

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ROKU, INC.,
Petitioner

v.

ANONYMOUS MEDIA RESEARCH HOLDINGS, LLC,
Patent Owner

Case IPR2024-01056
U.S. Patent No. 10,572,896

DECLARATION OF SAMUEL H. RUSS

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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Alexandria, VA 22313-1450

Roku EX1003
IPR2024-01056
U.S. Patent No. 10,572,896

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I, Samuel H. Russ, hereby declare as follows.

I. INTRODUCTION

1. I have been engaged by Sterne, Kessler, Goldstein & Fox PLLC on behalf of Roku, Inc. (“Roku”) to provide this Declaration concerning technical subject matter relevant to the *inter partes* review of U.S. Patent No. 10,572,896 (EX1001, “’896 patent”), which is entitled “Media Usage Monitoring and Measurement System and Method.”

2. I am over 18 years of age. I have personal knowledge of the facts stated in this Declaration.

3. I have reviewed, and am familiar with, the specification, claims, and prosecution history of the ’896 patent. I will cite to the specification of a U.S. Patent using the following format: Column:Line Number(s). For example, the citation to EX1001, 1:1-10, points to the ’896 patent specification at column 1, lines 1-10.

4. In forming my opinions expressed in this Declaration, I have reviewed and, in some cases, relied upon the list of materials provided in Section III. To the best of my knowledge, those exhibits listed in Section III are true and accurate copies of what they purport to be. An expert in the field would reasonably rely on them to formulate opinions such as those set forth in this Declaration.

5. I am being compensated at my standard rate by Roku for my time

spent in connection with this proceeding. My compensation is not dependent on, and in no way affects, the substance of my opinions. Nor is my compensation dependent on the outcome of this proceeding. My findings are based on my education, experience, and background in the fields discussed below.

II. MY BACKGROUND AND QUALIFICATIONS

6. My academic and professional pursuits are closely related to the subject matter of the '896 patent. Based on my education and work experience, I am well qualified to serve as a technical expert in this matter.

7. A summary of my educational and professional experience is set forth in my *curriculum vitae* ("CV"), which is submitted as Exhibit 1004. Exhibit 1004 also includes a list of my publications and the cases in which I have testified at deposition, hearing, or trial. Some of the relevant points in my CV are described below.

8. I received a Bachelor's degree in Electrical Engineering from the Georgia Institute of Technology ("Georgia Tech") in 1986 and a Ph.D. in Electrical Engineering from Georgia Tech in 1991.

9. From 2007 to the present, I have been a member of the faculty of the University of South Alabama as an Assistant and Associate Professor in the Department of Electrical and Computer Engineering. During that time, I have won awards for excellent teaching and have been actively publishing research in home

networking and digital video recording (DVR) technologies. I am active in the Institute of Electrical and Electronic Engineers (IEEE) and am a Distinguished Lecturer for the IEEE Consumer Electronics Society. As a consultant, I have conducted briefings for members of the financial community on technology trends in the cable, satellite, and IPTV sectors.

10. From 2000 to 2007, I worked for Scientific-Atlanta (now Cisco's Service Provider Video Tech. Group), where I managed a cable set-top box (STB) design group that designed four STB models, including the Explorer 4200 (non-DVR) and 8300 (DVR) models. Both models sold several million units. As design group manager, I was responsible for managing the design and prototyping activities of the group and for interfacing with other groups (especially integrated-circuit design, procurement, software developers, the factory where prototypes were built, and product managers) and for maintaining the hardware and mechanical development schedule. Since the products were produced in extremely high volumes, the projects had very high visibility in the company, and therefore carried a great deal of responsibility.

11. Also while at Scientific-Atlanta, I became a staff expert in home networking, conducting demonstrations of wireless video technology and managing a group that developed a new coaxial home networking system. The coaxial system won a Technology and Engineering Emmy® Award in 2013. I

became a staff expert in DVR reliability, and led a team that improved the software, hardware, repair, and manufacturing processes. I am a named inventor on over fifty patent applications that were filed while I was at Scientific-Atlanta, twenty-nine of which have issued as U.S. patents, as of the writing of this report. Many have also issued as European and Canadian patents.

12. From 1999 to 2000, I was a Staff Electrical Engineer and then Matrix Manager at IVI Checkmate (now Ingenico), where I managed the hardware design team that completed the design of the eN-Touch 1000 payment terminal. This terminal was in widespread use, for example, at the self-checkout at Home Depot.

13. I also served on the faculty of Mississippi State University from 1994 to 1999 as an Assistant Professor in the Department of Electrical & Computer Engineering, where I taught circuit board design and two-way interactive video classes, among other things.

14. I have also authored at least 15 journal articles and at least 31 conference papers, including a conference paper on digital video recording that won second place in a “best paper” competition at the 2011 International Conference on Consumer Electronics in Las Vegas, NV.

III. MATERIALS CONSIDERED

15. In formulating my opinions, I have relied upon my training, knowledge, and experience that are relevant to the '896 patent. Furthermore, I have

considered specifically the following documents listed below in addition to any other documents cited in this Declaration. I understand that the references are true and accurate copies of what they appear to be.

16. I have been asked to provide technical review, analysis, insights, and opinions regarding the references cited in the Petition and discussed below. My opinions are not only based on these references but also based on my over 30 years of experience as a computer architect, computer system designer, personal computer graphics designer, educator, and executive in the electronics industry.

Exhibit No.	Description
1001	U.S. Patent No. 10,572,896 to Steuer et al. (“’896 patent”)
1002	File History of the ’896 Patent (“’896 Patent File History”)
1004	<i>Curriculum Vitae</i> of Dr. Samuel Russ
1005	U.S. Patent No. 7,248,777 to Feininger et al. (“Feininger”)
1006	U.S. Patent Appl. Publ. No. 2007/0271300 to Ramaswamy (“Ramaswamy”)
1007	U.S. Prov. Pat. Appl. No. 60/574,836 (“’836 application”)
1008	U.S. Prov. Pat. Appl. No. 60/629,996 (“’996 provisional application”)
1009	Redline comparison of Ramaswamy specification and ’996 provisional application specification
1010	WO 2004/051997 A1 to Conklin (“Conklin”)
1011	U.S. Patent No. 5,581,658 to O’Hagan et al. (“O’Hagan658”)

Exhibit No.	Description
1012	Hernandez et al., “Real-world Data is Dirty: Data Cleansing and the Merge/Purge Problem,” Kluwer Academic Publishers, 1998
1013	Lakshminarayan et al., “Imputation of Missing data in Industrial Databases,” Kluwer Academic Publishers, 1999
1014	Battle et al., “Automatic Song Identification in Noisy Broadcast Audio,” 2002
1016	Mong Li Lee, W. Hsu and Vijay Kothari, “Cleaning the spurious links in data,” in IEEE Intelligent Systems, vol. 19, no. 2, 28-33, March-April 2004. (“Lee”)
1017	Ingunn Myrtveit, Erik Stensrud, and Ulf H. Olsson “Analyzing Data Sets with Missing Data: An Empirical Evaluation of Imputation Methods and Likelihood-Based Methods,” in IEEE Transactions on Software Engineering, vol. 27, no. 11, 999-1013, November 2001. (“Myrtveit”)
1018	U.S. Patent Appl. Publ. No. 2003/0037333 to Ghashghai et al. (“Ghashghai”)
1019	Microsoft Computer Dictionary, Fifth Edition, Microsoft Press 2002

17. This Declaration represents the opinions I have formed to date. I may consider additional documents as they become available or other documents that are necessary to form my opinions. I reserve the right to revise, supplement, or amend my opinions based on new information.

18. In light of my review of the exhibits, I recognize that the specification of the '896 patent describes systems and methods for “enhance[ing] recognition (e.g. in terms of accuracy or efficiency) of the content of a media sample by

analyzing information exogenous to the sample.” EX1001, 1:66-2:3. In particular, the ’896 patent purports to deduce “play-altering activity of an audience member” from “content offset values of identifications corresponding to captured samples.” EX1001, 2:14-17.

19. I understand that the ’896 patent purports to claim priority to U.S. Provisional Application No. 60/574,836, filed May 27, 2004. I am familiar with the technology at issue in the ’896 patent and the state of the art as of May 27, 2004.

IV. RELEVANT LEGAL STANDARDS

20. When considering the ’896 patent and stating my opinions, I am relying on legal principles that have been explained to me by counsel.

21. I understand that for a claim to be found patentable, the claims must be, among other requirements, novel and nonobvious from what was known at the time of the invention.

22. I understand that the information that is used to evaluate whether a claim is novel and nonobvious is referred to as prior art.

23. I understand that in this proceeding, Petitioner has the burden of proving that each element of the challenged claims is disclosed by the prior art or would have been obvious based on the prior art.

A. Obviousness

24. I understand that a patent claim is invalid if the claims would have

been obvious to a person of ordinary skill in the art (“POSA”) at the time of the invention. I understand that the obviousness inquiry should not be done in hindsight, but from the perspective of a POSA as of the time of invention of the patent claim.

25. I understand that to obtain a patent, the claims must have, as of the time of the invention, been nonobvious in view of the prior art.

26. I understand that a claim is obvious when the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a POSA at the time the invention.

27. I understand that to prove that the prior art reference or a combination of prior art references renders a patent obvious, it is necessary to: (1) identify the particular references that, singly or in combination, make the patent obvious; (2) specifically identify which elements of the patent claim appear in each of the asserted references; and (3) explain how a POSA could have combined the prior art references to create the claimed invention and what the combination would be.

28. I understand that to support a conclusion that a prior art reference or a combination of prior art references renders a patent obvious, there must be some documentary evidence. Mere statements about what is basic knowledge or common sense, i.e., common knowledge as a replacement for documentary evidence, is insufficient to support a conclusion of obviousness.

29. I understand that certain objective indicia can be important evidence regarding whether a patent is obvious. Such indicia include: industry acceptance, commercial success of products covered by the patent claims; long-felt need for the invention; failed attempts by others to make the invention; copying of the invention by others in the field; unexpected results achieved by the invention as compared to the closest prior art; praise of the invention by the infringer or others in the field; taking of licenses under the patent by others; expressions of surprise by experts and those skilled in the art at the making of the invention; and the patentee proceeded contrary to the accepted wisdom of the prior art.

B. Level of Skill in the Art

30. I have been asked to consider the level of ordinary skill in the field that someone would have had at the time the claimed invention was made, which I understand is purported to be May 27, 2004. However, as I explain below in Section VI.C, it is my opinion that the earliest priority date for the '896 patent is May 26, 2005. My opinions included herein do not change regardless of the May 27, 2004, or the May 26, 2005, dates. In deciding the level of ordinary skill, I considered the following:

- the educational level of the inventor;
- type of problems encountered in the art;
- prior art solutions to those problems;

- the rapidity with which innovations are made;
- the sophistication of the technology; and
- the educational level of active workers in the field.

31. In my opinion, a POSA at the time of the invention would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or equivalent degree with at least two years of relevant industry experience, including in digital media content delivery.

32. Throughout my Declaration, even if I discuss my analysis in the present tense, I am always making my determinations based on what a POSA would have known at the time of the invention. Additionally, throughout my Declaration, even if I discuss something stating "I," I am referring to a POSA's understanding.

C. Motivation to Combine and Hindsight Bias

33. I understand that obviousness can be established by combining multiple prior art references to meet each and every claim element, but I also understand that a proposed combination of references can be susceptible to hindsight bias.

34. I understand that references are more likely to be combinable if the nature of the problem to be solved is the same.

35. I understand that if the combination of references results in the

references being unsatisfactory for their intended purposes or the combination changes the references' principle of operation, a POSA would not have a motivation to combine the references.

36. I understand that obviousness may be defeated if the prior art indicates that the invention would not have worked for its intended purpose or otherwise teaches away from the invention. I further understand that a reference teaches away when a POSA, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken in the claim. I also understand that teaching away, e.g., discouragement, is strong evidence that the references are not combinable and/or that a POSA would not be motivated to combine them. I also understand that a disclosure of more than one alternative does not necessarily constitute a teaching away. I understand that the combination does not need to result in the most desirable embodiment.

D. Claim Construction

37. I understand that the claims of a patent are read in light of the specification of the patent as understood by a POSA at the time of the invention. I understand that "the time of the invention" refers to the effective filing date of the patent in question, which I am informed by counsel is no earlier than May 27, 2004, for the purposes of this proceeding. Whether or not explicitly stated below,

my analysis of the prior art is made as of the time the invention was made.

38. I understand that claim terms are given their plain and ordinary meaning as would be understood by a POSA as of the effective filing date. I understand that an inventor may provide a special meaning for a term, but that she must do so in the specification with precision and clarity.

39. In construing claims, I understand that evidence that is intrinsic to the patent and prosecution history is given more weight than extrinsic evidence. For example, if there are specific statements in the specification that define the invention, those statements are strong evidence of a definition for a term. In this Declaration, I have understood the claims in view of the general principles outlined above. Unless I indicate otherwise below, I have interpreted each claim term discussed herein to have its plain and ordinary meaning.

V. TECHNOLOGY BACKGROUND

40. The '896 patent is directed to providing “a media measurement system and method that enhances recognition (e.g. in terms of accuracy or efficiency) of the content of a media sample by analyzing information exogenous to the sample.” EX1001, 1:66-2:3. In particular, the '896 patent purports to deduce “play-altering activity of an audience member” from “content offset values of identifications corresponding to captured samples.” EX1001, 2:14-17.

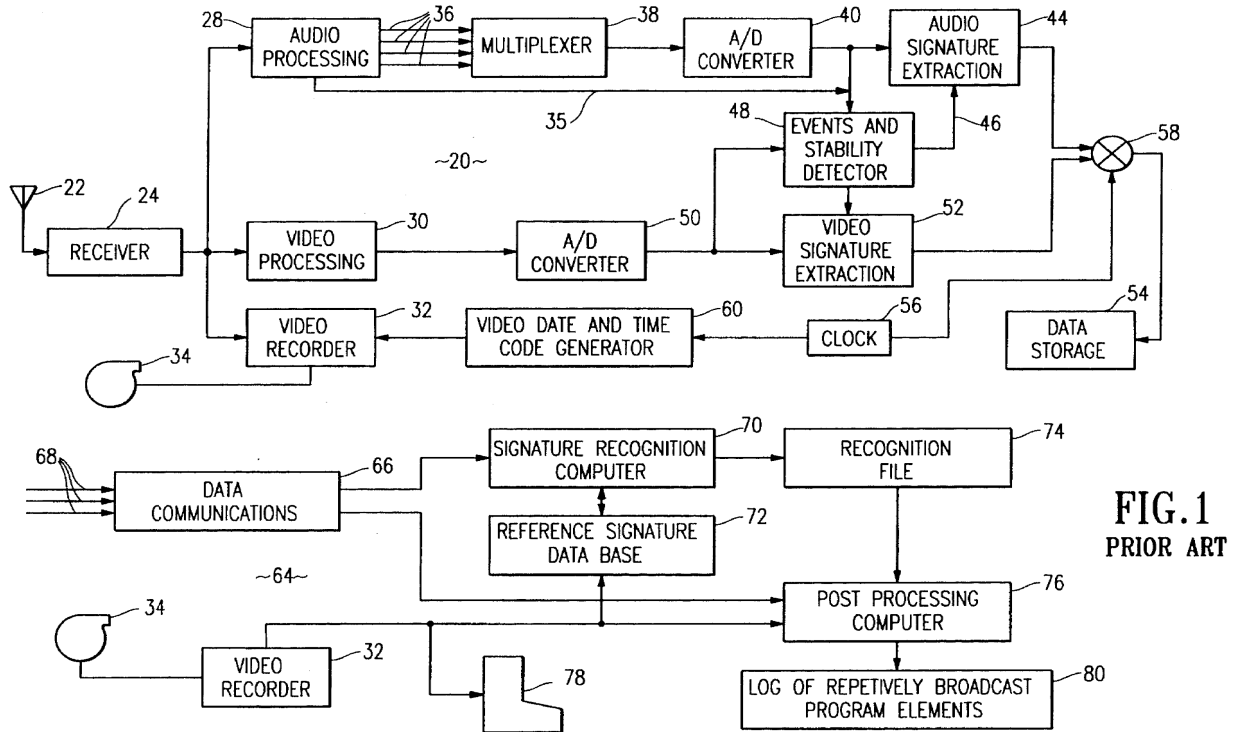
A. Content Identification Was Well Known

41. The '896 patent explains that its “[c]ontent recognition system 124 is adapted to implement one or more known content recognition methods that identify content by extracting parameters from a media signal and applying an algorithm to those parameters to search for a content match. Those skilled in the art will recognize that many such methods and algorithms exist. One such example is described in U.S. patent application Ser. No. 09/839,476 entitled ‘System and Methods for Recognizing Sound and Music Signals in High Noise and Distortion’ by Wang et al. and published Jun. 27, 2002 with publication number US2002/0083060. Aspects of other such examples are described in the following published PCT applications by Konin-Klijke Philips Electronics N.V.: ‘Fingerprinting Multimedia Contents’ (WO2004/044820, published May 27, 2004), ‘Fingerprint Extraction’ (WO2004/030341 published Apr. 8, 2004), and ‘Improvements in and Relating to Fingerprint Searching’ (WO2004/040475 published May 13, 2004).” EX1001, 5:48-66.

B. Generating Play Streams Was Well Known

42. The '896 patent explains that a “raw play stream” functionally relates “a sequence of samples to content identification results” EX1001, 6:24-27, 8:13-15. By this definition, the generation of play streams in content identification systems was well known by a POSA in the art by the time of the '896 disclosure.

For example, the O'Hagan patent, which was issued in 1996 (nearly two decades prior to the '896 patent), describes the generation of play streams as being known to a POSA at that time. O'Hagan describes play stream generation in relation to FIG. 1.



EX1011, FIG. 1.

43. O'Hagan describes the automatic identification of broadcast performances, such as music and commercials. EX1011, 1:9-12. In operation, O'Hagan describes Figure 1 as including station monitoring unit 20, which receives radio signals and process the signals to extract audio signatures representative of the received signatures. EX1011, 5:1-22. The received signals

pass through audio processing circuitry 28 to output an audio signature. EX1011, 5:1-22. The extracted audio signatures are stored along with their timestamps in a storage medium 34. EX1011, 5:30-36. The extracted audio signatures are then identified by comparison to a library of reference signatures. EX1011, 5:40-51. O'Hagan's prior art utilizes a signature recognition computer 70 to compare extracted signatures to a library of reference signatures stored in memory 72, "searches for instances of successive recognition of extracted signatures to identify a particular program," and then classifies and stores the signatures in recognition file 74. EX1011, 5:52-64. At a minimum, recognition file 74 comprises a play stream by the '896 definition. Further, O'Hagan discloses that the recognition file 74 is further provided to a post-processing computer 76 which, in turn, produces a file or log 80 of identified programs along with their start times and durations if successive recognized extracted signatures are detected. EX1011, 5:64-6:3. Additionally, post processing computer 76 assigns a code to non-recognized or unmatched signatures for later manual review and identification. EX1011, 6:7-10.

44. O'Hagan evidences that the generation of play streams in the content identification art was well known nearly two decades before the issuance of the '896 patent – in the mid-1990s.

C. Deducing Play-Altering Actions Was Well Known

45. For example, the '896 patent defines a play-altering action as

including pausing, reversing, or fast forwarding media. EX1001, 11:14-23. By this definition, the deducing of such actions was well known by a POSA in the art by the time of the '896 disclosure. For example, Conklin (EX1010), which was filed nearly 10 years before the issuance of the '896 patent, describes that the usage of digital video recorders (DVRs) complicated the “collection of viewing behavior information because viewers in households with these types of recording devices [rapidly changes] between live viewing of a program, a somewhat delayed viewing of a program, fast forwarding and rewinding a program, pausing a program, and recording a program for later viewing while watching another program live.” EX1010, ¶7.

46. Conklin provides a solution for such an issue. For instance, Figure 8 of Conklin (reproduced below) described a system 300 that uses digital information monitor/analyzer 302 in conjunction with a DVR 304 and an audience measurement unit or home unit 306. EX1010, ¶68.

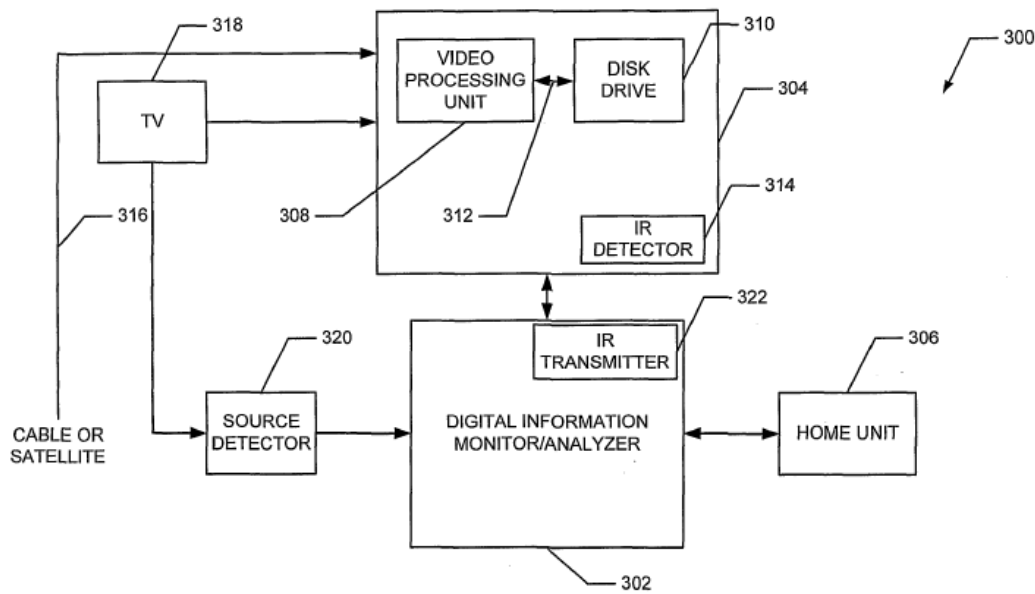


FIG. 8

EX1010, FIG. 8.

47. Digital information monitor/analyzer 302 generates event records containing recording times and sources for recorded media content. EX1010, ¶70. Digital information monitor/analyzer 302 also adds additional information, including the playback or viewing time information to these event records when the media content is subsequently viewed. EX1010, ¶70.

48. The sequence of event records generated by the digital information monitor/analyzer 302 are analyzed to ascertain audience viewing behaviors or habits. EX1010, ¶70. Figures 9-12 of Conklin, which are reproduced below, illustrate the relationship between “view time” and “delay time” of media content consumed on, for example, a DVR. EX1010, ¶71.

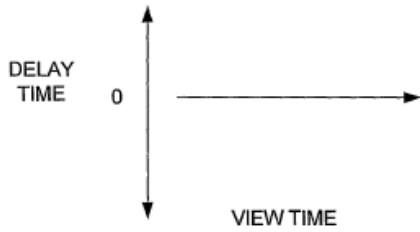


FIG. 9

EX1010, FIG. 9.

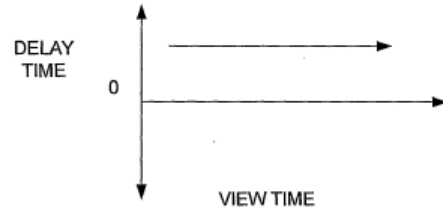


FIG. 10

EX1010, FIG. 10.

