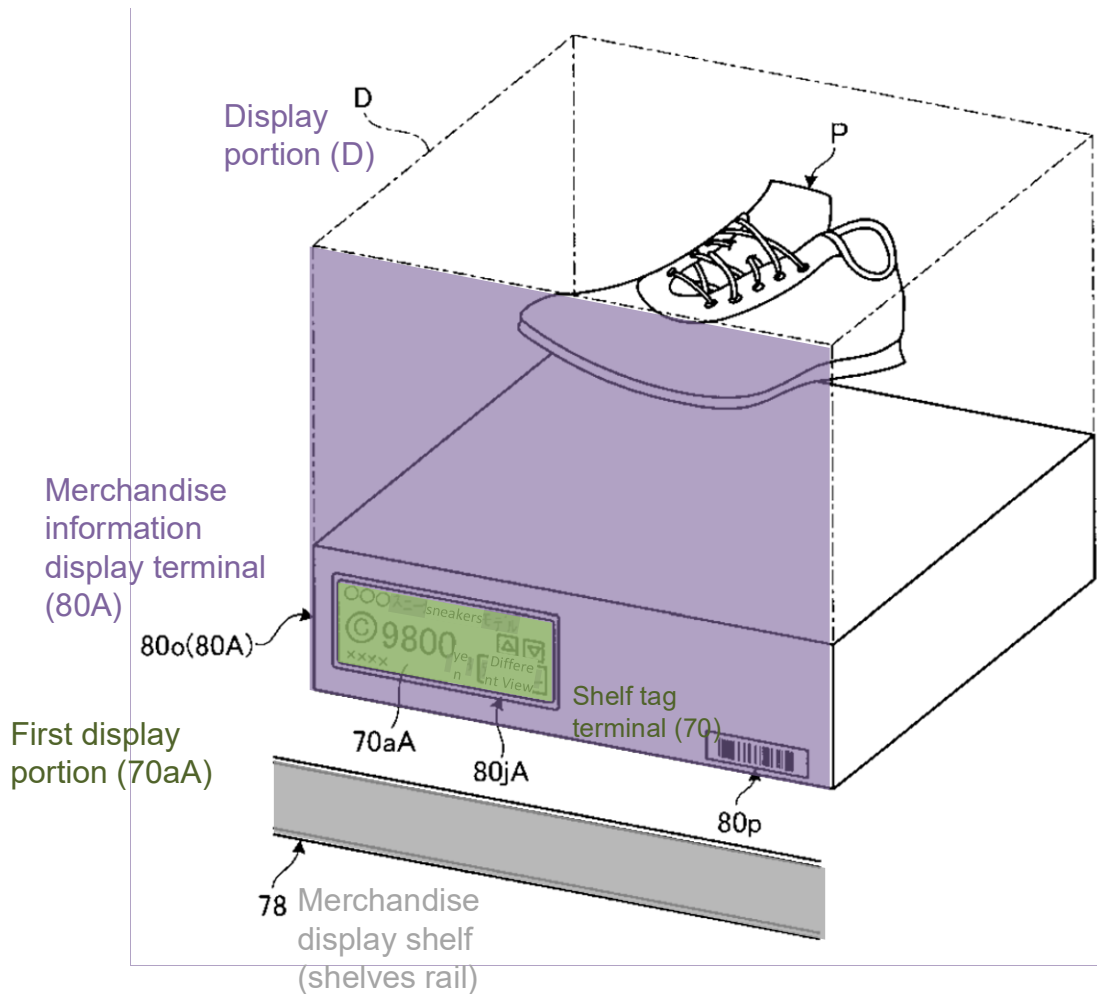
221. As explained above with respect to [1.0]-[1.4] in §III.B.3, Masumoto in view of Kipp and Takashi teaches [15.0]. Takashi teaches a video playback enabled electronic shelf label system. (Takashi, FIGS. 5, 14).

222. Takashi discloses that “[t]he shelf tag terminal 70 is provided at an edge 78a, etc., of a merchandise display shelf 78 in the store.” (Takashi, [0019], FIG. 5). In FIG. 14 (reproduced below), Takashi shows that the image display terminal 80 having the first display portion 70aA and the display portion D are placed above the merchandise display shelf 78. Therefore, Takashi teaches that the merchandise display shelf 78 carries different display portions.

223. According to Takashi, a store inherently has multiple shelves to display different products. Therefore, multiple shelves 78 carrying displays exist in a store.



Ex.1008 (Takashi), FIG. 5 (annotated)



Ex.1008 (Takashi), FIG. 14 (annotated)

4. Combination of Kipp, Masumoto and Takashi

224. As discussed above with respect to §III.B.1-3 and for the reasons provided below, a POSITA would have been motivated to combine the teachings of Masumoto with Kipp and Takashi in the manner described below. In particular, a POSITA reading Masumoto in view of Kipp and Takashi would have found it obvious to implement the video content displayed on Kipp's multiple playback devices and the product content displayed on Takashi's image display terminal, in Masumoto's multiple displays when applying

Masumoto's multiple-display apparatus in a specific business premise, *e.g.*, a retail store for the following reasons.