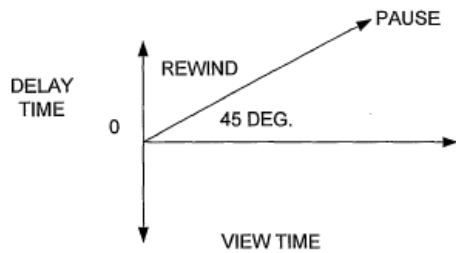


FIG. 11

EX1010, FIG. 11.

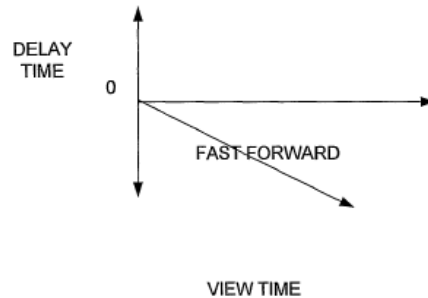


FIG. 12

EX1010, FIG. 12.

49. Figure 9, in which the delay time equals zero for all view times, depicts an example of live viewing of a video program via DVR 304. EX1010, ¶72. Figure 10, in which the delay time is constant for all view times, indicates that the video program was previously recorded by the DVR and is now being viewed.

EX1010, ¶72. In Figure 11, the line having a slope of one (i.e. a one-for-one increase in delay time and view time) indicates a pause condition, and a rewind operation is indicated if the relationship between the view time and delay time falls between the forty-five degree pause line and the vertical axis. EX1010, ¶73. As shown in Figure 12, if the delay time decreases as the view time increases, a fast forward operation is indicated. EX1010, ¶74. In other words, Conklin teaches that user operations can be derived by comparing timing of a known, identified program to the timing of the same program while viewing. These general operational characteristics are used to analyze a sequence of events record generated by the digital information monitor/analyzer 302 in order to interpret the viewing behavior (e.g., whether a user paused, rewound, or fast-forwarded media content) associated with a DVR. EX1010, ¶¶75-76, FIG. 13.

50. Accordingly, Conklin evidences that the deduction of play-altering actions was well known nearly a decade before the issuance of the '896 patent.

VI. OVERVIEW OF THE '896 PATENT

51. With the background discussed in Section V in mind, I now turn to the '896 patent, described below.

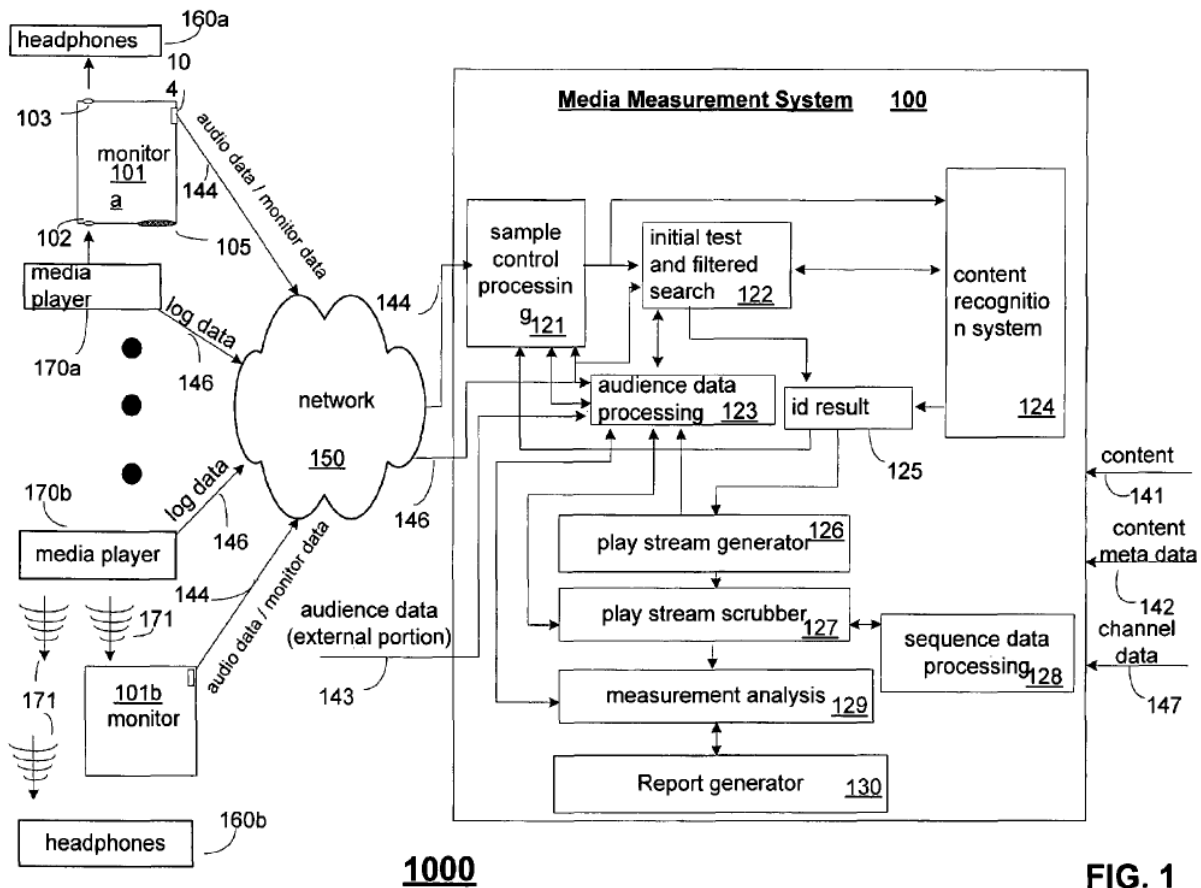
A. Summary of the Disclosure

52. The '896 patent purports to “provide a media measurement system and method that enhances recognition (e.g. in terms of accuracy or efficiency) of

the content of a media sample by analyzing information exogenous to the sample.”

EX1001, 1:66-2:3. In particular, the '896 patent purports to deduce “play-altering activity of an audience member” from “content offset values of identifications corresponding to captured samples.” EX1001, 2:14-17.

53. Figure 1 illustrates a media usage monitoring and measurement system 100:



EX1001, FIG. 1.

54. The '896 patent explains that a “monitoring device 101a includes a microphone 105, a media player port 102, a headphone port 103, and a data upload

port 104.” EX1001, 3:10-12. Audio data captured by the monitor 101a, along with associated monitor data (e.g., device ID) (collectively, “audio data/monitor data” 144), is uploaded to system 100. EX1001, 3:45-50.

55. Media measurement system 100 includes sample control 121 that receives the audio data and monitor data (e.g., device ID), divides the audio data into samples if the audio data was not previously divided, and determines which samples should be submitted for further content recognition testing. EX1001, 4:58-64. “Initial test and filtered search module 122 conducts one or more initial identification attempts.” EX1001, 5:6-7. “After completing the initial identification attempt, filtered search module 122 passes the identification result to ID result module 125.” EX1001, 5:39-41.

56. “If an identification has been made, the result is passed to play stream generator 126 and to sample control processing module 121.” EX1001, 5:41-43. The play stream generator 126 generates a raw play stream relating a sequence of samples to content identification results, which is then processed by play stream scrubber 127 which analyzes the sequence of sample identification results utilizing sequence data processing module 128. EX1001, 6:24-30. Based on the analysis, play stream scrubber 127 generates a clean play stream and clean play list for use by measurement analysis module 129. EX1001, 6:30-35. Results of the media measurement analysis can then be obtained via report generator 130. EX1001,

6:35-37.

57. Figure 2 illustrates a media measurement method 200 of the '896 patent:

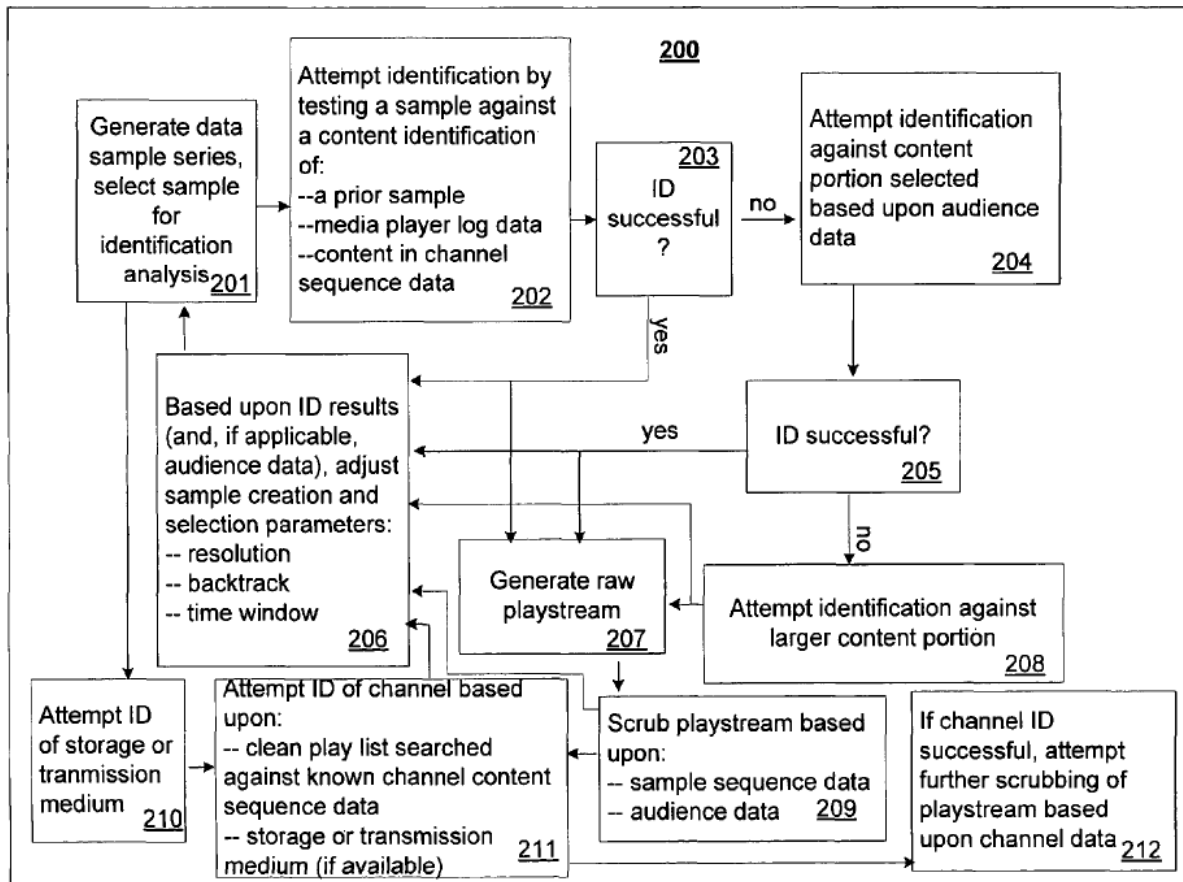


FIG. 2

EX1001, FIG. 2.

58. Media measurement method 200 is carried out by system 100.

EX1001, 7:1-5, FIG. 2. At step 201, system 100 receives audio data from a monitoring device 101 and caches a series of samples for content identification. EX1001, 7:5-8. The '896 patent explains that this audio data is uploaded to the

system 100 by monitoring device 101a, which includes a microphone 105 and a media player port 102 to capture audio energy when an audience member is consuming media from media player 170a. EX1001, 3:10-44, FIG. 2.

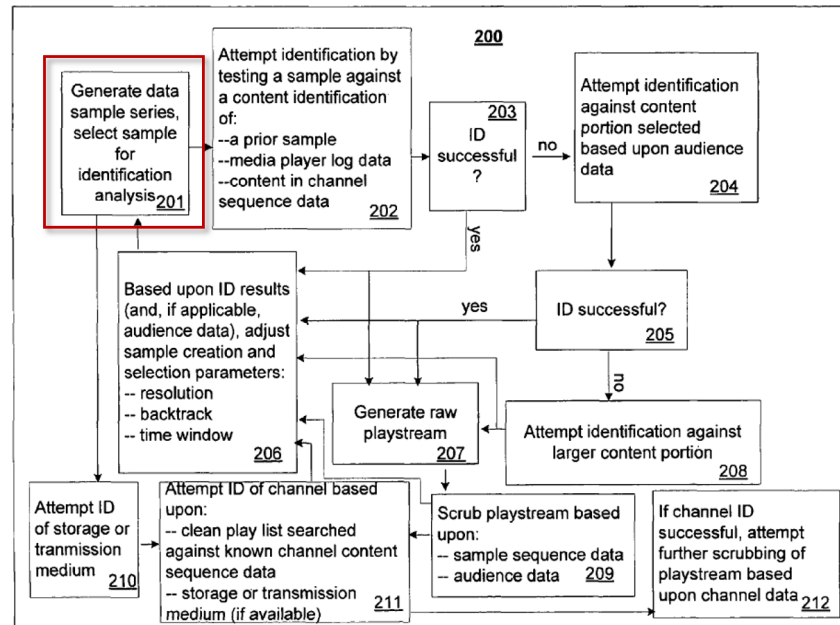


FIG. 2

EX100, FIG. 2 (annotated).

59. At step 202, the initial test and filtered search module 122 attempts to identify a sample in a series of samples via initial test methods by determining whether the audio data in the tested sample matches data associated with the content ID corresponding to the most recently identified sample. EX1001, 5:7-10, 7:26-30.

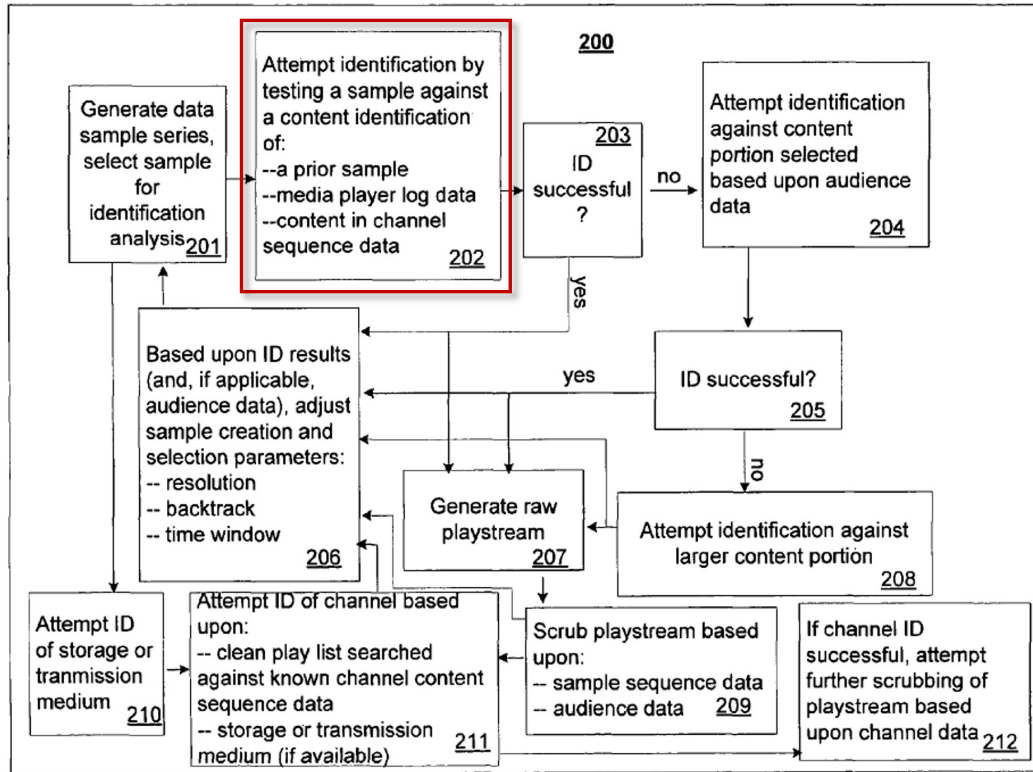


FIG. 2

EX1001, FIG. 2 (annotated).

60. If the sample is identified, the result is provided to play stream generator 126 (step 207). EX1001, 7:34-36. If not, then the initial test and filtered search module 122 may search (step 204) for a content match against targeted content selected based at least in part upon additional audience data. EX1001, 7:36-38, FIG. 2.

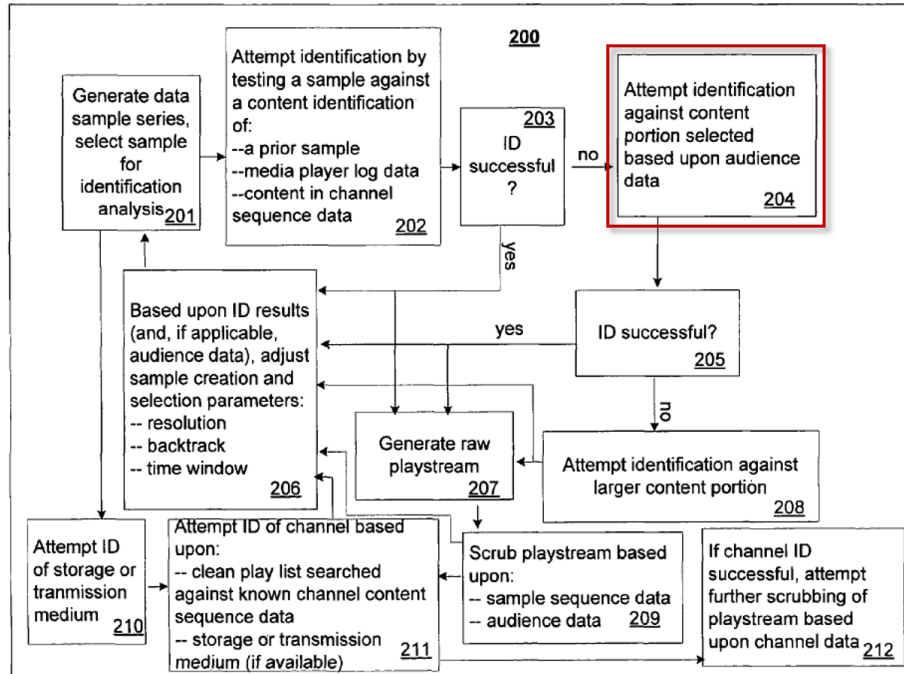


FIG. 2

EX1001, FIG. 2 (annotated).

61. If the sample is identified here, the result is provided to play stream generator 126 (step 207). EX1001, 7:40-41. If not, the content recognition system 124 performs a search using a larger portion of the content to identify the data sample at step 208. EX1001, 5:41-46, 7:41-42, FIG. 2.

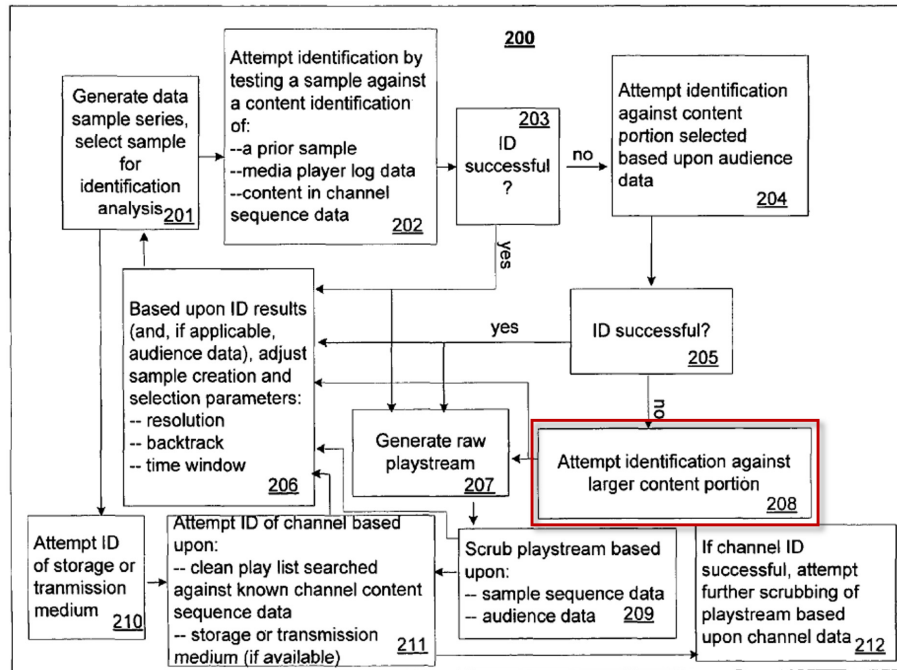


FIG. 2

EX1001, FIG. 2 (annotated).

62. The '896 patent admits that the content recognition system 124 did not implement a new or novel method or technique of identifying content but instead simply “implement[s] one or more known content recognition methods that identify content by extracting parameters from a media signal and applying an algorithm to those parameters to search for a content match.” EX1001, 5:48-52; *see also* EX1001, 5:53-62.

63. The '896 patent explains that there are two possible results of steps 202, 204, and 208: an identification has been made or no identification has been made. EX1001, 7:42-45. Whatever the result is at step 208 (identification or no identification) that result is passed to steps 207 and 206. EX1001, 7:46-48.

64. At step 207, a raw play stream is generated by play stream generator 126 indicating a series of samples and corresponding identification results.

EX1001, 6:24-27, 8:13-15, FIG. 2.

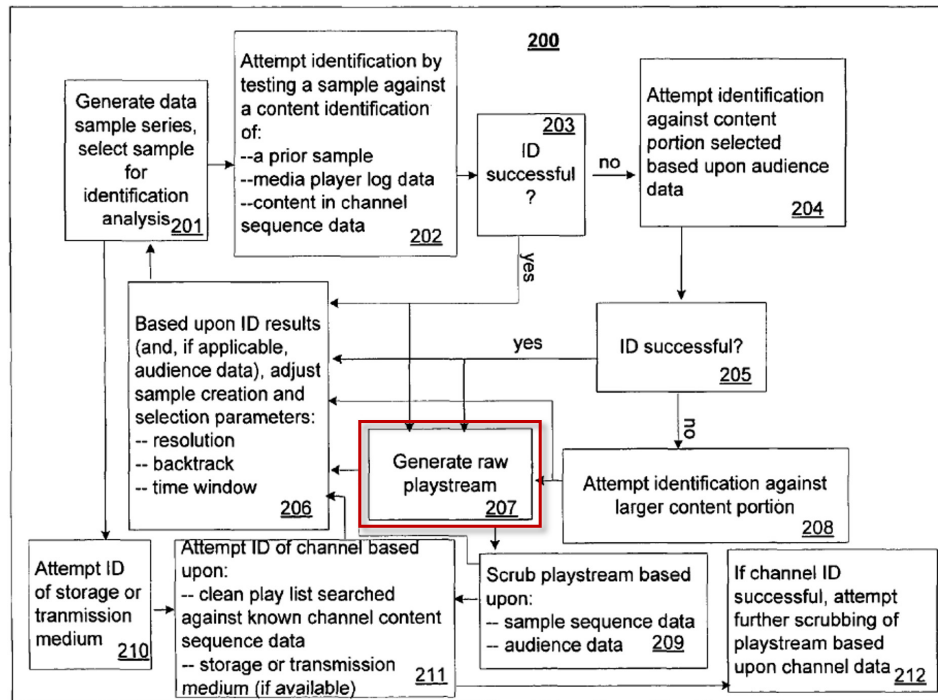


FIG. 2

EX1001, FIG. 2 (annotated).

65. Figure 4 illustrates a raw play stream 410, generated at step 207, which includes a sequence of analyzed samples, log times (e.g., t_0), and corresponding identification results (“content ID” column), where the content ID result indicates either a reference to a particular piece of content (e.g., “song 51”) or indicates that no identification was made (e.g., none). EX1001, 9:25-45. This sample sequence data (“ssd”) also includes time data (“log time” column); the

times in list 410 may be relative to an arbitrary value (e.g., “ t_0 ”) rather than representing an absolute time, or the times may indicate the actual time the sample started to be captured. EX1001, 9:40-45.

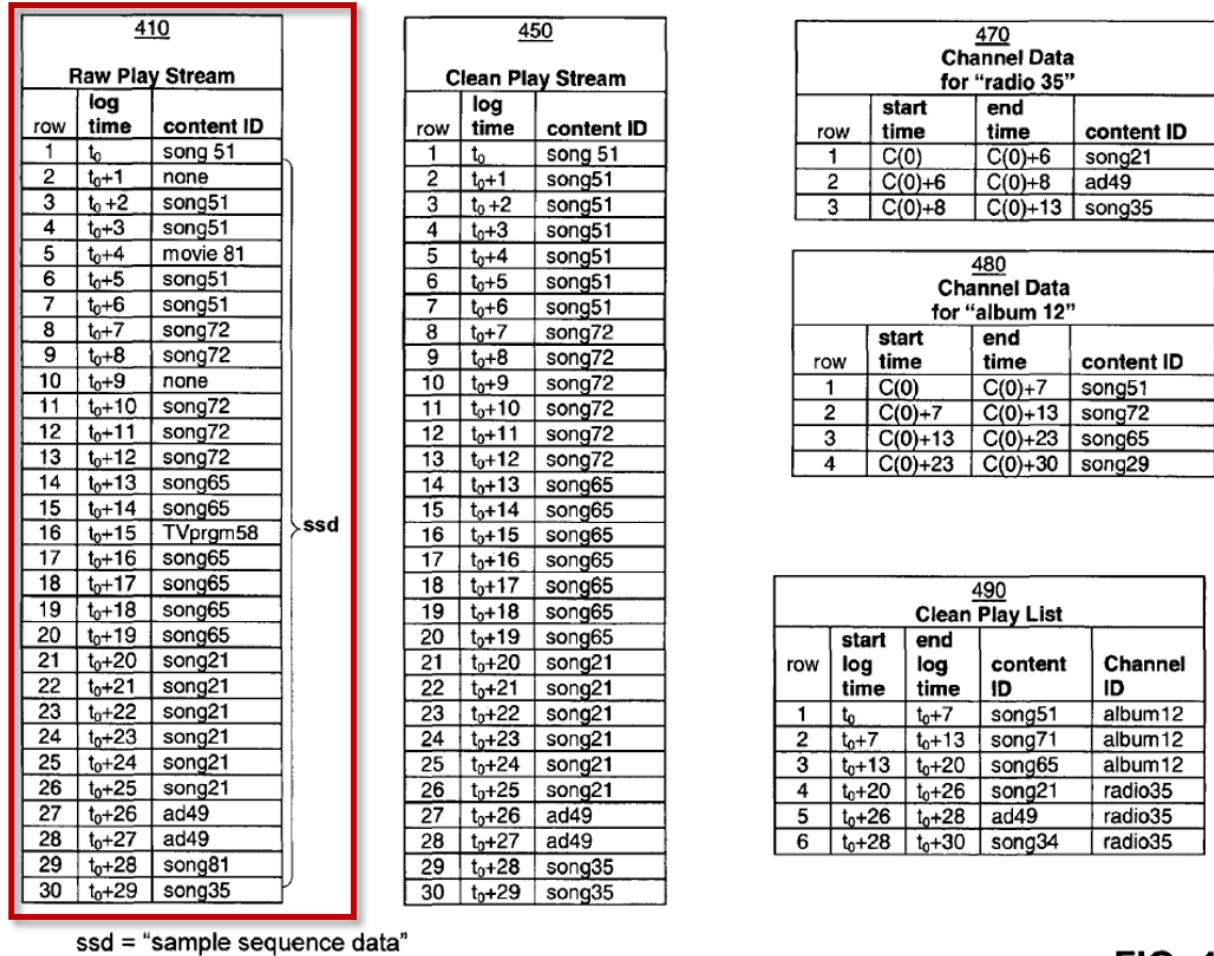


FIG. 4

EX1001, FIG. 4 (annotated).

66. At step 209, play stream scrubber 127 scrubs the raw play stream based upon the sample sequence data and audience data, and creates a clean play list. EX1001, 6:30-37, 8:15-18. Figure 3 illustrates this scrubbing process, which can include scrubbing the play stream by reviewing the play stream for missing or

incorrect data and deducing user actions. EX1001, 8:42-47. The '896 patent broadly characterizes a play stream and play list (and the data associated therewith), indicating that “the particular organization, division, and content of the data may vary considerably.” EX1001, 10:51-58. During this scrubbing process, the raw play stream 410 is reviewed for missing or incorrect data in order to generate a clean play stream 450. EX1001, 8:44-47, 9:25-65, FIG. 4

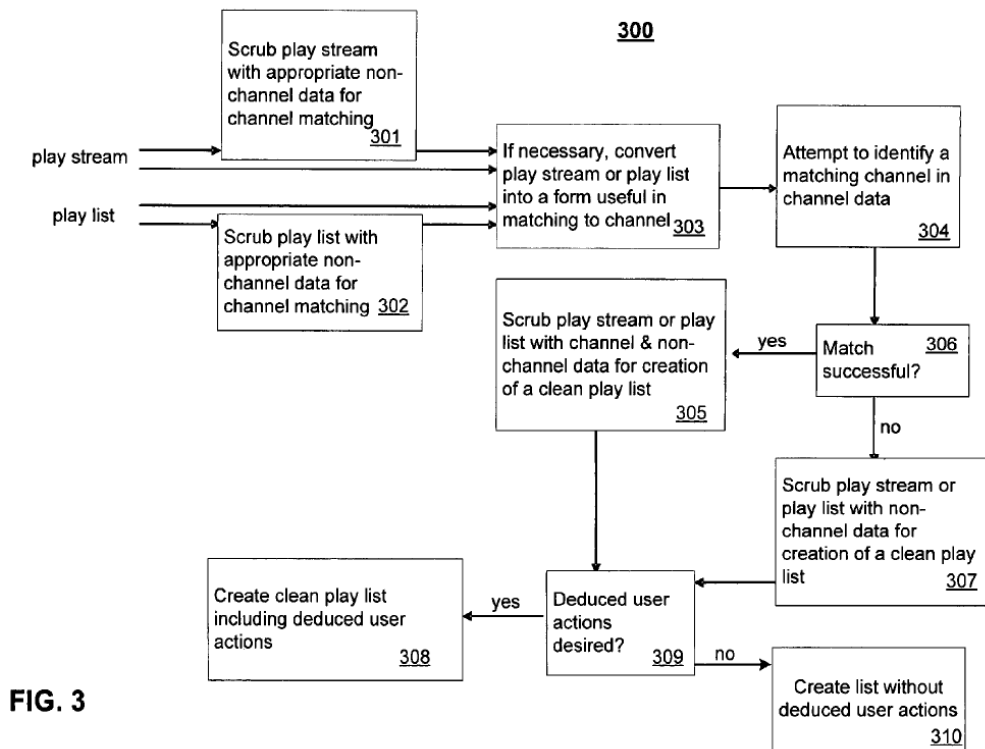


FIG. 3

EX1001, FIG. 3.

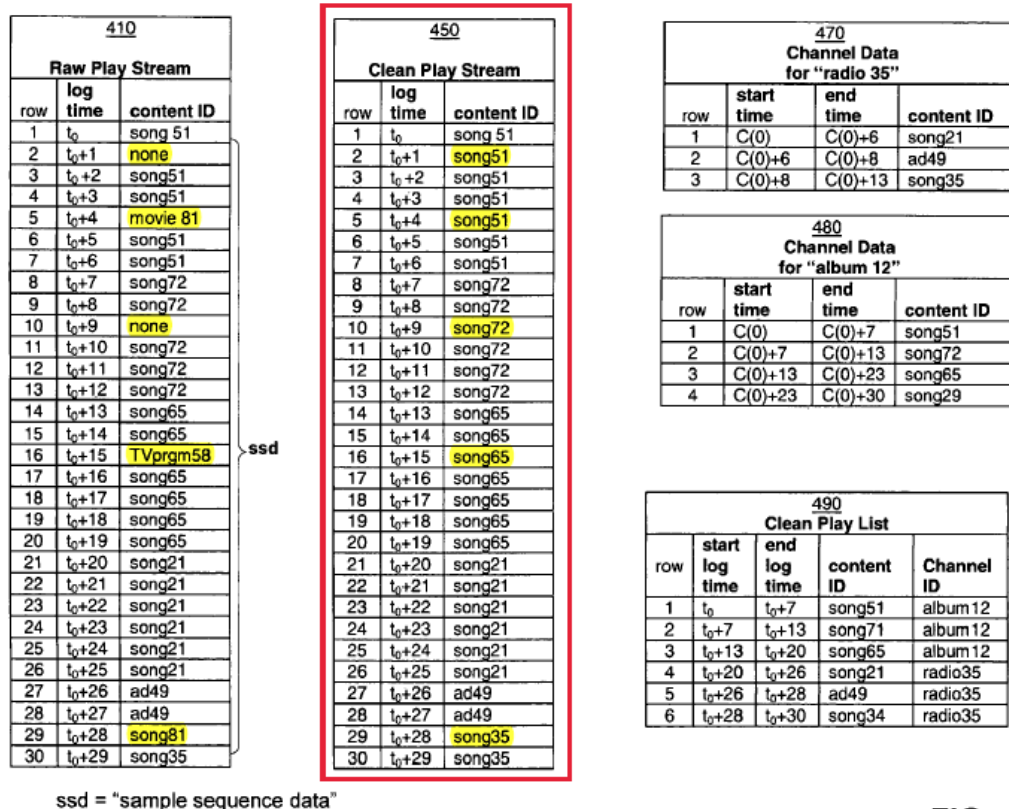


FIG. 4

EX1001, FIG. 4 (annotated)

67. Figure 5 illustrates a clean play stream 510, which includes a series of log times, content IDs, and content offsets but no deduced user actions. EX1001, 11:29-31. "Each log time indicates a time at which capture of the analyzed sample began, where t_0 simply represents a beginning time for samples on Play Stream 510." EX1001, 11:32-35. "Each content ID indicates an identifier of the content that has been identified as corresponding to the captured sample" (e.g., TVprgm 27). EX1001, 11:35-37. "Each content offset value represents a time offset from the beginning of a particular piece of content" (e.g., 9 time units). EX1001, 11:41-

46.

510 Clean Playstream			
row	log time	content ID	content offset
1	t_0	TVprgm 27	(0)
2	t_0+1	TVprgm 27	(0)+1
3	t_0+2	none	n/a
4	t_0+3	none	n/a
5	t_0+4	none	n/a
6	t_0+5	TVprgm 27	(0)+2
7	t_0+6	TVprgm 27	(0)+3
8	t_0+7	TVprgm27	(0)+9
9	t_0+8	TVprgm27	(0)+10
10	t_0+9	TVprgm27	(0)+9
11	t_0+10	TVprgm27	(0)+10
12	t_0+11	none	n/a
13	t_0+12	TVprgm27	(0)+29
14	t_0+13	TVprgm27	(0)+30
15	t_0+14	ad23	(0)
16	t_0+15	none	n/a
17	t_0+16	ad25	(0)+2
18	t_0+17	TVprgm28	(0)
19	t_0+18	TVprgm28	(0)+1
20	t_0+19	TVprgm28	(0)+2

560 Clean Play List				
row	start log time	end log time	content ID	content offset
1	t_0	t_0+2	TVprgm27	(0)
2	t_0+2	t_0+5	none	n/a
3	t_0+5	t_0+7	TVprgm27	(0)+2
4	t_0+7	t_0+9	TVprgm27	(0)+9
5	t_0+9	t_0+11	TVprgm27	(0)+9
6	t_0+11	t_0+12	none	n/a
7	t_0+12	t_0+14	TVprgm27	(0)+29
8	t_0+14	t_0+15	ad23	(0)
9	t_0+15	t_0+16	none	n/a
10	t_0+16	t_0+17	ad25	(0)+2
11	t_0+17	t_0+20	TVprgm28	(0)

570 Channel Data for TV C4			
row	start time	end time	content ID
1	C(0)	C(0)+31	TVprgm27
2	C(0)+31	C(0)+34	ad23
3	C(0)+34	C(0)+37	ad24
4	C(0)+37	C(0)+40	ad25
5	C(0)+40	C(0)+50	TVprgm28

590 Clean Play List with Deduced Actions				
row	log time	end log time	content ID and <deduced action>	content offset
1	t_0	t_0+2	TVprgm27	(0)
2	t_0+2	t_0+5	<pause for 3 units>	n/a
3	t_0+5	t_0+7	TVprgm27	(0)+2
4	t_0+7	t_0+7	<skip frwrd 5 units>	n/a
5	t_0+7	t_0+9	TVprgm27	(0)+9
6	t_0+9	t_0+9	<skip bckwrd 2 units>	n/a
7	t_0+9	t_0+11	TVprgm27	(0)+9
8	t_0+11	t_0+12	<fast frwrd 18 units>	n/a
9	t_0+12	t_0+14	TVprgm27	(0)+29
10	t_0+14	t_0+15	ad23	(0)
11	t_0+15	t_0+16	<fast frwrd 7 units>	n/a
12	t_0+16	t_0+17	ad25	(0)+2
13	t_0+17	t_0+20	TVprgm28	(0)

FIG. 5

EX1001, FIG. 5 (annotated).

68. Media measurement system 100 can also use the content offset data to deduce user actions. EX1001, 11:8-28. Such “play-altering actions” can include pausing, reversing, or fast forwarding the media player, or instantly skipping back or forward in played content. EX1001, 11:17-23. More generally, the ’896 patent references “activities of manipulating the pace and order in which media is consumed” as “play-altering actions or activities.” EX1001, 11:23-25.

69. For example, “[d]iscontinuities in consumption of the identified media may be identified by comparing the progression of sample log times to progression of corresponding content offset times in Play Stream 510.” EX1001, 11:59-62. The

deduced user actions can be added to clean playlist 510 to create a new playlist

590. EX1001, 12:17-22.

510 Clean Playstream			
row	log time	content ID	content offset
1	t ₀	TVprgm 27	(0)
2	t ₀ +1	TVprgm 27	(0)+1
3	t ₀ +2	none	n/a
4	t ₀ +3	none	n/a
5	t ₀ +4	none	n/a
6	t ₀ +5	TVprgm 27	(0)+2
7	t ₀ +6	TVprgm 27	(0)+3
8	t ₀ +7	TVprgm27	(0)+9
9	t ₀ +8	TVprgm27	(0)+10
10	t ₀ +9	TVprgm27	(0)+9
11	t ₀ +10	TVprgm27	(0)+10
12	t ₀ +11	none	n/a
13	t ₀ +12	TVprgm27	(0)+29
14	t ₀ +13	TVprgm27	(0)+30
15	t ₀ +14	ad23	(0)
16	t ₀ +15	none	n/a
17	t ₀ +16	ad25	(0)+2
18	t ₀ +17	TVprgm28	(0)
19	t ₀ +18	TVprgm28	(0)+1
20	t ₀ +19	TVprgm28	(0)+2

560 Clean Play List				
row	start log time	end log time	content ID	content offset
1	t ₀	t ₀ +2	TVprgm27	(0)
2	t ₀ +2	t ₀ +5	none	n/a
3	t ₀ +5	t ₀ +7	TVprgm27	(0)+2
4	t ₀ +7	t ₀ +9	TVprgm27	(0)+9
5	t ₀ +9	t ₀ +11	TVprgm27	(0)+9
6	t ₀ +11	t ₀ +12	none	n/a
7	t ₀ +12	t ₀ +14	TVprgm27	(0)+29
8	t ₀ +14	t ₀ +15	ad23	(0)
9	t ₀ +15	t ₀ +16	none	n/a
10	t ₀ +16	t ₀ +17	ad25	(0)+2
11	t ₀ +17	t ₀ +20	TVprgm28	(0)

570 Channel Data for TV C4			
row	start time	end time	content ID
1	C(0)	C(0)+31	TVprgm27
2	C(0)+31	C(0)+34	ad23
3	C(0)+34	C(0)+37	ad24
4	C(0)+37	C(0)+40	ad25
5	C(0)+40	C(0)+50	TVprgm28

590 Clean Play List with Deduced Actions				
row	log time	end log time	content ID and <deduced action>	content offset
1	t ₀	t ₀ +2	TVprgm27	(0)
2	t ₀ +2	t ₀ +5	<pause for 3 units>	n/a
3	t ₀ +5	t ₀ +7	TVprgm27	(0)+2
4	t ₀ +7	t ₀ +7	<skip frwrd 5 units>	n/a
5	t ₀ +7	t ₀ +9	TVprgm27	(0)+9
6	t ₀ +9	t ₀ +9	<skip bckwrd 2 units>	n/a
7	t ₀ +9	t ₀ +11	TVprgm27	(0)+9
8	t ₀ +11	t ₀ +12	<fast frwrd 18 units>	n/a
9	t ₀ +12	t ₀ +14	TVprgm27	(0)+29
10	t ₀ +14	t ₀ +15	ad23	(0)
11	t ₀ +15	t ₀ +16	<fast frwrd 7 units>	n/a
12	t ₀ +16	t ₀ +17	ad25	(0)+2
13	t ₀ +17	t ₀ +20	TVprgm28	(0)

FIG. 5

EX1001, FIG. 5 (annotated).

70. As one example of deducing play-altering actions, the '896 patent describes:

[R]eferring to rows 2, 3, 4, 5, and 6, of Play Stream 510, the content offset values of rows 2 and 6 indicate advancing for one time unit within TV program 27 while no content ID (or corresponding offset value) is available for rows 3-5. From this information, and the fact that log times of rows 3-5 together correspond to progression through three time units, it is reasonable to deduce that the audience member paused a media player for three time units from log time t₀+2 to log time t₀+5.

EX1001, 12:26-34.

71. Although the embodiments in the '896 patent are primarily described in the context of processing audio data, the '896 patent indicates that video fingerprinting techniques may be utilized to identify video data and that “various alternatives to the exemplary methods discussed in the context of the audio data-based embodiments illustrated in FIGS. 1-6 rely instead on video data.” EX1001, 14:27-29.

B. Prosecution History

72. I understand that the '896 patent claims priority to U.S. Pat. Appl. No. 60/574,836, filed May 27, 2004, and claims priority to U.S. Pat. Appl. No. 11/139,330, filed May 26, 2005. EX1001, (60).

73. I understand that on September 6, 2019, the USPTO mailed the first and only Office Action on the merits. EX1002, 0132. In that Action, the Examiner rejected claim 1 under pre-AIA 35 U.S.C. § 103 as being unpatentable over Kolessar (US 7,483,975) in view of Wang (US 2002/0083060) and Hansen (US 2002/0038456). EX1002, 0137.

74. I understand that claims 1-12 were also rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-11 of parent application US 8,296,791 ('791 patent). EX1002, 0135-0136.

75. I understand that on October 29, 2019, the Applicant submitted an

Amendment and Reply in response to the Office Action. EX1002, 0181. In the Amendment and Reply, the Applicant amended claim 1 with the features of claim 2, which defines that the content offset data includes “content offsets associated with the content identification results, a content offset indicating a time position of a content identification result within identified content” and recites that the “utilizing” step comprises “for a particular plurality of submitted data samples and corresponding content identification results, comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results.” EX1002, 0182.

76. I understand that the Applicant also submitted a Terminal Disclaimer with respect to the '791 patent to overcome the double patenting rejection. EX1002, 0174, 0175, 0178, 0185.

77. I understand that on November 17, 2019, the Examiner initiated an interview with the Applicant to propose amendments to independent claims 1 and 10 that would overcome a rejection under 35 U.S.C. § 101 and place the claims in condition for allowance. EX1002, 0199. The amendments recite “using one or more computers to utilize deduced play altering actions of the monitored audience member to generate a media measurement report.” EX1002, 0194-196.

78. I understand that the USPTO issued a Notice of Allowance on

December 18, 2019 allowing claims 1 and 3-14. EX1002, 0193. In the Notice of Allowance, the Examiner also entered the aforementioned Examiner's amendment. EX1002, 0194-0196. In allowing these amended claims, the Examiner found that the prior art does not disclose the aforementioned features. EX1002, 0196, 0197.

79. The Examiner was unaware, however, that such features are disclosed in Feininger, Ramaswamy, and Conklin as further explained below.

C. Priority Date of the '896 Patent

80. I understand that the '896 patent purports to claim priority to the '836 application, filed May 27, 2004.

81. I understand that the alleged invention here is to “utilize sample sequence data and content offset data to deduce play-altering actions of a monitored audience member” by “comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results.” However, I note that the '836 application simply states that “[o]nce the playstream has been cleaned, salient media usage events [(e.g., pausing, skipping, scanning, slow motion, program change, or device change)] are much more easily detected.” EX1007, 5. Elsewhere, the '836 application states: “[t]he system uses correlation of time-sequenced samples to detect manipulation of the media playback stream.” EX1007, 5. But the '836 application does not disclose the

specific comparison recited in the claims, i.e., “comparing a progression of log times associated with capture timing . . . and a progression of content offsets of the corresponding content identification results.” Nor does the ’836 application describe that the time-sequenced samples include any type of content offset data or that content offset data is used to detect manipulation of the media playback stream. In fact, the term “offset” is completely missing from the ’836 application. Thus, in my opinion, utilizing “sample sequence data and content offset data to deduce play-altering actions of a monitored audience member” by “comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results” is not disclosed in the ’836 application.

82. Thus, it is my opinion that the earliest priority date of the ’896 patent is May 26, 2005, the filing date of aforementioned U.S. Pat. Appl. No. 11/139,330.

VII. OVERVIEW OF THE PRIOR ART

A. Overview of Feininger

83. Feininger is titled “Methods and Apparatus to Detect Content Skipping by a Consumer of a Recorded Program.” EX1005, Title. Feininger describes a system for detecting content skipping by a consumer of a recorded program. EX1005, Abstract.

84. As described in the Background section of Feininger, certain companies (e.g., advertisers, television networks, and content providers) that rely on broadcast video and/or audio programs “wish to know the size and demographic composition of the audience(s) that consume their program(s).” EX1005, 1:21-25. Audience measurement companies address this need by collecting viewing data from select households by monitoring the content displayed on those households and by identifying the household member(s) watching that content. EX1005, 1:25-33. However, with the advent of recording devices, such as digital video recorders and personal video recorders, consumers are enabled to “time shift the consumption of broadcast programs” (i.e., record a program and watch that program at a later time) and “consume only selected portions [e.g., (advertising commercials)] of broadcast programs by, for example, skipping or fast-forwarding through portions of recorded content.” EX1005, 1:39-55. Feininger provides a solution for determining when such play-altering occurs and for identifying which segments of a broadcast program were skipped or fast-forwarded.