225. First, a POSITA would have been motivated to combine Masumoto with Kipp because Masumoto and Kipp are designed to achieve the same goal to synchronize a video across multiple displays. Masumoto's multiple-display apparatus is capable of "mutually synchronizing displays to match the frame number contained in the image marker. This enables to display one entire image by multiple displays without a sense of incongruity." Ex.1005 (Masumoto), [0004]. Kipp recognizes that "[t]herefore a need exists for synchronizing video streams across multiple playback devices." Ex.1006 (Kipp), [0003].

226. Second, it would have been obvious to a POSITA to have looked to Kipp's disclosure of synchronously displaying advertisement content associated with a premise where the multiple playback devices are co-located when applying Masumoto's multiple-display apparatus in a specific business premise, *e.g.*, a retail store, to solve a well-recognized need in a business premise – a need for synchronously providing clients with promotional information or advertisement. *See* the '669 Patent, 1:28-40, 7:29-38 ("playing back synchronized video [*e.g.*, advertisement video] on a number of devices comprised of relatively inexpensive hardware"); *see also* Ex.1006 (Kipp), [0023], [0124] ("playback devices deployed to a common location (*e.g.*, a sports

bar, a residence, etc.) may synchronize a segmented video stream presented to viewers on multiple displays at that location” and “selecting advertisements for playback on multiple digital billboards”); *see also* Ex.1009 (Clontz), [0032] (the shelf may be implemented with “connected” displays that “run the same ads all the time”).

227. Third, a POSITA would have expected using Masumoto’s multiple displays to display advertisement video as in Kipp and Kipp’s approach of presenting the same content can be extended to different content that needs to be synchronized as in Masumoto. Kipp’s display devices may “be any type of device configured to receive a video signal and output visual images corresponding to that video signal,” including “televisions, computer monitors, computer screens, touchscreens, video projectors, head-up displays, head-mounted displays, digital billboards, and other types of devices configured to generate visual images from a video signal received.” Ex.1006 (Kipp), [0041]. Masumoto’s each display receives video signals from the image transmission server and displays images from the video signals that are received and the display unit in the display can be a liquid crystal display panel. Ex.1005 (Masumoto), [0039]. Therefore, both Kipp’s display devices and Masumoto’s displays are used to receive video signals and display video images. A POSITA would have recognized, from Kipp’s teaching, that it would improve

Masumoto's similar device (i.e., displays) as displaying an advertisement video and presenting different video contents that needs to be synchronized in multiple displays, when applying Masumoto's device in a business place, e.g., retail store.

228. Fourth, in my opinion, a POSITA would have had been readily able to combine Masumoto's displays with Kipp's display devices that display information related to a premise and Takashi's manner of displaying production information and advertisement with an expectation of success. The displays in Masumoto, the multiple display devices in Kipp, and the image display terminal which may be a CRT or an LCD in Takashi all play the same role as displaying video content in the existing video playback art. Accordingly, it would have been routine for a POSITA to combine or modify the existing prior art features to arrive at the purported invention of the '669 Patent.

229. Fifth, a POSITA would also have looked to Takashi for displaying promotion content related to products in a business premise, e.g., a retail store. It is a universal, obvious goal of all such systems to display promotion content related to the premise where the systems are located. Both Kipp and Takashi disclose that, the video content displayed on the multiple playback devices or the image display terminal may include various content to the users at their premises. Ex.1006 (Kipp), [0032], [0036]; Ex.1008 (Takashi) [0020], [0042].

A POSITA reading Masumoto and Kipp naturally would have looked to Takashi for additional details regarding how to display advertisement contents in a business premise such as a retail store.

230. Moreover, a POSITA would have understood that to attract customers (e.g., Ex.1004 (Swafford), [0404] - “provide additional information to a customer or to attract a customer’s attention”), designing other promotion contents to substitute a part of advertisement video is a commonly used promotional strategy in a business premise, e.g., a retail store.

231. Thus, it would be obvious to a POSITA, in view of Takashi, to use the multiple displays in the combination of Masumoto and Kipp to display the product information in the similar manner (e.g., displaying product information or product price related information by means of virtual electronic shelf labels displayed within a section of a screen’s display area overlapping with a video content) as Takashi in the premise of a retail store.

232. For at least the above reasons, a POSITA would have found it obvious to incorporate Kipp’s synchronously displaying advertisement content associated with a premise where the multiple playback devices are co-located and Takashi’s manner of displaying promotion content of the product in Masumoto’s system.

C. Secondary Considerations

233. I am not aware of any evidence regarding secondary considerations of non-obviousness, and Patent Owner has not identified any such evidence in the patent specification, prosecution history, or related district court complaints. To the extent Patent Owner identifies evidence of secondary considerations at a later point in the proceeding, I reserve the right to address it at that time.

V. CONCLUSION

234. I reserve the right to supplement my opinions to address any information obtained, or positions taken, based on any new information introduced throughout this proceeding.

235. I declare under penalty of perjury that the foregoing is true and accurate to the best of my knowledge, information and belief.