85. Figure 1 of Feininger illustrates a system for developing audience measurement statistics:

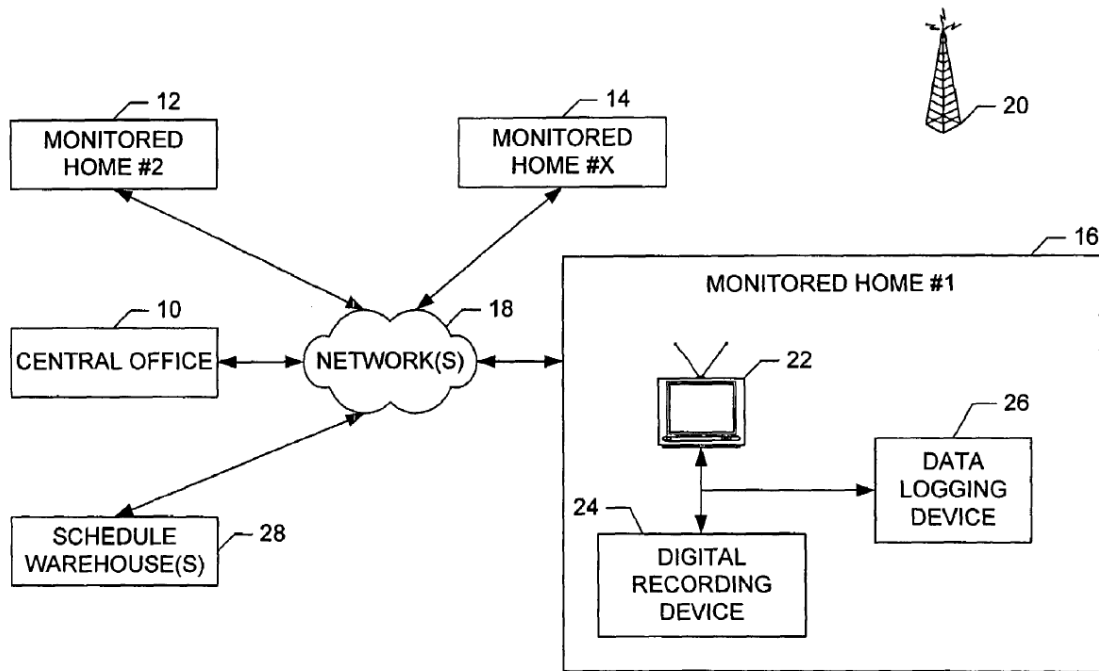


FIG. 1

EX1005, FIG. 1.

86. As shown in Figure 1, each of monitored home sites 12, 14, and 16 may include a presentation device 22 (e.g., a television), a digital recording device 24 and a data logging device 26. EX1005, 3:18-35. Digital recording device 24 is utilized to receive and record content video and/or audio programs broadcast from broadcasting system(s) 20. EX1005, 2:61-63, 3:21-27. Data logging device 26 is utilized to “collect, record and/or analyze data reflecting usage of the digital recording device 24.” EX1005, 3:26-30. Such data may be “periodically exported to the central office 10.” EX1005, 3:31-34.

87. Figure 2 of Feininger illustrates an apparatus 50 for detecting

“portions of a recorded program that were not played back in real time (e.g., that were skipped, fast forwarded, paused, and/or rewound.” EX1005, 4:4-7:

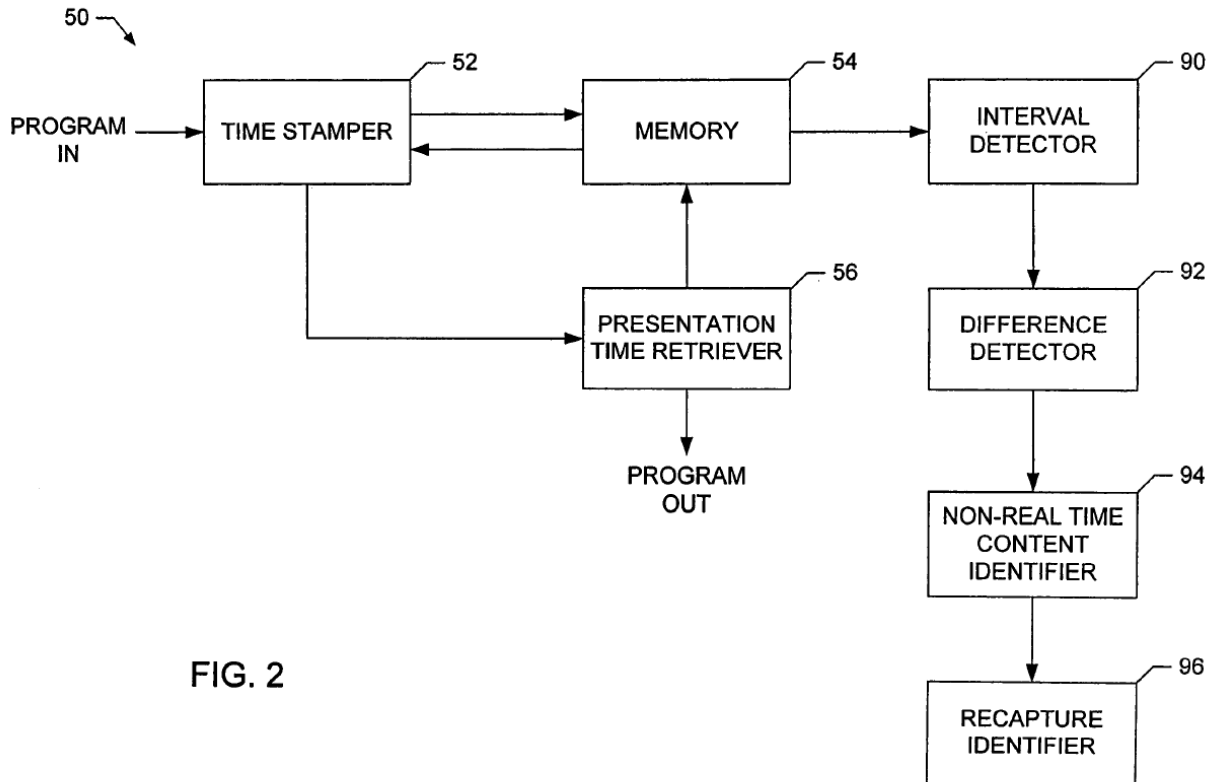


FIG. 2

EX1005, FIG. 2.

88. Apparatus 50 may be implemented by “one or more of the digital recording device 24, the data logging device 26, and/or the central office 10.” EX1005, 4:7-10. Time stamper 52 of apparatus 50 “records the times at which various sections of a received broadcast program are received[.]” EX1005, 4:19-23. Such times are referred to as “recording or presentation times.” EX1005, 4:15-17. In one example, the received program may be compressed and stored as an

audio datastream and a video datastream, each containing a series of data packets.

EX1005, 4:27-31. Each of the data packets includes a header and payload.

EX1005, 4:31-32. Time stamper 32 writes the time at which the corresponding payload was recorded by digital/personal video recorder 24 in the header of the packet. EX1005, 4:32-34.

89. When a program recorded in memory 54 is played back, presentation time retriever 56 retrieves the recording dates/times from the header(s) of the packet(s) currently being played and “stores those recording times in association with [a] playback time of the corresponding sections of the program.” EX1005, 4:51-61, 5:16-19. That is, “presentation time retriever 56 periodically creates a running list of log entry data structures 58[.]” EX1005, 4:61-64. Such log entry data structures are shown below in Figures 3A-3C:

60	62	64	66	68	58
01/23/2003	13:12:45.500	01/16/2003	21:57:20.920	13252	

FIG. 3A

60	62	64	66	68	58
01/23/2003	13:12:48.200	01/16/2003	21:59:23.420	13252	

FIG. 3B

60	62	64	66	68	58
01/23/2003	13:12:50.900	01/16/2003	21:59:26.120	13252	

FIG. 3C

EX1005, FIGs. 3A-3C.

90. Log entry data structures 58 may be generated in real time such that each of data structures 58 are “created at substantially the time that a corresponding section of the recorded program is being played.” EX1005, 4:66–5:2. For instance, data structure 58 of Figure 3A is created for a first section of the program being played, data structure 58 of Figure 3B is created for a second section of the program being played, data structure 58 of Figure 3C is created for a third section of the program being played. As shown in Figures 3A-3C, each log entry data structure 58 includes a playback date field 60 (which stores the date the

corresponding section of the recorded program is played back) and a playback time field 62 (which stores the time the corresponding section of the recorded program is played back). EX1005, 5:3-10. Each log entry data structure 58 also includes a recording date field 64 (which stores the date at which the section of the program was recorded) and a recording time field 66 (which stores the time at which the section of the program was recorded). EX1005, 5:10-16. The recording dates/times retrieved from the header(s) of the packet(s) currently being played are stored in data fields 64 and 66, respectively. EX1005, 5:19-23. The playback dates/times may be determined by time stamper 52 or presentation time retriever 56. EX1005, 5:43-45.

91. Presentation time retriever 56 may also “retrieve a program identifier from the packet header of the section of the recorded program currently being played back and store that identifier” in a program identification field 68 of log entry data structure 58. EX1005, 5:28-32. The program identifier may include a program name, a program identification number, a universal program identifier, and/or a station identifier (e.g., a broadcast channel number, a station name, etc.). EX1005, 5:32-42.

92. The operations of interval detector 90 and difference detector 92 are described with reference to Figures 12A-12C. At 270, interval detector 90 “retrieves a pair of contiguous log entry data structures 58” and, at 272, calculates

a recording time difference (i.e., a recording time interval) by subtracting the recording time value recorded in the older log entry data structure 58 of the pair from the recording time value recorded in the newer log entry data structure 58 of the pair. EX1005, 18:1-8. At 274, interval detector 90 also calculates a real time difference (i.e., a playback time interval) by subtracting the playback time value recorded in the older log entry data structure 58 of the pair from the playback time value recorded in the newer log entry data structure 58 of the pair. EX1005, 18:8-13.

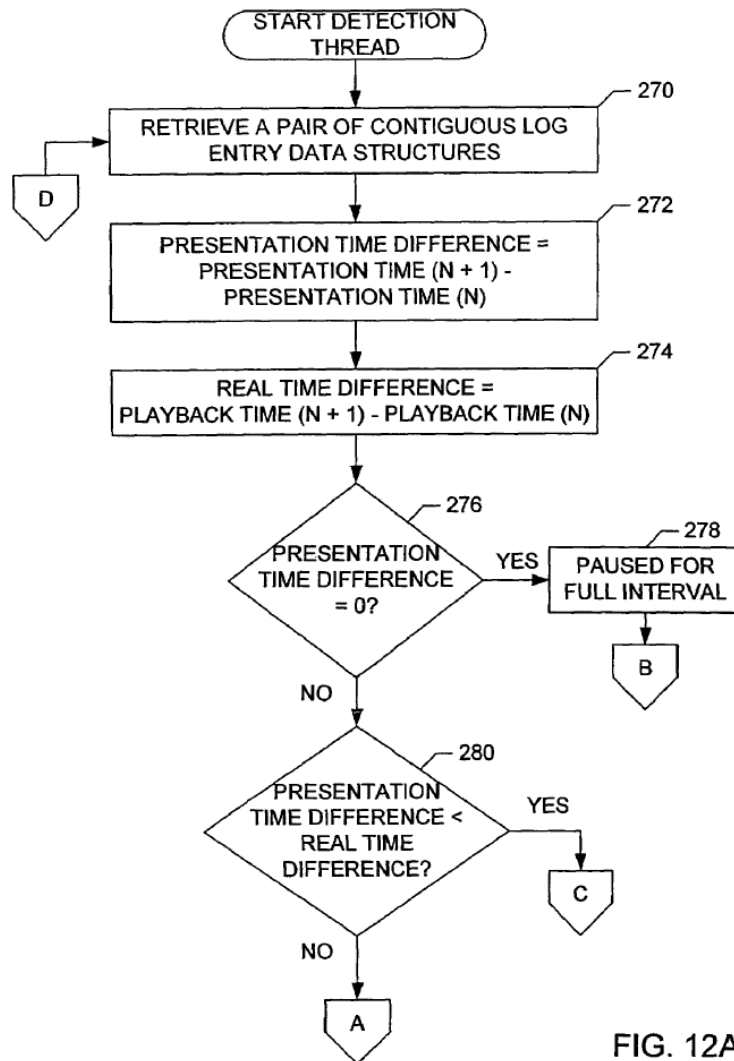
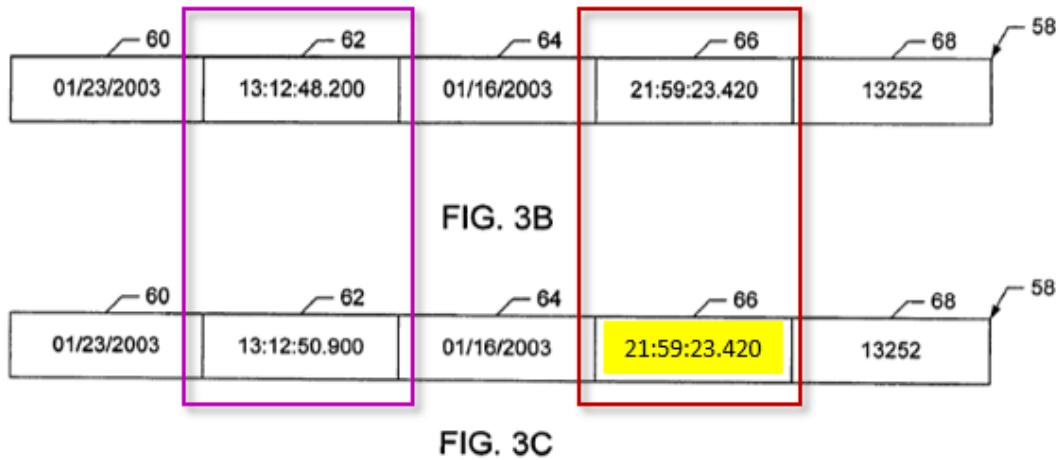


FIG. 12A

EX1005, FIG. 12A.

93. At 276, difference detector 92 determines if the presentation time difference (i.e., the recording interval) between the pair of log entry data structures is zero. EX1005, 18:18-21. If so, at 278, a determination is made that “the recorded program was paused for the entire playback interval between the data structures.” EX1005, 18:21-24. For instance, consider the example shown below in the annotated version of Figures 3B and 3C below:



Real Time
Difference =
13:12:48.200 –
13:12:50.900 = 2.7
seconds

Presentation Time
Difference =
21:59:23.420 –
21:59:23.420 = 0
seconds

EX1005, FIGs. 3B-3C (annotated).

94. As shown above, the recording time in field 66 of both data structures is the same. Thus, the presentation time difference (i.e., the recording interval) is 0 seconds. In this case, a determination would be made that the program was paused during the playback interval (i.e., the real time difference of 2.7 seconds) between the data structures of Figures 3B and 3C.

95. If, at 276, it is determined that the recording interval is not zero, then a determination is made that no pause occurred and control advances to 280.

EX1005, 18:30-33. At 280, difference detector 92 determines if the recording interval is less than the playback interval. EX1005, 18:34-35. If the recording interval is less than the playback interval, control advances to 286 of Figure 12C, where the presentation time difference is analyzed to determine whether a pause event/slow motion event occurred or whether a rewind event occurred. EX1005, 18:35-40.

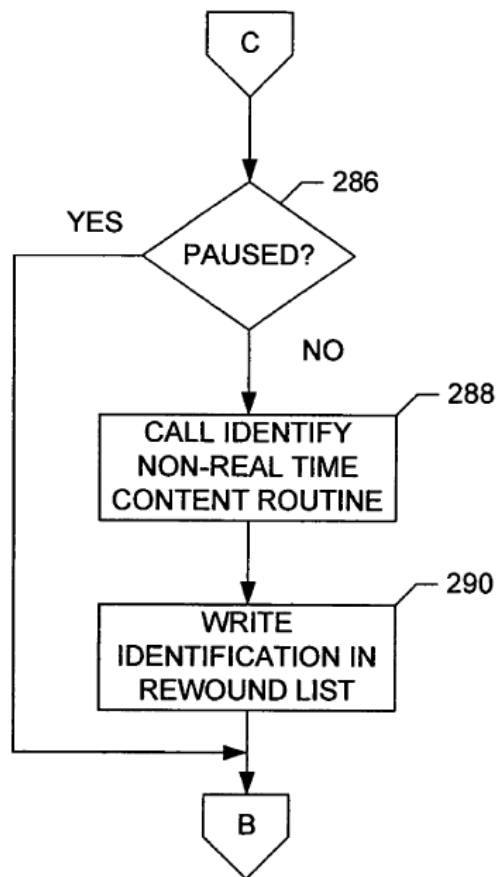


FIG. 12C

EX1005, FIG. 12C.

96. In particular, at 286, if it is determined that the presentation time difference is a positive value, then a determination is made that a brief pause or slow motion event occurred. EX1005, 18:40-43. If the presentation time difference is a negative value, then a determination is made that a rewind event has occurred. EX1005, 18:44-46.

97. For instance, consider the example shown below in the annotated version of Figures 3B and 3C:



Real Time
Difference =
13:12:48.200 –
13:12:50.900 = 2.7
seconds

Presentation Time
Difference =
21:45:23.420 –
21:59:23.420 = -14
second

-14 seconds is less than 2.7 seconds

EX1005, FIGs. 3B-3C (annotated).

98. As shown above, the recording time in field 66 of data structure 58 of Figure 3C is 21:45:23.420, and the recording time in field 66 of data structure 58 of Figure 3B is 21:59:23.420. Thus, the presentation time difference (i.e., the recording interval) is -14 seconds. As further shown above, the playback time in field 62 of data structure 58 of Figure 3C is 13:12:50.900, and the playback time in field 62 of data structure 58 of Figure 3B is 13:12:48.200. Thus, the real time difference (i.e., the playback interval) is 2.7 seconds. Per 280 of Figure 12A, the presentation time difference is less than the real time difference, and thus, control advance to 286 of Figure 12C. At 286, it is determined that presentation time difference is a negative value (i.e., -14 seconds), and thus, a determination is made that a rewind event has occurred.

99. Referring again to 280 of Figure 12A, if a determination is made that the recording interval is not less than the playback interval, control advances to 292 of Figure 12B. EX1005, 18:54-56.

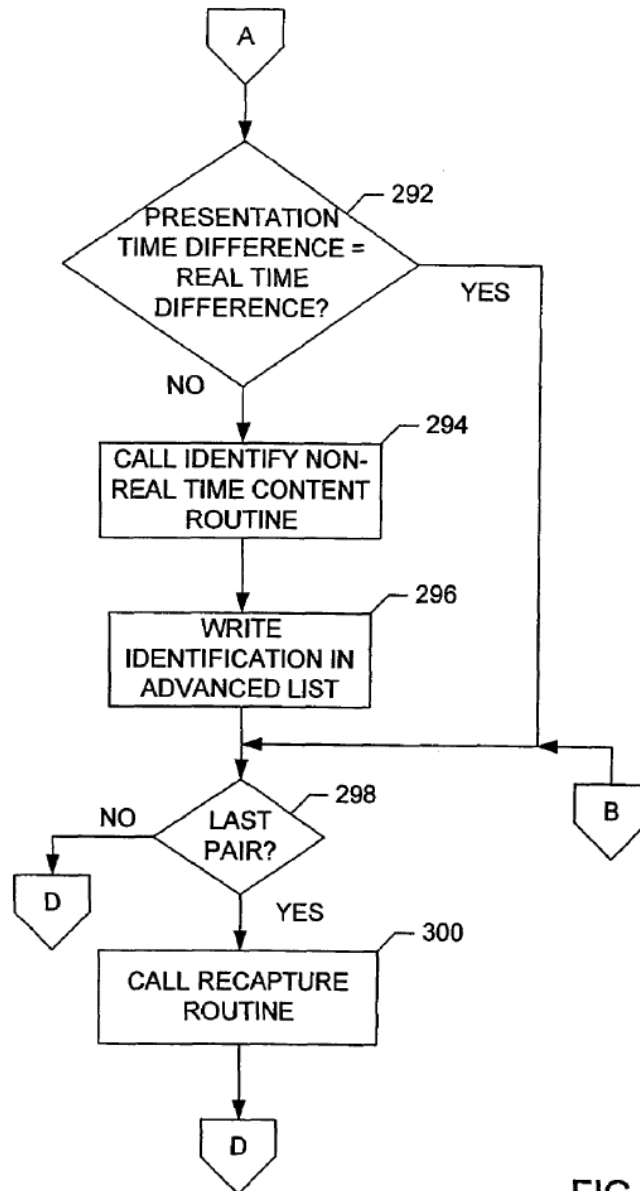
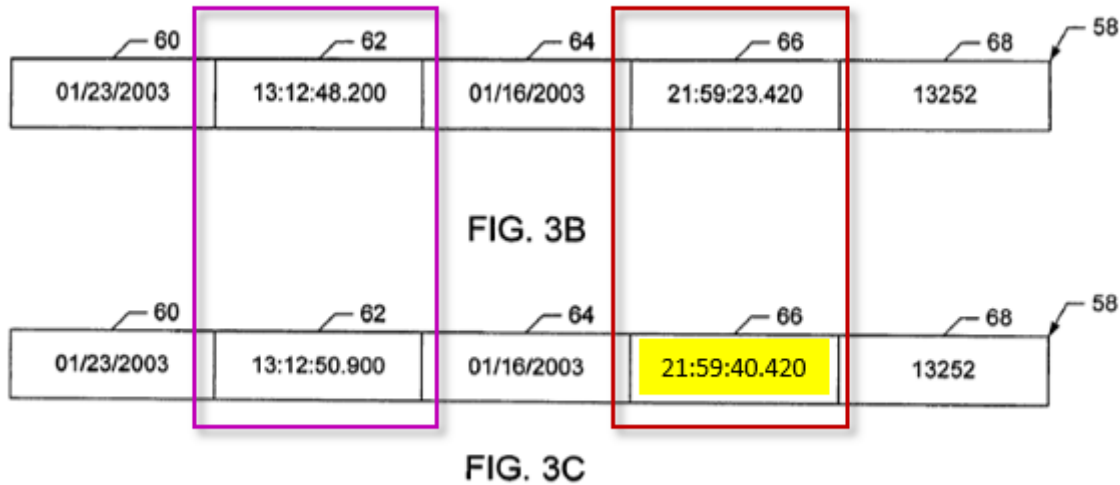


FIG. 12B

EX1005, FIG. 12B.

100. At 292, difference detector 92 “determines if the recording interval is equal to the playback interval.” EX1005, 18:56-68. If the intervals are not equal, then a determination is made that the “corresponding portion of the recorded program has been skipped and/or fast forwarded[.]” EX1005, 18:58-62.

101. For instance, consider the example shown below in the annotated version of Figures 3B and 3C:



Real Time
Difference =
13:12:48.200 –
13:12:50.900 = 2.7
seconds

Presentation Time
Difference =
21:59:40.420 –
21:59:23.420 = 17
second

17 second is not less than (i.e., it is greater than) or equal to 2.7 seconds

EX1005, FIGs. 3B-3C (annotated).

102. As shown above, the recording time in field 66 of data structure 58 of Figure 3C is 21:59:40.420, and the recording time in field 66 of data structure 58

of Figure 3B is 21:59:23.420. Thus, the presentation time difference (i.e., the recording interval) is 17 seconds. As further shown above, the playback time in field 62 of data structure 58 of Figure 3C is 13:12:50.900, and the playback time in field 62 of data structure 58 of Figure 3B is 13:12:48.200. Thus, the real time difference (i.e., the playback interval) is 2.7 seconds. Per 280 of Figure 12A, the presentation time difference is not less than the real time difference, and thus, control advance to 292 of Figure 12B. At 298, it is determined that presentation time difference is a positive value (i.e., 17 seconds), and thus, a determination is made that a skip or fast forward event has occurred.

103. Referring again to Figure 2, non-real time content identifier 94 identifies the segment(s) in the portion of the recorded program that were not played back in real time (i.e., segment(s) that were skipped or rewound). EX1005, 9:61-64. In particular, non-real time content identifier 94 retrieves the identity of the recorded program from one of the corresponding log entry data structures 58, 70 (e.g., from program identification field 68, as shown in Figures 3A-3C). EX1005, 19:24-26. Using the identity, non-real time content identifier 94 retrieves “a program table such as the example program table shown in FIG. 5 for the recorded program from a database of program tables.” EX1005, 19:23-29.

FIG. 5

NAME	START TIME	END TIME
INTRODUCTION	00:00:00.000	00:03:30.003
COMMERCIAL 1	00:03:30.003	00:06:01.015
CONTENT 1	00:06:01.015	00:13:35.920
COMMERCIAL 2	00:13:35.920	00:15:55.723
CONTENT 2	00:15:55.723	00:20:43.513
COMMERCIAL 3	00:20:43.513	00:23:53.819
CONTENT 3	00:23:53.819	00:28:09.875
...	...	...
COMMERCIAL N	00:57:20.920	00:59:18.562
...	...	...

EX1005, FIG. 5.

104. In the program table shown above in Figure 5, the names of segments of the same program are stored, along with the respective start times and end times of each of the segments. EX1005, 10:15-24.

105. Non-real time content identifier 94 may compare the “start time of the recording interval of the recorded program at issue to the start times appearing in the program table associated with the corresponding program[.]” EX1005, 10:58-

63. Non-real time content identifier 94 may also “search[] the program table associated with the recorded program for an end time that matches the normalized end time of the recording interval that was subjected to non-real time playback.”

EX1005, 11:12-20. Once matching start and end times are identified in the program table, “non-real time content identifier 94 identifies the segment(s) corresponding to” the matched start and end times as the “segment(s) of the

recorded program that were subjected to non-real time playback.” EX1005, 11:29-34.

B. Overview of Ramaswamy

1. Ramaswamy is prior art as of November 22, 2004

106. I understand that Ramaswamy is prior art as of the November 22, 2004 filing date of U.S. Provisional Patent Application 60/629,996 (EX1008, “’996 provisional application”) to which it claims priority.

107. Based on my review of Ramaswamy and the ’996 provisional application, I have concluded that the specification and figures of the ’996 provisional application are identical to the specification and figures of Ramaswamy’s specification and figures (apart from the first paragraph which adds the priority claim). EX1009 (redline comparison of Ramaswamy’s specification and the ’996 provisional’s specification); *compare* EX1006, ¶¶2-75, FIGs. 1-10, *with* EX1008, ¶¶1-74 (pp. 5-39), FIGs. 1-10. Accordingly, the ’996 provisional application provides support for at least Ramaswamy claim 1, as shown below in the claim-by-claim analysis.

Ramaswamy Claim 1	’996 Provisional Appl. (EX1008)
1. A method of identifying a media source, comprising:	“METHODS AND APPARATUS FOR MEDIA SOURCE IDENTIFICATION AND TIME SHIFTED MEDIA CONSUMPTION MEASUREMENTS.” Title.

Ramaswamy Claim 1	'996 Provisional Appl. (EX1008)
	“Methods and apparatus for media source identification and time shifted media consumption measurements are disclosed.” Abstract.
generating first signature information based on media presented via a media delivery device;	“A disclosed method identifies a media source by generating first signature information based on media presented via a media delivery device” Abstract. “After invoking the update library process (block 302), the consumption site process 300 generates or collects signatures or signature information (block 304) associated with media content currently being consumed. . . . The signature information may be generated at block 304 by, for example, the signature information generator 208 of FIG. 2.” ¶43; FIG. 3. “As shown in FIG. 2, the example system 200 includes a media delivery device 202 such as, for example, a television, radio, video monitor, etc. that receives (as described in detail below) a media content signal 204 (e.g., an audio/video signal)” ¶27; FIG. 2. “The example system 200 also includes a signature information generator 208 that performs signature generation functions using one or more media signals provided by the media delivery device 202. More specifically, in one example, the signature information

Ramaswamy Claim 1	'996 Provisional Appl. (EX1008)
	generator 208 receives an audio output signal 210 from the media delivery device 202. The audio output signal 210 contains audio information associated with the media content currently being presented by the media delivery device 202.” ¶29.
comparing the first signature information to second signature information, wherein the second signature information is derived from a library of signature information local to the media delivery device;	“A disclosed method identifies a media source by . . . comparing the first signature information to second signature information. The second signature information is derived from a library of signature information local to the media delivery device.” Abstract. “After generating the signatures or signature information (block 304), the consumption site process 300 matches the newly generated signature information to the signature information stored in the library (e.g., the local reference library 222) by invoking a match signature in information process (block 306). The match signature information process (block 306) compares first signature information (e.g., the signature information generated by the signature information generator 208 and stored in the signature information buffer 218) to second signature information (e.g., the signature information generated by the library generators 230, 232, and 234 and stored in the local reference library 222)” ¶44; FIG. 3. “The signature information generated

Ramaswamy Claim 1	'996 Provisional Appl. (EX1008)
	by the well-known signature generation technique(s) may be transmitted to a matcher 216 via a communication link 217 to match the signature information to media content received from one or more media sources.” ¶31; FIG. 2. “The matcher 216 compares the signature information associated with the media content presented via the media delivery device 202 to signature information 220 stored in a local reference library 222.” ¶32. “The comparison of signatures may be implemented using any well-known signature comparison technique” ¶56.
generating a collection of matching signature information based on the comparison of the first and second signature information;	“The disclosed method generates a collection of matching signature information based on the comparison of the first and second signature information” Abstract. “The match signature information process (block 306) . . . generates a matcher collection of signature information (i.e., a collection of signature information corresponding to signature information for which substantial or identical matches were found at block 306).” ¶44; FIG. 3. “If the comparison (e.g., within the matcher 216) of the signature information 217 generated by the signature information generator 208 to

Ramaswamy Claim 1	'996 Provisional Appl. (EX1008)
	some or all of the signature information 220 from the local reference library 222 yields a substantial or identical match, the matcher 216 outputs a collection (i.e., a matcher collection) of data that associates some or all of the signature information 220 from the local reference library 222 with the signature information 217 received from the signature information generator 208.” ¶32; FIG. 2.
identifying a source of the media presented via the media delivery device based on the collection of matching signature information; and	“The disclosed method . . . identifies a source of the media presented via the media delivery device based on the collection of matching signature information.” Abstract. “In general, source identification refers to determining which of a plurality of media sources (e.g., a television program, an audio program, web pages, a video game, etc.) is presenting or delivering media content.” ¶17. “The example methods and apparatus described herein use signature information (e.g., a signature, a source identifier, a time stamp, etc.) to identify media sources and to measure time shifted media consumption activities.” ¶17. “The media source (i.e., a PVR, a DVD player, a DVR, a VCR, an STB, a game console, etc.) of the media presented via the media delivery device may be identified based on the collection of matching signature

Ramaswamy Claim 1	'996 Provisional Appl. (EX1008)
	information.” ¶18. “When a match is detected, the matching reference signature information is used to identify the channel on which the associated media content was received at the reference site and to identify the time at which the associated media content was received at the reference site 108.” ¶23.
performing a time shift analysis on the collection of matching signature information by identifying records in the collection of matching signature information having substantially identical signature values and substantially different time stamp values.	“After invoking the match signature information process (block 306), the consumption site process 300 analyzes the data in the matcher collection returned by the match signature information process (block 306) for time shifted information (block 308). The time shifted information may be analyzed by the consumption site process 300 via a time shift analyzer (e.g., the example time shift analyzer 246 of FIG. 2). The time shift analyzer may determine that the matcher collection includes time shifted data by analyzing the number of records. . . . For example, if the matcher collection has two or more records with the same signature values (e.g., the first record and the second record of FIG. 4 have the same signature values [i.e., SIG1 equals SIG2]) but different time stamp values (e.g., if TS2 is greater than TS1), the time shift analyzer may be adapted to consider these two or more records as being associated with time-shifted consumption and, thus, may determine that the matcher collection

Ramaswamy Claim 1	'996 Provisional Appl. (EX1008)
	includes time shifted data.” ¶45 (bracketed material in original); FIG. 3. “As depicted in FIG. 2, the matcher 216 is coupled to a time shift analyzer 246 via a communication link or connection 248. The matcher 216 periodically or continuously sends matcher collections associated with media content presented via the media delivery device 202 to the time shift analyzer 246. The time shift analyzer 246 receives the matcher collection and converts the matcher collection to a time shift analysis data structure.” ¶39; FIG. 2. “FIG. 8 is a flow diagram of an example process for analyzing time shifted information (i.e., a time shift analysis process 800).” ¶60; FIG. 8.

108. I note that apart from the first paragraph which adds the priority claim, Ramaswamy’s specification and figures are identical to those in the Ramaswamy provisional. EX1009 (redline comparison of the specifications); *compare* EX1006, ¶¶2-75, FIGs. 1-10, *with* EX1008, ¶¶1-74, FIGs. 1-10.

2. Overview

109. Ramaswamy is titled “Methods and Apparatus for Media Source Identification and Time Shifted Media Consumption Measurements.” EX1006,

Title. Ramaswamy describes a system for media source identification and time shifted media consumption measurements. EX1006, Abstract.

110. As described in the Background section of Ramaswamy, audio/video content (e.g., television programs, radio programs, etc.) metering is typically performed by collecting consumption (e.g., viewing) records from a group of statistically selected households. EX1006, ¶3. Each household typically has a data logging and processing unit (also referred to as a site unit). EX1006, ¶3. The site unit collects consumption records and transmits the records to a central data processing facility for further processing. EX1006, ¶5. The consumption records may contain information such as a broadcast station, a channel number, a program name, and a time (e.g., day and time) at which the audio/video content was consumed. EX1006, ¶4.

111. However, obtaining accurate consumption records has been complicated in cases in which the audio/video content being consumed is delivered to a television via local content delivery devices, such as a personal video recorder (PVR) or a digital video recorder (DVR). EX1006, ¶7. Such devices enable the same audio/video content to be viewed at various times. EX1006, ¶7. That is, the consumption of audio/video content may be “time shifted with respect to a time at which the audio/video content is originally broadcast[.]” EX1006, ¶7. The different times in which audio/video content is consumable across consumption sites

“precludes the use of a program lineup” at a central data processing facility to identify consumed audio/video content based on “channel and consumption time information,” thereby complicating audio/video identification at the central facility. EX1006, ¶7. Consequently, audio/video consumption activities are “not readily measurable using known media consumption measurement techniques.” EX1006, ¶7. Ramaswamy provides a solution for identifying media that has been “time shifted” via a local content delivery device. EX1006, ¶18.

112. Figure 1 of Ramaswamy illustrates a system for media source identification and time shifted media consumption measurement:

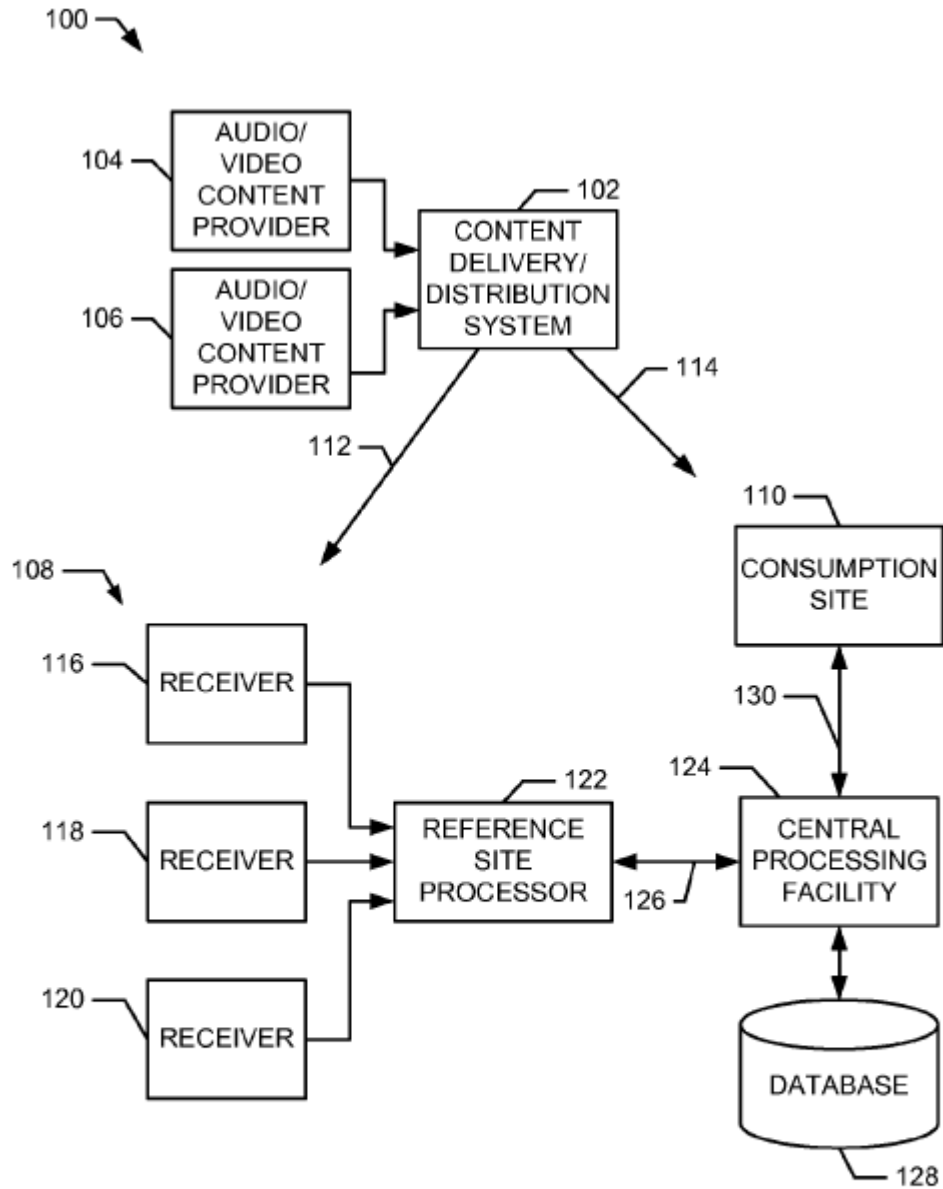


FIG. 1

EX1006, FIG. 1.

113. As shown in Figure 1, system 100 includes a content

delivery/distribution system 102 that receives video and/or audio content from audio/video content providers 104 and 106. EX1006, ¶21. Audio/video content providers 104, 106 may provide, for example, audio (e.g., radio) programs or video (e.g., television) programs. EX1006, ¶21. Content delivery/distribution system 102 may transmit signal(s) containing audio/video content information to a reference site 108. EX1006, ¶21. Reference site 108 includes a plurality of receivers 116, 118, and 120. EX1006, ¶23. Each of receivers 116, 118, and 120 provide respective information associated with a respective broadcast program to reference site processor 122. EX1006, ¶23. Reference site processor 122 generates reference signature information for each broadcast program. EX1006, ¶24. The reference signature information may include a signature that uniquely represents media content, information identifying the channel on which the media content was received at reference site 108, and information indicating the time at which that media content was received at reference site 108. EX1006, ¶24. Reference site processor 122 sends the signature information to central processing facility 124 and stores the signature information in database 128. EX1006, ¶24.

114. Consumption site 110 receives media content from a remotely situated content delivery/distribution system 102 (e.g., a broadcast station) via the communication link 114. EX1006, ¶27. “[C]onsumption site 110 may alternatively or additionally receive media content from one or more local media content

delivery systems or devices,” as shown in Figure 2. EX1006, ¶27. Subsequently, a “signature associated with media content displayed on a television at a media consumption site 110 is generated at the media consumption site 110.” EX1006, ¶24. The signature is transmitted to central processing facility 124, which compares the signature received from consumption site 110 to the reference signature information stored in database 128. EX1006, ¶24. When a match is detected, the matching reference signature information is used to identify the channel and the time at which the associated media content was received at the reference site 108. EX1006, ¶24. The reference signature information is also compared to “known broadcast lineup information associated with the identified channel and time to identify the television programming contained in the associated media content.” EX1006, ¶24.

115. Figure 2 of Ramaswamy illustrates a system 200 for implementing consumption site 110:

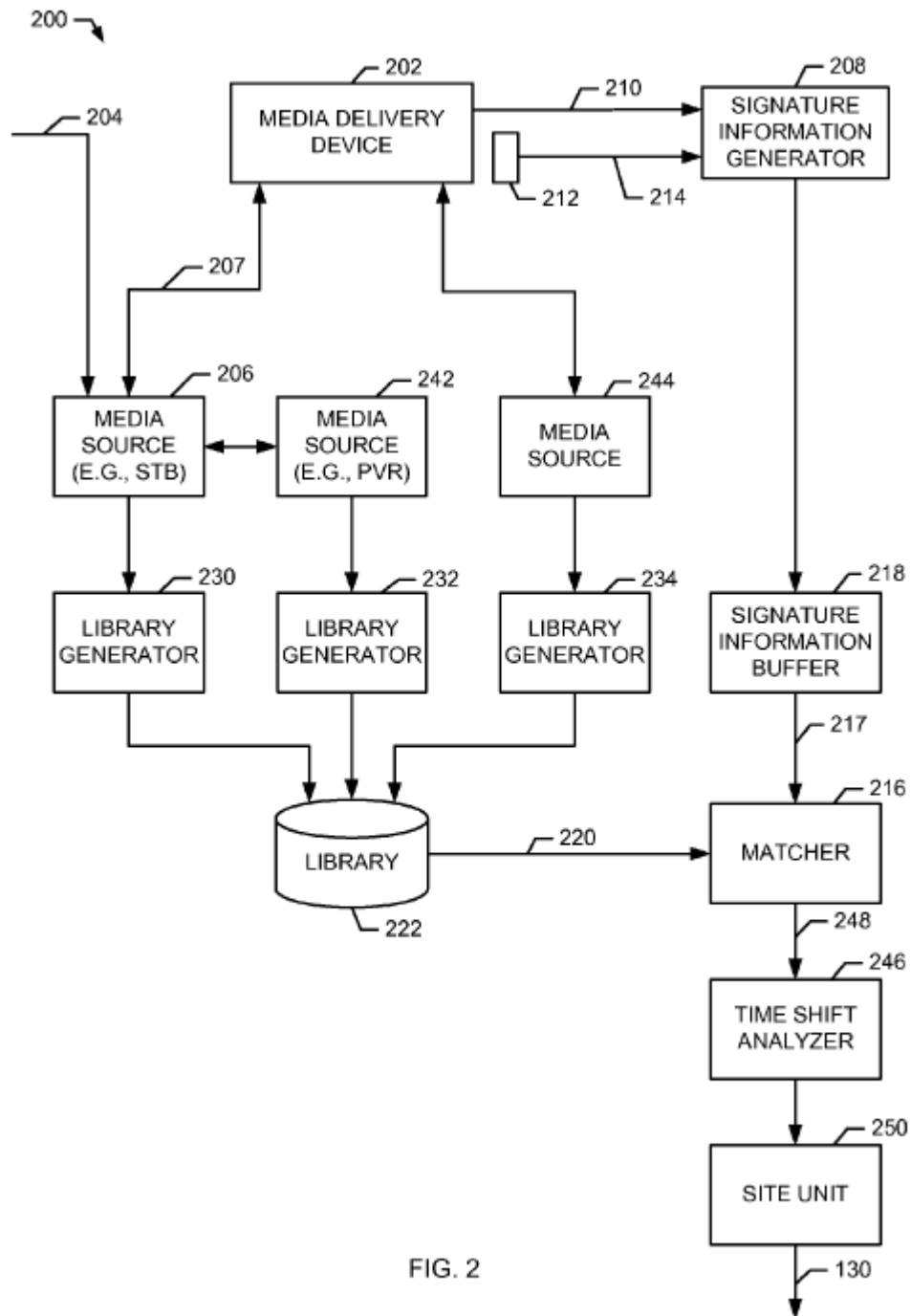


FIG. 2

EX1006, FIG. 2.

116. As shown in Figure 2, system 200 includes a media delivery device 202 (e.g., a television, radio, video monitor, etc.). EX1006, ¶28. Media delivery

device 202 is coupled to various media sources (e.g., a set-top box (STB) 206, a PVR 242, etc.). Media sources 206 and 242 demodulate a broadcast signal (e.g., signal 204) and data streams and “selectively parses video and/or audio data packets associated with a desired channel and/or program from” data stream(s). EX1006, ¶29. The selected data packets are processed to form an output signal 207, which is provided to media delivery 202. EX1006, ¶29.

117. System 200 also includes a signature information generator 208, which performs signature generation functions using media signal(s) provided by media delivery device 202. EX1006, ¶30. For instance, media delivery device 202 provides an output signal 210 (containing information associated with the media content being presented by media delivery device 202) to signature information generator 208 to provide an output signal 210. EX1006, ¶30. Signature information generator 208 generates a unique signature for output signal 210 based on characteristic(s) of the yet to be identified media content. EX1006, ¶32; EX1006, ¶44, FIG. 3 (block 304). Signature information generator 208 may use any known “audio or video signature-based techniques” to generate a signature. EX1006, ¶31, FIG. 2. The unique signature is stored in a signature information buffer 218. EX1006, ¶32.

118. Matcher 216 obtains the unique signature (shown as signature 217) from signature information buffer 218 and compares signature 217 to signature

information 220 stored in a local reference library 222. EX1006, ¶33; *see also* ¶45, FIG. 3 (block 306). The local reference library 222 is generated and updated by a plurality of library generators 230, 232, and 234, which may be, for example, a PVR, DVR, STB, etc. EX1006, ¶34; *see also* ¶43, FIG. 3 (block 302). If the comparison yields a match, matcher 216 outputs a collection of “data that associates some or all of the signature information 220” (referred to as a matcher collection) with signature 217. EX1006, ¶33.

119. In an example in which media source 242 is a PVR and media source 26 is an STB, the signature information derived from content played back via PVR may be monitored for time-shifted information. EX1006, ¶36. For instance, when PVR 242 receives and records media content from STB 206 for later viewing by a user, library generator 230 “generates corresponding signature information of the media content.” EX1006, ¶36. The signature information includes a time stamp, a signature, and a source ID representing STB 206. EX1006, ¶36. Library generator 230 stores the signature information in library 222. EX1006, ¶36.

120. When media content is subsequently played back via PVR 242, library generator 232 processes the media content and generates signature information for the media content. EX1006, ¶37. The signature information includes a time stamp, a signature that is substantially similar to the signature generated during the recording to the media content, and a source ID representing

PVR 242. EX1006, ¶37. Library generator 232 stores the signature information in library 222. EX1006, ¶37.

121. During playback, the media content is rendered on media delivery device 202. EX1006, ¶38. Signature information generator 208 processes the media content presented via media delivery device 202, generates signature information, and stores the signature information in signature information buffer 216. EX1006, ¶38. The source ID for the signature information indicates that the source is media delivery device 202. EX1006, ¶38.

122. Matcher 216 compares the time stamps of the signature information stored in signature information buffer 218 with the time stamps of the signature information in local reference library 222. EX1006, ¶38. If the time stamps are the same or similar, matcher 216 compares the signature information associated with the matching time stamps and outputs a matcher collection associated with media content presented via media delivery device 202 to time shift analyzer 246. EX1006, ¶40.

123. Time shift analyzer 246 analyzes the data in the matcher collection for time shifted information. EX1006, ¶46. For example, time shift analyzer 246 may analyze a number of records of the matcher collection. EX1006, ¶46. “[I]f the matcher collection has two or more records with the same signature values . . . but different time stamp values . . . , the time shift analyzer . . . consider[s] these two or

more records as being associated with time-shifted consumption and, thus, may determine that the matcher collection includes time shifted data.” EX1006, ¶46.

Figure 4 of Ramaswamy depicts a collection of records, which is reproduced below:

The diagram shows a table with three columns and four rows. The first row contains the headers 'TIME STAMP', 'SIGNATURE', and 'SOURCEID'. The subsequent three rows contain data: (TS1, SIG1, ID1), (TS2, SIG1, ID2), and (TS3, SIG3, ID3). A label '400' with an arrow points to the top-left corner of the table. A label '402' with a bracket points to the first column. A label '404' with a bracket points to the second column. A label '406' with a bracket points to the third column.

TIME STAMP	SIGNATURE	SOURCEID
TS1	SIG1	ID1
TS2	SIG1	ID2
TS3	SIG3	ID3

EX1006, FIG. 4.

124. As shown in Figure 4, each record includes a time stamp, a signature, and a source ID. Time shift analyzer 246 checks whether the matcher collection includes at least two records with the same signature values. EX1006, ¶46. In the example shown in Figure 4, the first two records have the same signature (i.e., SIG1). Time shift analyzer 246 then checks whether these records have different time stamps. EX1006, ¶46. In the example shown in Figure 4, the first two records

have two different time stamps (i.e., TS1 and TS2), which means that the same media content was played back at different times. Thus, time shift analyzer 246 determines that these two records are associated with time-shifted consumption. EX1006, ¶46. Based on this determination, time shift analyzer 246 generates a time shift analysis data structure, which is shown in Figure 9 of Ramaswamy (reproduced below):

900 ↘

```
902:    Struct {  
904:        bool        TimeShift;  
906:        if(TimeShift) {  
908:            SourceID    TimeShiftSource;  
910:            Time        TimeShiftSourceTime;  
912:        }  
914:        SourceID    TuningSource;  
916:        Time        TuningTime;  
918:    }
```

EX1006, FIG. 9.

125. In response to determining that matcher collection has been time shifted, time shift analyzer 246 sets a time shift flag (e.g., TimeShift) to indicate that the time shift analysis data structure contains time shifted information. EX1006, ¶62. Time shift analyzer 246 also sets a time shift source variable (i.e.,

TimeShiftSource) (which indicates the source at which the content was downloaded, stored, and/or recorded), and a time shift time variable (i.e., TimeShiftSourceTime) (which indicates the time at which the content was downloaded, stored, and/or recorded). EX1006, ¶¶62, 66. Time shift analyzer 246 also sets a tuning source variable (i.e., TuningSource) (which indicates the source (e.g., a television) via which the content was played back) and a tuning time variable (i.e., TuningTime) (which indicates the time the content is played back). EX1006, ¶¶62, 66. The time shift analyzer data structure is provided to central processing facility 124 for further analysis. EX1006, ¶41.

C. Overview of Conklin

126. Conklin relates to methods and apparatus for “tracking a sequence of events associated with a digital recording device.” EX1010, Abstract. Conklin describes a solution for collecting viewing behavior information in the context of “situations where a recording device enables rapid changes between live viewing of a program, delayed viewing of the program, viewing of another program while recording the program, etc.,” such as when a viewer uses digital video recorders (DVRs) or personal video recorders (PVRs). EX1010, ¶7.

127. Conklin's Figure 8 is reproduced below.

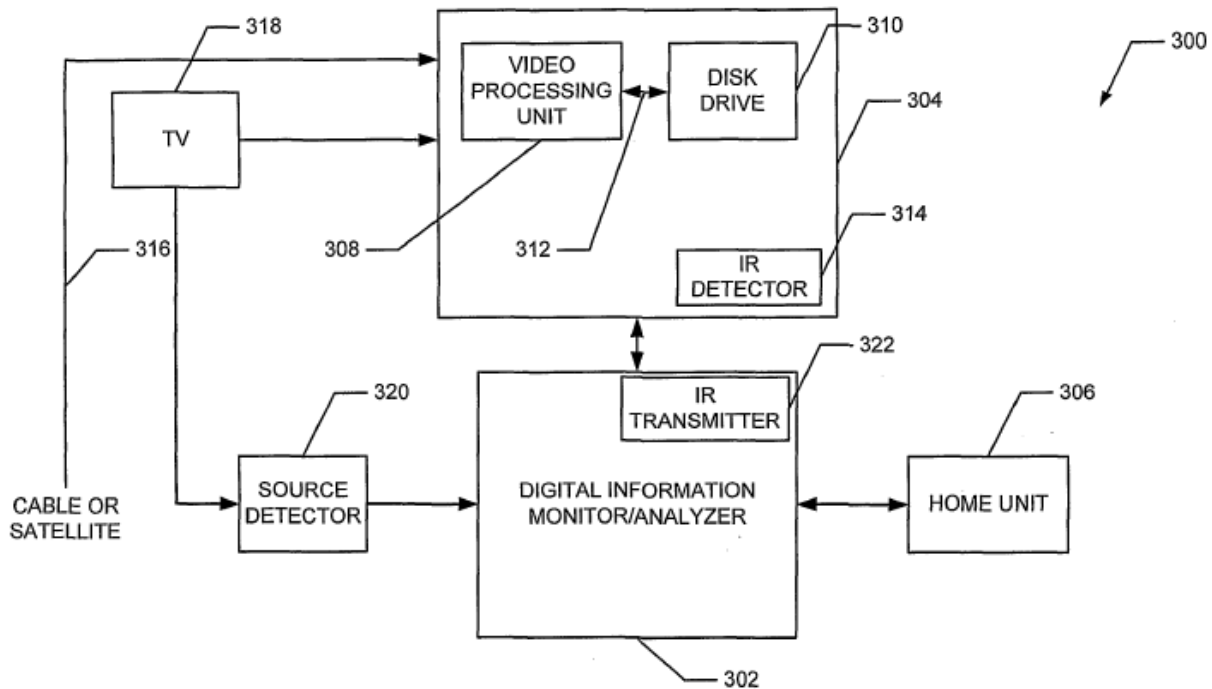


FIG. 8

EX1010, FIG. 8.

128. In accordance with Figure 8, system 300 uses digital information monitor/analyzer 302 in conjunction with a DVR 304 and an audience measurement unit or home unit 306. EX1010, ¶68. Digital information monitor/analyzer 302 generates event records containing recording times and sources for recorded media content. EX1010, ¶70. Digital information monitor/analyzer 302 also adds additional information, including the playback or viewing time information to these event records when the media content is

subsequently viewed. EX1010, ¶70. Conklin recognizes that, like in Ramaswamy, the source may be detected by analyzing or decoding video content, e.g., using well-known “signature detection systems and methods.” EX1010, ¶35

129. The sequence of event records generated by the digital information monitor/analyzer 302 can be analyzed to ascertain audience viewing behaviors or habits. EX1010, ¶70. Figures 9-12 of Conklin, which are reproduced below, illustrate the relationship between “view time” and “delay time” of media content consumed on, for example, a DVR. EX1010, ¶71.

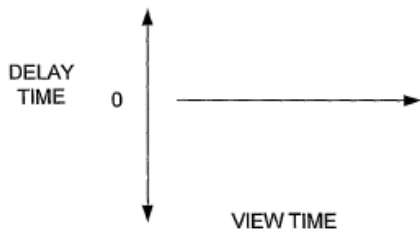


FIG. 9

EX1010, FIG. 9.

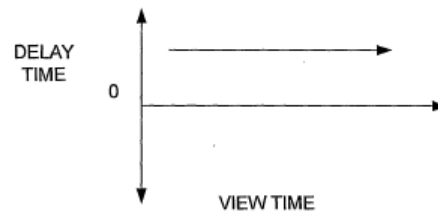


FIG. 10

EX1010, FIG. 10.

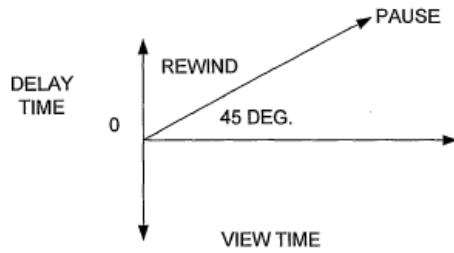


FIG. 11

EX1010, FIG. 11.

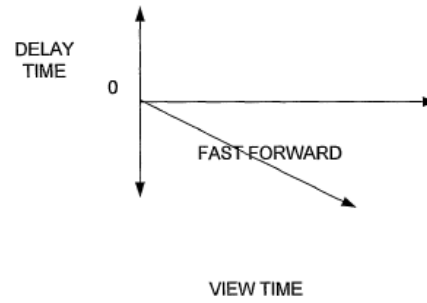


FIG. 12

EX1010, FIG. 12.

130. Figure 9, in which the delay time equals zero for all view times, depicts an example of live viewing of a video program via DVR 304. EX1010, ¶72. Figure 10, in which the delay time is constant for all view times, indicates that the video program was previously recorded by the DVR and is now being viewed. EX1010, ¶72. In Figure 11, the line having a slope of one (i.e. a one-for-one increase in delay time and view time) indicates a pause condition, and a rewind operation is indicated if the relationship between the view time and delay time falls between the forty-five degree pause line and the vertical axis. EX1010, ¶73. As shown in Figure 12, if the delay time decreases as the view time increases, a fast forward operation is indicated. EX1010, ¶74. These general operational characteristics can be used to analyze a sequence of events record generated by the digital information monitor/analyzer 302 in order to interpret the viewing behavior

associated with a DVR. EX1010, ¶¶75-76, FIG. 13.

VIII. CLAIM CONSTRUCTION

131. I do not believe that any particular construction of any particular claim term is required for purposes of this proceeding. I have therefore interpreted the claim terms recited in the '896 patent consistent with their plain and customary meaning to a person of ordinary skill in the art, as informed by the specification.

132. I reserve the right to offer claim construction opinions, however, in the event that Patent Owner proposes, or the Board adopts, particular constructions for claim terms.

IX. CLAIMS 1, 3-6, AND 9-11 OF THE '896 PATENT ARE UNPATENTABLE UNDER 35 U.S.C. § 103 OVER FEININGER

133. It is my opinion that a POSA would have found claims 1, 3-6, and 9-11 of the '896 patent obvious in light of the disclosure from Feininger (EX1005).

A. Independent Claim 1

1. Preamble [1.P]

[1.P] <i>A media measurement method comprising:</i>

134. To any extent that the preamble is limiting, it is my opinion that Feininger discloses a “*media measurement method*.”

135. Feininger discloses a system for developing “audience measurements statistics.” EX1005, 2:41-42. As explained by Feininger, audience measurement includes “measuring the demographic composition of a set of statistically selected

households and the program consumption habits of the member(s) of those households” and collecting “viewing data on a selected household by monitoring the content displayed on that household’s television(s) and by identifying which household member(s) are watching that content.” EX1005, 1:25-33.

2. Element [1.1]

[1.1] using one or more computers to generate a play stream of content identification results corresponding to a sequence of submitted data samples, the submitted data samples corresponding to video data samples captured at a monitoring device associated with a monitored audience member; and

136. In my opinion, Feininger teaches, or at least renders obvious, this element.

137. Figure 2 of Feininger, reproduced and annotated below, illustrates “an example apparatus 50 to detect portions of a recorded program that were not played back in real time (e.g., that were skipped, fast forwarded, paused, and/or rewind).” EX1005, 4:4-7.

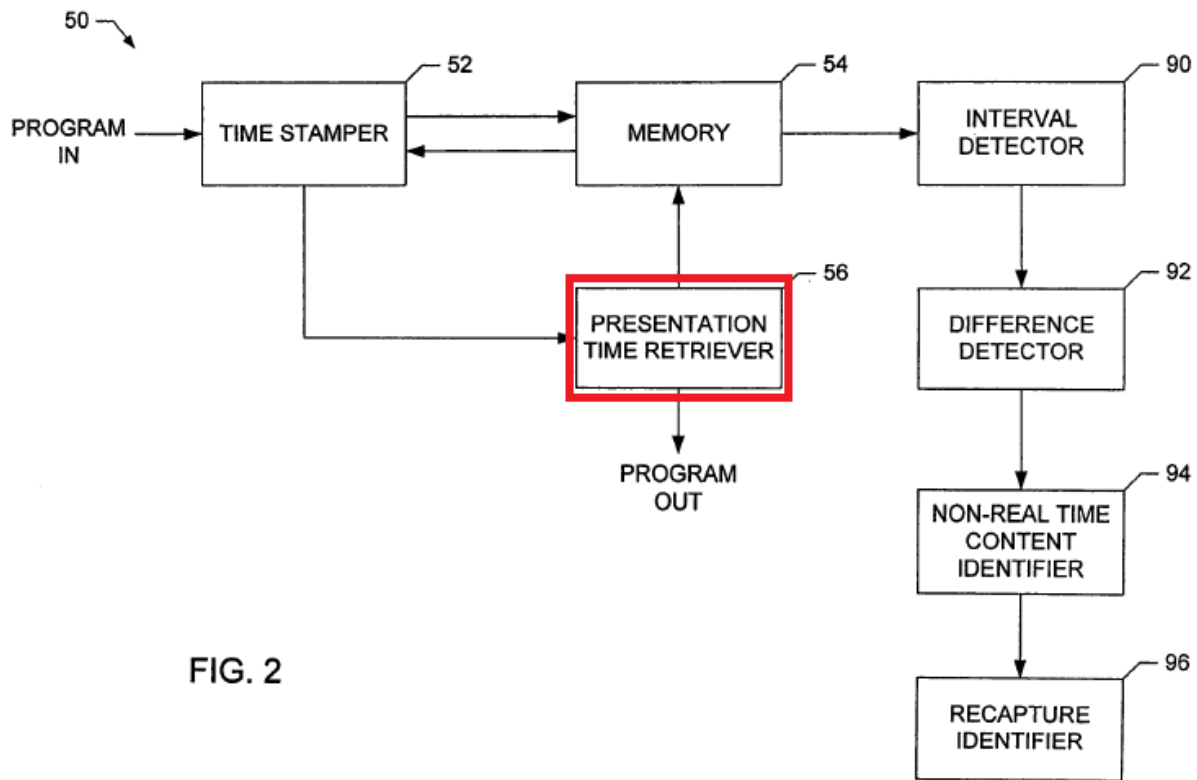


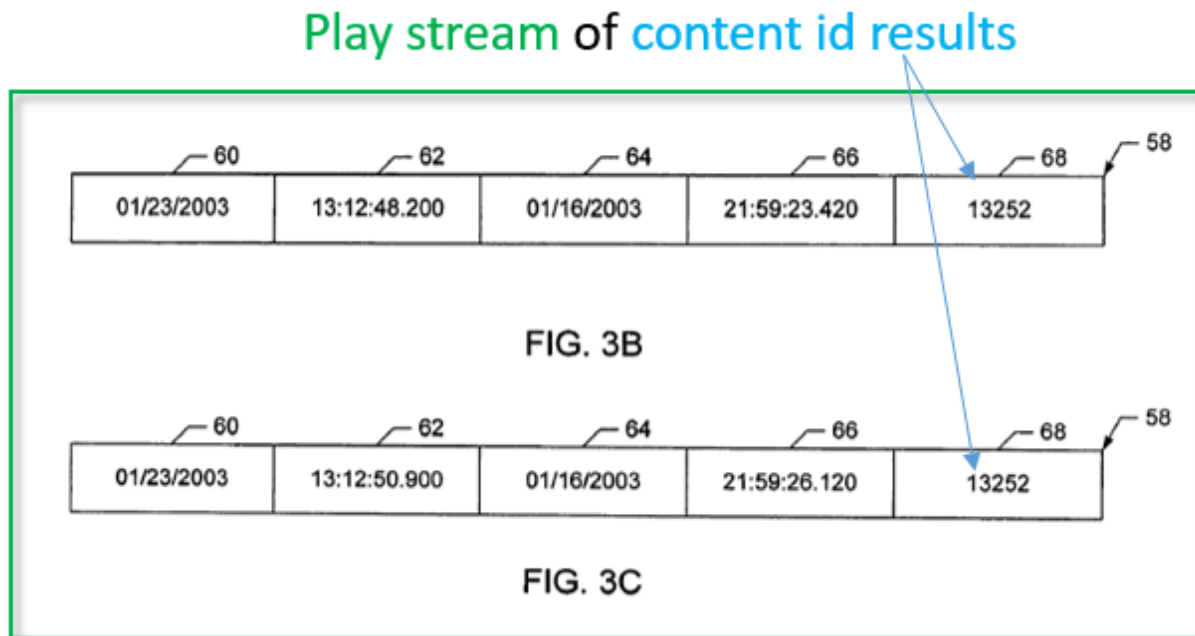
FIG. 2

EX1005, FIG. 2 (annotated).

138. As shown in Figure 2, a presentation time retriever 56 “creates” (*generate[s]*) a “running list of log entry data structures 58” (*a play stream¹*). EX1005, 4:61–5:2. Presentation time retriever 56 also retrieves a “program identifier [*(content identification results)*] from the packet header of the section of

¹ The ’896 patent broadly characterizes a play stream, indicating that “the particular organization, division, and content of the data may vary considerably from that illustrated in [Figures 4 and 5] without departing from the spirit and scope of the present invention.” EX1001, 10:51-58.

the recorded program currently being played back and store[s] that identifier in one or more program identification fields 68.” EX1005, 5:28-42. The program identifier may be a universal program identifier as known in the art. EX1005, 5:37-42. The program identifier is obtained by (e.g., the result of) investigating/examining the packet data of the program being played to extract the program identifier information. EX1005, 4:61-5:2, 5:28-42, 16:56-17:2. Log entry data structures 58 (including the program identifier) are shown in Figures 3A-3C of Feininger, which are reproduced and annotated below:



EX1005, FIGs. 3A-3C (annotated).

139. In Feininger, apparatus 50 (*monitoring device*) is “equipped to record and analyze data reflecting usage of, for example, a digital recording device 24 in a

home site 12, 14, 16” (e.g., the *monitoring device* is *associated with a monitored audience member*). EX1005, 4:12-14. Apparatus 50 may be implemented by one of more of a digital recording device 24, a data logging device 26, and/or the central office 10. EX1005, 4:8-11, FIG. 1.

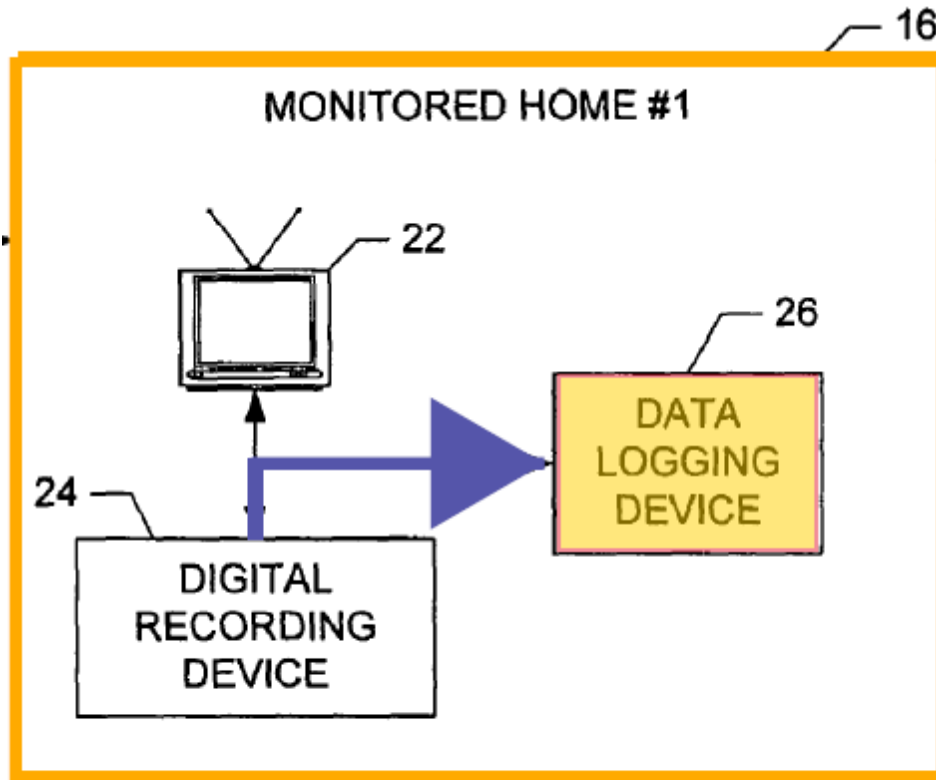


FIG. 1

EX1005, FIG. 1 (annotated).

140. Data logging device 26 may comprise apparatus 50 of Figure 2 (shown above), which generates the “*play stream of content identification results*” based on the data samples submitted to data logging device 26. EX1005, 4:4-13;

see also EX1005, 15:18-31 (“data logging device 26 waits to receive data from the digital recording device 24[.]”).

141. Feininger further discloses that a broadcast program received by a digital recording device 24 may be “compressed and stored as two datastreams, namely an audio datastream and a *video datastream*² . . . containing a series of data packets.” EX1005, 4:27-31; *see also* EX1005, 16:1-6 (“When a program is received[,], the digital recording device 24 packetizes the received program data into one or more datastreams[.] [T]he received program data may be packetized into a stream of *video packets* and a stream of audio packets”). The video datastream is then submitted to a data logging device 26, as shown in Figure 1. Digital recording device 24 then outputs the log entry data structures 58 (*play stream*) generated from the received broadcast program data based on a user’s viewing activity. EX1005, 14:33-39, 16:7-17:60. In particular, log entry data structures 58 are created in response to a user’s playback of stored program data. EX1005, 16:38-17:2, FIG. 10; *see also* EX1005, 4:66-5:2 (“each log entry data structure 58 is preferably created at substantially the time that a corresponding section of the recorded program is being played”). Thus, the user’s viewing activity corresponds to the claimed *sequence of submitted data samples* . . .

² Emphasis added throughout unless otherwise indicated.

corresponding to video data samples captured at a monitoring device associated with a monitored audience member.

142. Feininger also discloses that the generation of the “*play stream of content identification results*” is performed “*using one or more computers.*” For instance, Feininger discloses that the apparatus and methods disclosed in Feininger may be performed by “a server, a personal computer” or “any other type of computing device.” EX1005, 21:24-32.

3. Element [1.2]

[1.2] <i>using one or more computers to utilize sample sequence data and content offset data to deduce play-altering actions of the monitored audience member</i>
--

143. In my opinion, Feininger teaches, or at least renders obvious, this element.

144. Apparatus 50 of Feininger “detect[s] portions of a recorded program that were not played back in real time (e.g., that were skipped, fast forwarded, paused, and/or rewind).” EX1005, 4:4-7. It is my opinion that a POSA would have understood the detection of such actions to be *deduc[ing] play-altering actions*. Moreover, the ’896 patent gives specific examples of *play-altering actions* as including pausing, rewinding, fast forwarding, and skipping. EX1001, 11:14-23.

145. Interval detector 90 and difference detector 92 of Feininger, as shown in Figure 2 (reproduced and annotated below), are utilized to “detect portions of a

recorded program that were not played back in real time (e.g., that were skipped, fast forwarded, paused, and/or rewind).” EX1005, 4:4-7. Specifically, interval detector 90 and difference detector 92 utilize the log entry data structures 58 in order to make the determination if the audience has played a portion of the recorded program back in something other than real time. EX1005, 8:53-10:8, 18:17-19:9. As explained in more detail below, the data in Feininger’s log entry data structures 58 includes both the claimed *sample sequence data* and the claimed *content offset data*. See Sections IX.A.4 (discussing *sample sequence data*), IX.A.5 (discussing *content offset data*).

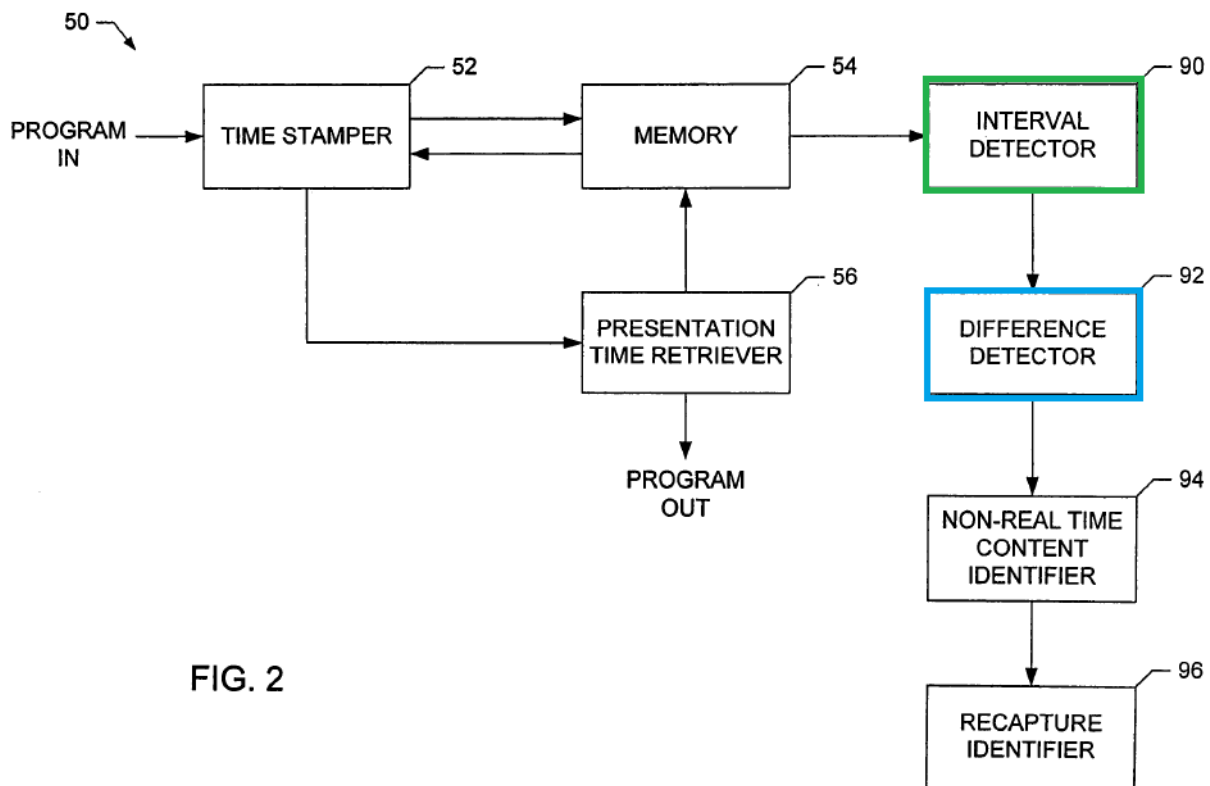


FIG. 2

EX1005, FIG. 2 (annotated).

146. Feininger also discloses that deducing of the *play altering actions* is implemented *using one or more computers*.” For instance, Feininger discloses that the apparatus and methods disclosed in Feininger may be performed by “a server, a personal computer” or “any other type of computing device.” EX1005, 21:24-32.

4. Element [1.3]

[1.3] <i>the sample sequence data corresponding to a sequence of the content identification results.</i>
--

147. In my opinion, Feininger teaches, or at least renders obvious, this element.

148. As described above with respect to claim element [1.1], presentation time retriever 56 “creates a running list of log entry data structures 58” EX1005, 4:62–5:2. The running list of log entry data structures 58 are shown in Figures 3A-3C, which are reproduced and annotated below:

60 01/23/2003	62 13:12:45.500	64 01/16/2003	66 21:57:20.920	68 13252	58
FIG. 3A					
60 01/23/2003	62 13:12:48.200	64 01/16/2003	66 21:59:23.420	68 13252	58
FIG. 3B					
60 01/23/2003	62 13:12:50.900	64 01/16/2003	66 21:59:26.120	68 13252	58
FIG. 3C					

EX1005, FIGs. 3A-3C (annotated).

149. Presentation time retriever 56 also retrieves a “program identifier from the packet header of the section of the recorded program currently being played back and store[s] that identifier in one or more program identification fields 68.” EX1005, 5:28-42. Accordingly, each of the log entry data structures 58 in the running list identifies content based on program identification field 68 (annotated in blue) (*content identification result*). EX1005, 5:28-42.

150. Each of the log entry data structures 58 also includes a playback time stored in playback time field 62 (annotated in purple). In particular, playback time

field 62 stores “data representative of the playback time (in this example, formatted as HH:MM:SS.mmm for hour/minute/second/millisecond) of the corresponding section of the program being played.” EX1005, 5:7-10. Log entry data structures 58 further include a recording time field 66 (annotated in red), which stores “data representative of the recording time . . . of that same section of the program.” This running list provides a *play stream of content identification results*, as each data structure 58 in the running list includes a *content identification result*. It is my opinion that a POSA would have understood that, collectively these data fields of Feininger’s log entry data structures 58 (e.g., the playback time, recording time, and program identification) comprise *sample sequence data*, as the running list includes sequence of playback times, recording times, and program identification results.

5. Element [1.4]

[1.4] *the content offset data including content offsets associated with the content identification results, a content offset indicating a time position of a content identification result within identified content.*

151. In my opinion, Feininger teaches, or at least renders obvious, this element.

152. The ’896 patent describes an example of *content offsets* with reference to Figure 5, reproduced below.

510 Clean Playstream			
row	log time	content ID	content offset
1	t_0	TVprgm 27	(0)
2	t_0+1	TVprgm 27	(0)+1
3	t_0+2	none	n/a
4	t_0+3	none	n/a
5	t_0+4	none	n/a
6	t_0+5	TVprgm 27	(0)+2
7	t_0+6	TVprgm 27	(0)+3
8	t_0+7	TVprgm27	(0)+9
9	t_0+8	TVprgm27	(0)+10
10	t_0+9	TVprgm27	(0)+9
11	t_0+10	TVprgm27	(0)+10
12	t_0+11	none	n/a
13	t_0+12	TVprgm27	(0)+29
14	t_0+13	TVprgm27	(0)+30
15	t_0+14	ad23	(0)
16	t_0+15	none	n/a
17	t_0+16	ad25	(0)+2
18	t_0+17	TVprgm28	(0)
19	t_0+18	TVprgm28	(0)+1
20	t_0+19	TVprgm28	(0)+2

560 Clean Play List				
row	start log time	end log time	content ID	content offset
1	t_0	t_0+2	TVprgm27	(0)
2	t_0+2	t_0+5	none	n/a
3	t_0+5	t_0+7	TVprgm27	(0)+2
4	t_0+7	t_0+9	TVprgm27	(0)+9
5	t_0+9	t_0+11	TVprgm27	(0)+9
6	t_0+11	t_0+12	none	n/a
7	t_0+12	t_0+14	TVprgm27	(0)+29
8	t_0+14	t_0+15	ad23	(0)
9	t_0+15	t_0+16	none	n/a
10	t_0+16	t_0+17	ad25	(0)+2
11	t_0+17	t_0+20	TVprgm28	(0)

570 Channel Data for TV C4			
row	start time	end time	content ID
1	C(0)	C(0)+31	TVprgm27
2	C(0)+31	C(0)+34	ad23
3	C(0)+34	C(0)+37	ad24
4	C(0)+37	C(0)+40	ad25
5	C(0)+40	C(0)+50	TVprgm28

590 Clean Play List with Deduced Actions				
row	log time	end log time	content ID and <deduced action>	content offset
1	t_0	t_0+2	TVprgm27	(0)
2	t_0+2	t_0+5	<pause for 3 units>	n/a
3	t_0+5	t_0+7	TVprgm27	(0)+2
4	t_0+7	t_0+7	<skip frwrd 5 units>	n/a
5	t_0+7	t_0+9	TVprgm27	(0)+9
6	t_0+9	t_0+9	<skip bckwrd 2 units>	n/a
7	t_0+9	t_0+11	TVprgm27	(0)+9
8	t_0+11	t_0+12	<fast frwrd 18 units>	n/a
9	t_0+12	t_0+14	TVprgm27	(0)+29
10	t_0+14	t_0+15	ad23	(0)
11	t_0+15	t_0+16	<fast frwrd 7 units>	n/a
12	t_0+16	t_0+17	ad25	(0)+2
13	t_0+17	t_0+20	TVprgm28	(0)

FIG. 5

EX1001, FIG. 5 (annotated).

153. In this example, “[e]ach content offset value represents a time offset from the beginning of a particular piece of content.” EX1001, 11:41-43. “For example, row 8 of Play Stream 510 corresponds to a sample whose beginning is located 9 time units from the beginning of TV program 27, thus the content offset is referenced as (0)+9.” EX1001, 11:43-46. In other words, it is my opinion that a POSA would understand that a *content offset* is determined in relation to the beginning time of reference content (as opposed to the consumed content). The *content offset* is characterized broadly, and may be determined relative to an “arbitrary start time value ‘C(0)’” or from the “absolute time” for a broadcast

channel for example. EX1001, 10:10-19.

154. Feininger teaches including the recording time 66 in the log entry data structures 58. EX1005, 5:13-19, FIG. 3. This recording time 66 is the time at which the program was originally broadcast and stored on the digital recording device 24. EX1005, 4:15-48, 5:3-27. Thus, it is my opinion that the recording time 66 corresponds to the reference content (as opposed to the consumed content, which is the playback time 62 in Feininger). As discussed in more detail below, Feininger's interval detector 90 and difference detector 92 use the relative recording times 66 and playback times 62 of successive log entries 58 to determine if the audience has played any portion of the recorded program back in other than real time. EX1005, 8:53-9:60; Section IX.A.6. It is my opinion that the recording time 66 thus teaches, or at least renders obvious, the claimed *content offset* because it *indicat[es] a time position of a content identification result within identified content*. In other words, the recording time 66 for a particular log entry 58 indicates the time at which that particular section of the recorded program was stored on the device 24. When considering the recording time 66 for that particular log entry 58 relative to all of the recording times 66 in all of the log entries 58 for the recorded program, the *time position* of that section (*content identification result*) within the content as a whole (*identified content*) can be determined.

155. To the extent Patent Owner argues the *content offset* must be relative

to a zero start value at the beginning of the program as in the exemplary embodiments (it does not), Feininger also teaches that using “normalized” times in place of actual recording times can be beneficial (e.g., setting the start time of a program to zero). EX1005, 10:26-33, FIG. 5. This is because “different home sites 12, 14, 16 may receive the same broadcast program at slightly different times” but “all of the relative lengths of the broadcast segments . . . will be the same from site to site.” EX1005, 10:34-52. The recording times can be normalized “by, for example, subtracting the start time of the recorded program as recorded in the log entry data structures 58 . . . from the recording times retrieved from the log entry data structures 58.” EX1005, 19:32-36. It is my opinion that these normalized recording times explicitly teach the claimed *content offset* because they *indicat[e] a time position of a content identification result within identified content* in the same way as in the ’896 patent. Based on Feininger’s teachings of using recording times or normalized times, it is my opinion that it would have been obvious for Feininger’s interval detector 90 and difference detector 92 to use normalized start times (*content offsets*) instead of the absolute recording times in determining if the audience has played a portion of the recorded program back in something other than real time.

156. In any event, once the comparison of recording times 66 in successive log entries 58 is complete, the distinction between using an arbitrary start time

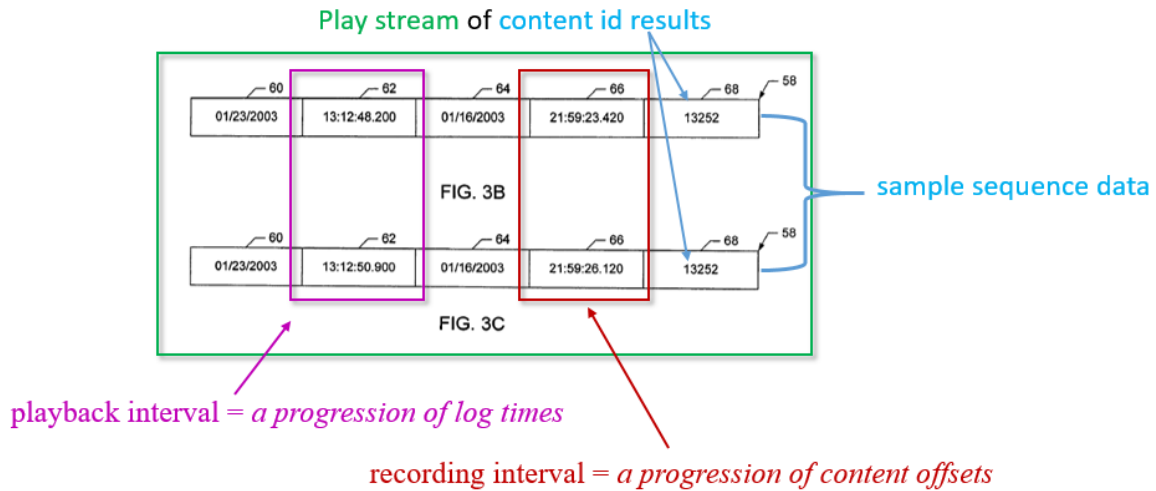
value (e.g., zero) or from the absolute time becomes irrelevant.

6. Element [1.5]

[1.5] *wherein to utilize comprises, for a particular plurality of submitted data samples and corresponding content identification results, comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results*

157. In my opinion, Feininger teaches, or at least renders obvious, this element.

158. Feininger discloses that interval detector 90 “computes recording intervals between the recording times appearing in successive ones of the log entry data structures 58.” EX1005, 8:56-59. The recording interval is computed by “finding the difference between the recording times appearing in successive log entries 58.” EX1005, 8:60-62. Interval detector 90 also calculates the difference between “playback times stored in successive log entries 58” to “determine a playback interval corresponding to each pair of successive log entry data structures 58.” EX1005, 9:13-18. Difference detector 92 determines a difference between the playback interval and recording interval to determine whether a play-altering action has occurred. EX1005, 18:17-24, 44-45, and 54-63. These intervals are illustrated in an annotated version of Figures 3B and 3C, reproduced below.



EX1005, FIGs. 3B, 3C (annotated).

159. It is my opinion that a POSA would have understood that Feininger's recording interval corresponds to *a progression of content offsets of the corresponding content identification results*. As discussed in the prior section, recording times 66 teach or at least render obvious the claimed *content offsets*, and Feininger's recording interval, e.g., the difference between recording time 66 in Figure 3C and that in Figure 3B is a numerical representation of a *progression* thereof.³

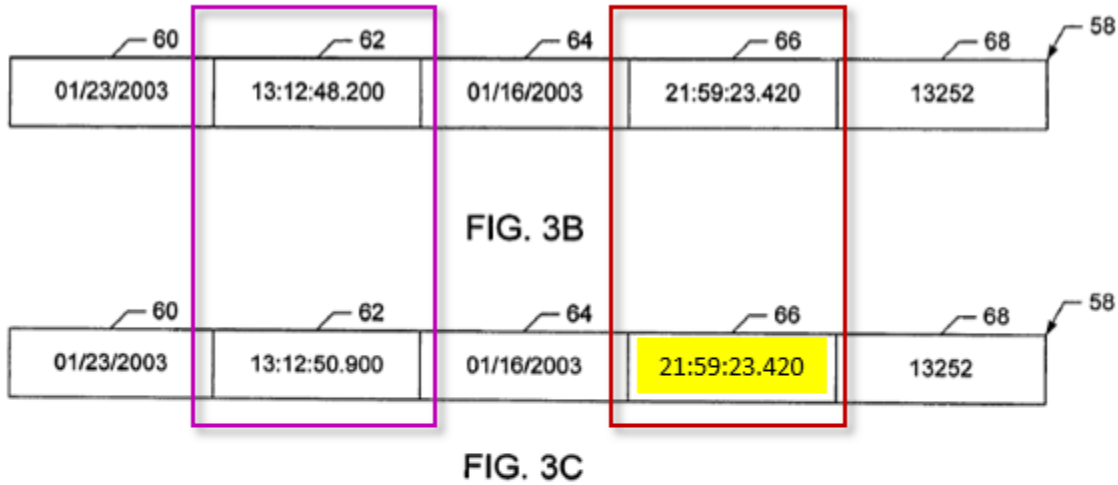
³ Whether an arbitrary start time value (e.g., zero) or the absolute time is used, the interval calculated between successive recording times will be the same.

160. As discussed above, Feininger's log entry data structures 58 are created at substantially the same time that a corresponding section of the recorded program is being played. EX1005, 4:67-5:2. Thus, the playback time (*log time*) is *associated with* the data structure creation time (*capture timing*) of each section of the program being played (*submitted data sample*). It is my opinion that a POSA would have understood that Feininger's playback intervals correspond to *a progression of log times associated with capture timing of each of the particular plurality of submitted data samples*. In other words, the difference between playback time 62 in Figure 3C and that in Figure 3B is a numerical representation of a *progression of log times*.

161. Difference detector 92 determines a difference (*comparing*) between the playback interval (*a progression of log times associated with capture timing of each of the particular plurality of submitted data samples*) and recording interval (*a progression of content offsets of the corresponding content identification results*) to determine whether a play-altering action has occurred. EX1005, 18:17-24, 44-45, 54-63, claim 10.

162. For instance, difference detector 92 determines if the presentation time difference (i.e., the recording interval) between the pair of log entry data structures is zero. EX1005, 18:18-21. If so, a determination is made that the "program was paused for the entire playback interval between the data structures."

EX1005, 18:21-23. For instance, consider the example shown below in the annotated version of Figures 3B and 3C below:



Real Time
Difference =
13:12:48.200 –
13:12:50.900 = 2.7
seconds

Presentation Time
Difference =
21:59:23.420 –
21:59:23.420 = 0
seconds

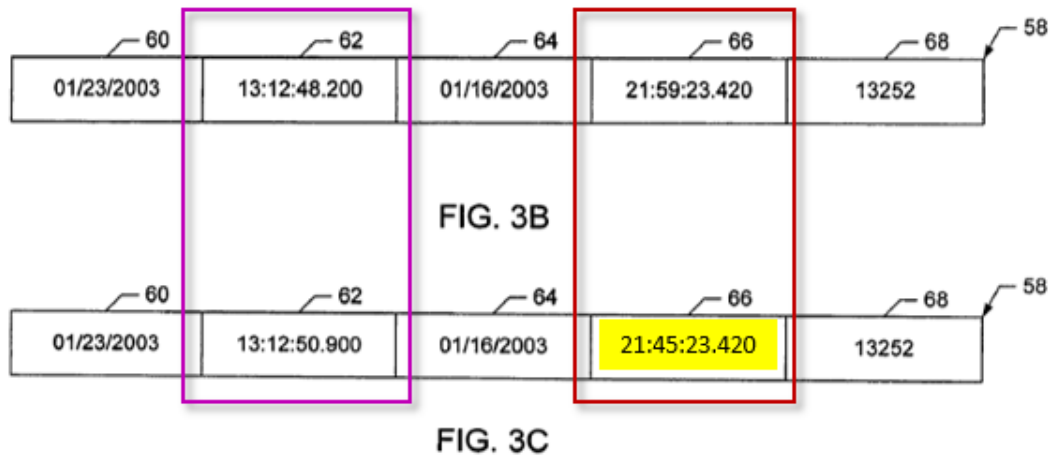
EX1005, FIGs. 3B-3C (annotated).

163. As shown above, the recording time in field 66 of both data structures is the same. Thus, the presentation time difference (i.e., the recording interval) is 0 seconds. In this case, a determination would be made that the program was paused

during the playback interval (i.e., the real time difference of 2.7 seconds) between the data structures of Figures 3B and 3C.

164. If it is determined that the recording interval is not zero, difference detector 92 determines if the recording interval is less than the playback interval. EX1005, 18:34-35. If the recording interval is less than the playback interval, the presentation time difference is analyzed to determine whether a pause event/slow motion event occurred or whether a rewind event occurred. EX1005, 18:35-40.

165. In particular, if it is determined that the presentation time difference is a positive value, then a determination is made that a brief pause or slow motion event occurred. EX1005, 18:40-43. If the presentation time difference is a negative value, then a determination is made that a rewind event has occurred. EX1005, 18:44-46. For instance, consider the example shown below in the annotated version of Figures 3B and 3C:



Real Time
Difference =
13:12:48.200 –
13:12:50.900 = 2.7
seconds

Presentation Time
Difference =
21:45:23.420 –
21:59:23.420 = -14
second

-14 seconds is less than **2.7 seconds**

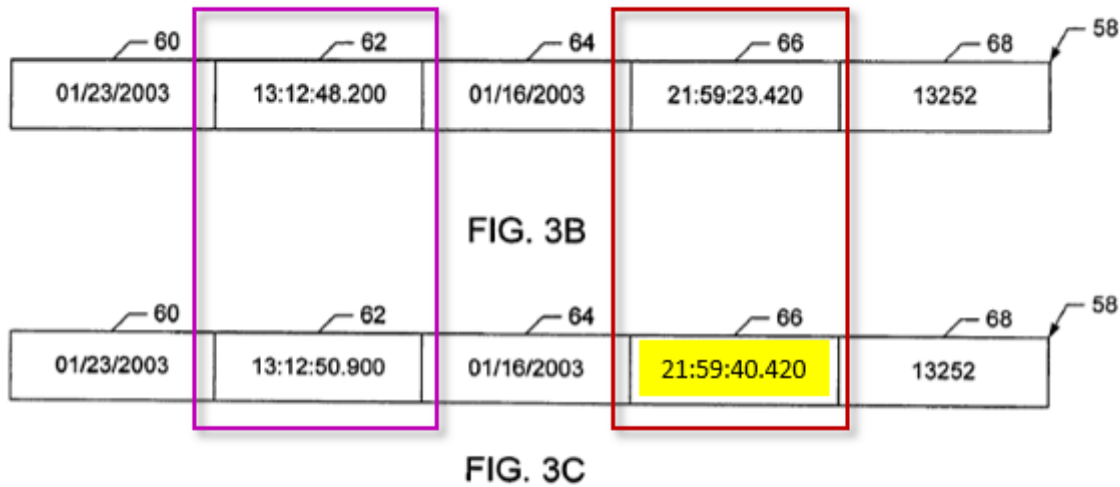
EX1005, FIGs. 3B-3C (annotated).

166. As shown above, the recording time in field 66 of data structure 58 of Figure 3C is 21:45:23.420, and the recording time in field 66 of data structure 58 of Figure 3B is 21:59:23.420. Thus, the presentation time difference (i.e., the recording interval) is -14 seconds. As further shown above, the playback time in field 62 of data structure 58 of Figure 3C is 13:12:50.900, and the playback time in field 62 of data structure 58 of Figure 3B is 13:12:48.200. Thus, the real time

difference (i.e., the playback interval) is 2.7 seconds. Because the presentation time difference is less than the real time difference, and because the presentation time difference is a negative value (i.e., -14 seconds), a determination is made that a rewind event has occurred.

167. If a determination is made that the recording interval is not less than the playback interval, difference detector 92 “determines if the recording interval is equal to the playback interval.” EX1005, 18:56-68. If the intervals are not equal, then a determination is made that the “corresponding portion of the recorded program has been skipped and/or fast forwarded[.]” EX1005, 18:58-63.

168. For instance, consider the example shown below in the annotated version of Figures 3B and 3C:



Real Time
Difference =
13:12:48.200 –
13:12:50.900 = 2.7
seconds

Presentation Time
Difference =
21:59:40.420 –
21:59:23.420 = 17
second

17 second is not less than (i.e., it is
greater than) or equal to 2.7 seconds

EX1005, FIGs. 3B-3C (annotated).

169. As shown above, the recording time in field 66 of data structure 58 of Figure 3C is 21:59:40.420, and the recording time in field 66 of data structure 58 of Figure 3B is 21:59:23.420. Thus, the presentation time difference (i.e., the recording interval) is 17 seconds. As further shown above, the playback time in

field 62 of data structure 58 of Figure 3C is 13:12:50.900, and the playback time in field 62 of data structure 58 of Figure 3B is 13:12:48.200. Thus, the real time difference (i.e., the playback interval) is 2.7 seconds. Because the presentation time difference is not less than the real time difference, and because the presentation time difference is a positive value (i.e., 17 seconds), a determination is made that a skip or fast forward event has occurred.

7. Element [1.6]

[1.6] *using one or more computers to utilize deduced play altering actions of the monitored audience member to generate a media measurement report.*

170. In my opinion, Feininger teaches, or at least renders obvious, this element.

171. I note that the '896 patent's discussion of *media measurement report* is limited. *See* EX1001, 6:35-37 ("Results of the media measurement analysis can be obtained via report generator 130").

172. Feininger teaches generally that "audience measurement companies may collect [household] viewing data." EX1005, 1:25-33. Feininger also recognizes that the ability to time-shift viewing allows consumers to "consume only selected portions of broadcast programs by, for example, skipping or fast-forwarding through portions of recorded content." EX1005, 1:49-55. As discussed above, Feininger teaches methods to "develop audience measurement statistics" in

such a scenario. EX1005, 2:41-42.

173. After difference detector 92 deduces play altering actions (elements [1.2]-[1.5]), this information is used by recapture identifier 96 to determine a list of portions of a recorded program that were viewed by the user in real time. EX1005, 12:49-13:48. This information is “periodically exported to the central office via the network 18 for compilation with data from other home sites 12, 14, 16 and/or further analysis.” EX1005, 13:61-14:1, 3:31-34. It is my opinion that a POSA would consider the household viewing data collected, analyzed, and exported to the central office (e.g., “[r]esults of the media measurement analysis,” EX1001, 6:35-37) to be a *media measurement report*. The ’896 patent does not provide any details about, nor do the claims require, any specific information to be included in a report.

174. To the extent Patent Owner argues that Feininger does not include express disclosure of a report, it was within the general knowledge of a POSA to organize information into a report form. *See, e.g.*, EX1019, 450 (“**report** n. The presentation of information about a given topic, typically in printed form. Reports prepared with computers and appropriate software can include text, graphics, and charts. Database programs can include special software for creating report forms and generating reports. Desktop publishing software and laser printers or typesetting equipment can be used to produce publication-quality output.”).

175. For example, U.S. Application Pub. No. US 2003/0037333 to Ghashghai et al. (EX1018, “Ghashghai”), titled “Audience Measurement System,” describes an audience measurement system for creating reports covering various information, including, “aggregate viewer behavior in relation to a specific television program; aggregate viewer response to specific commercial pods; and aggregate viewer behavior in relation to tuning out of a specific television program and viewer tune-in destinations.” EX1018, Abstract. As described in the Background section of Ghashghai, “television production studios, stations, broadcasters, and advertisers have an increasing interest in the ability to track television viewer habits and actions.” EX1018, ¶13. Ghashghai recognizes it would be “advantageous to provide an audience measurement system that monitors viewer habits and preferences for both live and recorded television program material.” EX1018, ¶14. Ghashghai provides a solution for monitoring such habits and preferences for live and recorded television program material, including providing various reports. EX1018, Abstract, ¶¶18, 43, 257-264.

176. Based on this general knowledge to organize information into a report form, it would have been obvious to a POSA to put the information exported to Feininger’s central office into a report. *See also, e.g.*, EX1018, Abstract, ¶¶262-263 (“Timeshifting Reports”).

177. As discussed for elements [1.1] and [1.2], Feininger’s apparatus and

methods are implemented *using one or more computers*. EX1005, 21:24-32, FIG.

15.

B. Independent Claim 9

1. Preamble [9.P]

[9.P] *A media measurement method comprising:*

178. It is my opinion that Feininger teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.P]. *See* Section IX.A.1.

2. Element [9.1]

[9.1] *using one or more computers to generate a play stream of content identification results corresponding to a sequence of submitted data samples, the submitted data samples corresponding to video data samples captured at a monitoring device associated with a monitored audience member*

179. Element [9.1] corresponds to element [1.1]. It is my opinion that Feininger teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.1]. *See* Section IX.A.2.

3. Element [9.2]

[9.2] using one or more computers to utilize sample sequence data and content offset data to deduce play-altering actions of the monitored audience member

180. Element [9.2] corresponds to element [1.2]. It is my opinion that Feininger teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.2]. *See* Section IX.A.3.

4. Element [9.3]

[9.3] the sample sequence data corresponding to a sequence of the content identification results

181. Element [9.3] corresponds to element [1.3]. It is my opinion that Feininger teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.3]. *See* Section IX.A.4.

5. Element [9.4]

[9.4] wherein play-altering actions include actions that alter at least one of a pace and a sequence of a media stream

182. It is my opinion that Feininger teaches, or at least renders obvious, this element. As discussed above for element [1.2], Feininger's apparatus 50 "detect[s] portions of a recorded program that were not played back in real time (e.g., that were skipped, fast forwarded, paused, and/or rewound)." *See* Section IX.A.3; EX1005, 4:4-7, 8:53-10:8, 18:17-19:9. It is my opinion that a POSA would

have understood that at least rewinding and fast forwarding *alter . . . a pace . . . of a media stream* and that at least skipping (forward or backward) *alter[s] . . . a sequence of a media stream* as recited. See EX1001, 11:14-23 (identifying pausing, rewinding, fast forwarding, and skipping as examples of *play-altering actions*).

6. Element [9.5]

[9.5] *the content offset data including content offsets associated with the content identification results, a content offset indicating a time position of a content identification result within identified content*

183. Element [9.5] corresponds to element [1.4]. It is my opinion that Feininger teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.4]. See Section IX.A.5.

7. Element [9.6]

[9.6] *wherein to utilize comprises, for a particular plurality of submitted data samples and corresponding content identification results, comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results*

184. Element [9.6] corresponds to element [1.5]. It is my opinion that Feininger teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.5].

8. Element [9.7]

[9.7] *using one or more computers to utilize deduced play altering actions of the monitored audience member to generate a media measurement report.*

185. Element [9.7] corresponds to element [1.6]. It is my opinion that Feininger teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.6].

C. Dependent Claim 3

[3] *utilizing sample sequence data together with corresponding channel data to deduce play-altering actions of a monitored audience member.*

186. It is my opinion that Feininger teaches, or at least renders obvious, this element.

187. In particular, Feininger teaches that the program identifier 68 included as part of the log entry data structures 58 (*sample sequence data*) that is used to deduce play-altering actions may additionally include “information that identifies . . . the station that broadcast the program (e.g., a broadcast channel number, a station name, or a standardized station identifier)” (*channel data*). EX1005, 5:28-42; see also EX1005, 6:38-47, FIG. 4 (including, e.g., channel number 78 in log entry data structure 70).

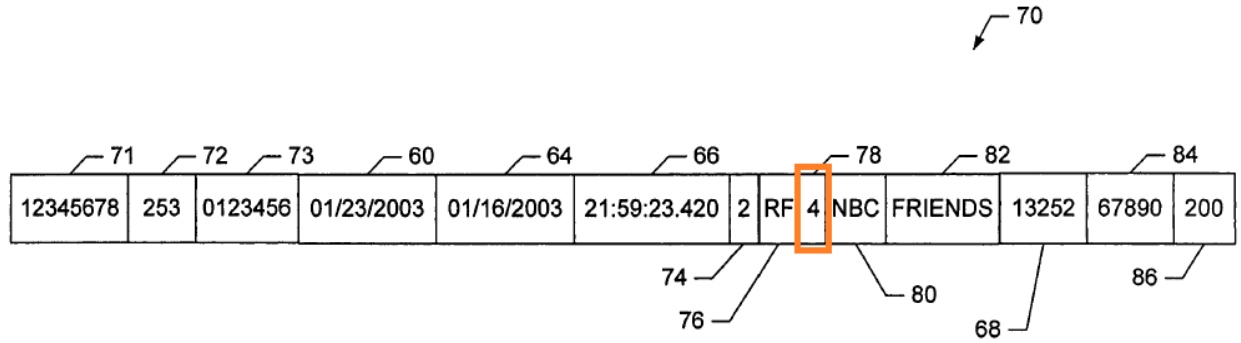


FIG. 4

EX1005, FIG. 4 (annotated).

188. Feininger further discloses that non-real time content identifier 94 identifies the segment(s) in the portion of the recorded program that were not played back in real time (segment(s) that were skipped or rewound). EX1005, 9:61-64 and Figure 2, which is reproduced and annotated below.

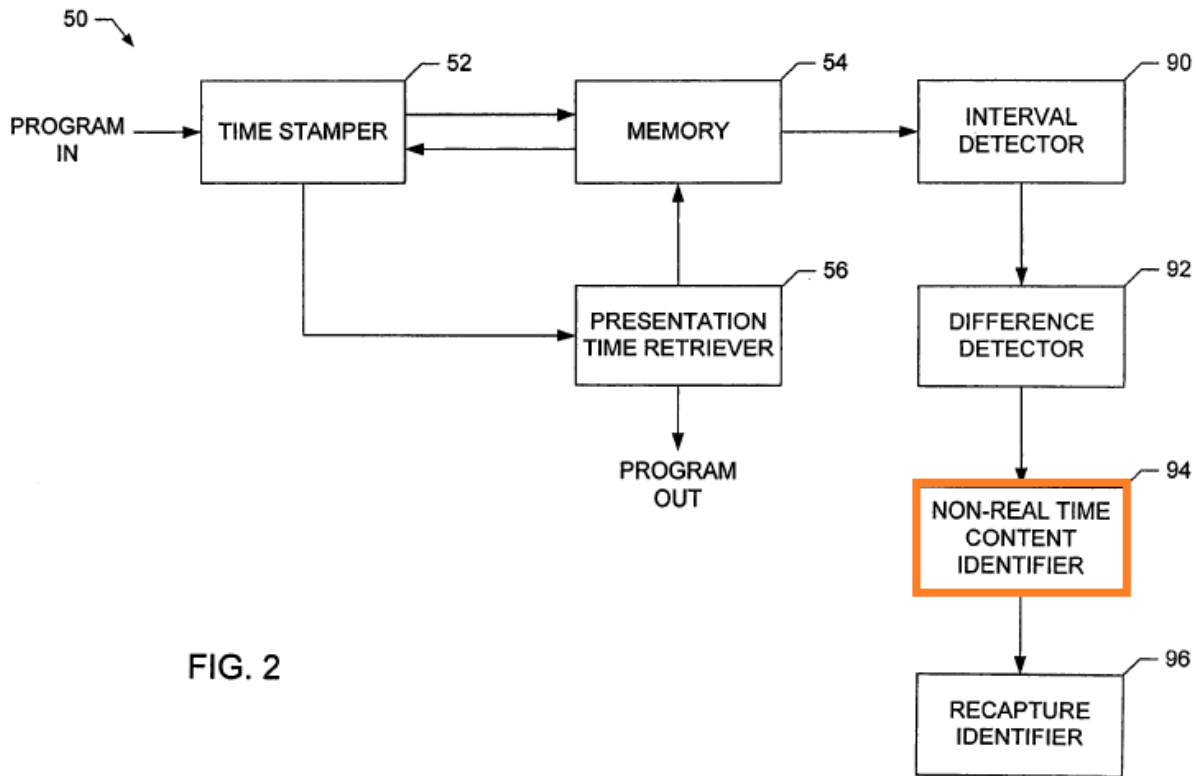


FIG. 2

EX1005, FIG. 2 (annotated).

189. In particular, non-real time content identifier 94 retrieves the channel information of the recorded program from one of the corresponding log entry data structures 58, 70 (e.g., from channel number field 78, as shown in Figure 4 above). EX1005, 19:24-26. Using the information, non-real time content identifier 94 retrieves “a program table such as the example program table shown in FIG. 5 for the recorded program from a database of program tables.” EX1005, 19:23-29; *see* also EX1005, 3:37-59, 8:16:35 (explaining that the channel number or a network name (e.g., from field 80 of log structure 70 of Figure 4) can be used to identify a media program schedule downloaded from schedule warehouse 28 to discern

additional information about the broadcast programming on that channel). The program schedule may be used to identify a particular program. EX1005, 8:16-35. A program table associated with the program includes information about segments of that program, as shown in Figure 5 (below). EX1005, 10:15-32.

FIG. 5

NAME	START TIME	END TIME
INTRODUCTION	00:00:00.000	00:03:30.003
COMMERCIAL 1	00:03:30.003	00:06:01.015
CONTENT 1	00:06:01.015	00:13:35.920
COMMERCIAL 2	00:13:35.920	00:15:55.723
CONTENT 2	00:15:55.723	00:20:43.513
COMMERCIAL 3	00:20:43.513	00:23:53.819
CONTENT 3	00:23:53.819	00:28:09.875
...	...	...
COMMERCIAL N	00:57:20.920	00:59:18.562
...	...	...

EX1005, FIG. 5.

190. In this example, the program table includes normalized start and end times for several segments of a broadcast program and commercials, and is identified based on the “identity of the recorded program [retrieved] from one of the corresponding log entry data structures 58.” EX1005, 10:15-32, 19:23-29.

191. Non-real time content identifier 94 may compare the “start time of the recording interval of the recorded program at issue to the start times appearing in the program table associated with the corresponding program[.]” EX1005, 10:58-63. Non-real time content identifier 94 may also “search[] the program table

associated with the recorded program for an end time that matches the normalized end time of the recording interval that was subjected to non-real time playback.”

EX1005, 11:12-20. Once matching start and end times are identified in the program table, “non-real time content identifier 94 identifies the segment(s) corresponding to” the matched start and end times as the “segment(s) of the recorded program that were subjected to non-real time playback.” EX1005, 11:29-34. That is, the program table is used by the non-real time content identifier 94 to determine particular segment(s) of a program that were affected by a play-altering action. EX1005, 9:61-10:8, 11:29-34, 19:19-20:25, FIGs. 2, 12A-12C, 13A-13B.

192. Therefore, in my opinion, a POSA would have understood that Feininger teaches, or at least renders obvious, claim [3].

D. Dependent Claim 4

[4] <i>wherein a clean play list is generated including deduced play-altering actions.</i>

193. It is my opinion that Feininger teaches, or at least renders obvious, this element.

194. As an initial matter, the '896 patent broadly characterizes a play list, indicating that “the particular organization, division, and content of the data may vary considerably from that illustrated in” Figures 4 and 5. EX1001, 10:51-58.

195. As described in Feininger, in response to detection of non-zero

differences by the difference detector 92 (discussed above), non-real time content identifier 94 determines identities of particular segment(s) of a program that were affected by a play-altering action. EX1005, 9:61-10:8, 11:29-34. The non-real time content identifier 94 records the determined identities in a recapture table, such as that shown in Figure 6, reproduced below, which identifies which segment(s) were fast-forwarded and which segment(s) were rewound. EX1005, 12:32-38.

FIG. 6

ADVANCED SEGMENT NAME(S)	REWOUND SEGMENT NAME(S)
1	4
5	5
8	6
8	7
9	8
	9

EX1005, FIG. 6.

196. As described in Feininger, the “first column stores the identities (in this example, represented by segment numbers), of any segments that the non-real time content identifier 94 identifies as having been skipped and/or fast forwarded.” EX1005, 12:42-46. The “second column of the recapture table of FIG. 6 is used to store the identities of all segments of the recorded program that were rewound.” EX1005, 12:46-48. Accordingly, the recapture table of Feininger corresponds to a “*clean play list*,” as it includes “*deduced play-altering actions*” performed for different segment(s) of a program. Alternatively, a POSA would understand that

the example log entries (*e.g.* as shown in Figs. 3A-3C), the conclusions drawn from the log entries (*e.g.* the fast-forward and rewind examples shown above), and the recapture table collectively contain the information of a clean play list and of deduced play-altering actions.

197. Therefore, in my opinion, a POSA would have understood that Feininger teaches, or at least renders obvious, claim [4].

E. Dependent Claim 5

[5] <i>wherein the play stream is a raw play stream</i>

198. It is my opinion that Feininger teaches, or at least renders obvious, this element.

199. The '896 patent describes a “raw play stream” as “indicating a series of samples and corresponding identification results” and as being “not scrubbed.” EX1001, 8:13-15, 8:54-56. The '896 patent also defines “scrubbing” as “reviewing for missing or incorrect data.” EX1001, 8:44-47.

200. As I discussed above with respect to claim element [1.1], the running list of log entry data structures 58 of Feininger corresponds to “*play stream*.” See Section IX.A.2. In addition, the running list of log entry data structures 58 indicates both a series of samples and identification results. In particular, each log entry data structure 58 in the running list corresponds to a particular section of a particular program (*e.g.*, corresponds to a sample), and each log entry data

structure 58 includes an identification result (i.e., the program identifier that is identified as a result of analyzing the packet header of the section of the recorded program). EX1005, 4:66–5:2, 5:29-42.

201. Moreover, Feininger does not describe that the running log entry data structures 58 are scrubbed (i.e., reviewed for missing or incorrect data as described in the '896 patent). Thus, it is my opinion that a POSA would understand the running list of log entry data structures 58 of Feininger teaches, or at least renders obvious, a *raw play stream* as recited in claim 5 because it includes all of the log entry data structures 58 created during playback of a program.

202. Therefore, in my opinion, a POSA would have understood that Feininger teaches, or at least renders obvious, claim [5].

F. Dependent Claim 6

[6] <i>wherein the play stream is a clean play stream</i>

203. It is my opinion that Feininger teaches, or at least renders obvious, this element.

204. The '896 patent implies that a *clean play stream* is a play stream that contains no missing or incorrect data, as the clean play stream is generated as a result of scrubbing. EX1005, 8:3-6, 8:34-35.

205. As I discussed above with respect to claim element [1.1], the running list of log entry data structures 58 of Figure 3 of Feininger corresponds to a *play*

stream. Feininger also discloses an embodiment in which the log entry data structures may include a sequence number field 72. Such an embodiment is shown as log entry data structure 70 of Figure 4, which is reproduced and annotated below:

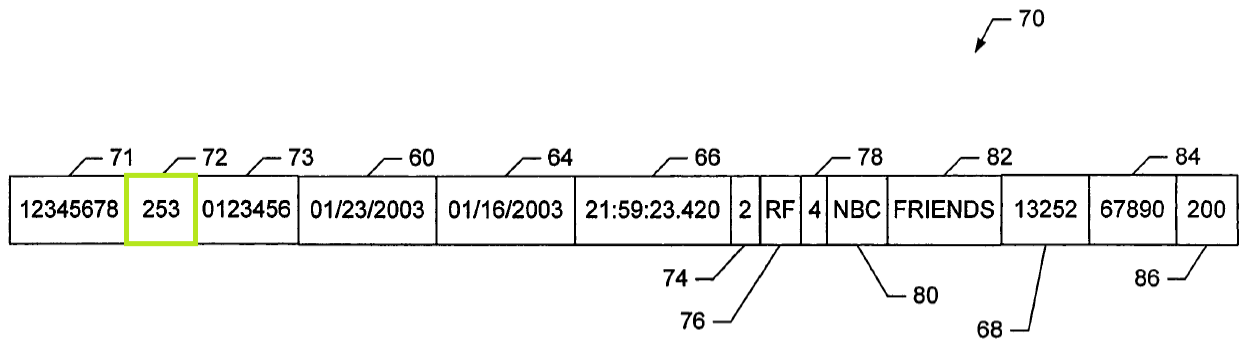


FIG. 4

EX1005, FIG. 4 (annotated).

206. Sequence number field 72 is utilized in log entry data structures 70 to “ensure that they are transmitted, analyzed, and/or processed in the correct order.” EX1005, 6:59-61. Given this disclosure of Feininger, a POSA would understand that the safeguards provided by utilizing sequence number field 72 would result in a running list of log entry data structures 70 that do not include any entries.

207. Further, it is my opinion that scrubbing (or cleaning) data and the benefits of such operations was within the general knowledge of a POSA, and it would have, at a minimum, been obvious to scrub the data in Feininger’s running list of log entry data structures 58 in order to ensure accurate results. The ’896

patent defines “scrubbing” as “reviewing for missing or incorrect data.” EX1001, 8:44-47. This concept was notoriously well known at the time of the ’896 patent. By this definition, scrubbing data was well known by a POSA decades prior to the time of the ’896 patent disclosure, and a POSA would have been familiar with these well-known data error correction and data imputation techniques. For example, the publications to Lee (EX1016) and Myrtveit (EX1017) describe examples of known data imputation techniques.

208. Lee notes that data quality problems can arise from a variety of sources. EX1016, 28. “When mining these data warehouses for decision-making information, making logical and well-informed decisions becomes problematic if the data’s quality is doubtful.” EX1016, 28. Lee teaches that “clean data is crucial” for many database implementations, including data mining. Lee notes “[d]ata cleaning refers to processes for detecting and removing errors and inconsistencies from data.” EX1016, 28. “Research in this area has included outlier detection, noise handling for classification, and duplicate elimination.” EX1016, 28. “Given the ‘garbage in, garbage out’ principle, clean data is crucial for database integration, data warehousing, and data mining, thus leading to data cleaning’s strong association with these research areas.” EX1016, 28.

209. Lee further explains that “[d]ata cleaning refers to processes for detecting and removing errors and inconsistencies from data.” EX1016, 28. Lee

notes a type of erroneous data is known as “spurious links” and Lee identifies a “context-based solution” to identify data that needs correcting. EX1016, 28.

210. Lee describes automated software-based methods for identifying and correcting data. EX1016, 30. “We implemented our algorithms in Java and ran the experiments on a Pentium 4 1.6-GHz system with 256 Mbytes of RAM running Windows XP Professional. We used IntelliClean4 on the three data sets to find record sets with high similarity in the spurious attribute, and we used DM2-CBA7 to generate association rules to determine the context attributes.” EX1016, 30.

211. Myrtveit discusses automated software-based imputation methods for data sets containing missing data. EX1017, 999. As described in Myrtveit, “imputation-based techniques” are one type of “missing data techniques (MDTs)” to handle missing data. EX1017, 1001. One such imputation technique is “similar response pattern imputation (SRPI)” in which the most similar entry without missing data is determined, and those values are copied into the missing data. EX1017, 1002. In SRPI, “[t]he idea . . . is to identify the most similar project without missing [data] and [to] copy the values of this project to fill in the [data] holes in the project with missing [data].” EX1017, 1002. Myrtviet describes another technique known as “[h]ot deck imputation (HDI)” which “replaces missing values by drawing from an *estimated* distribution for each missing value.” EX1017, 1002. Myrtviet teaches “[i]t is common [in hot deck imputation] to use

the *sample* distribution . . . as the distribution (or deck) to draw from.” EX1017, 1002, 1003. Continuing, Myrtviet teaches “SRPI belongs to the hot deck class,” and “picks the nearest neighbor rather than drawing from the sample at random.” EX1017, 1003. Myrtveit articulates clearly that “[i]mputation-based methods replace missing values by suitable estimates.” EX1017, 1001. In my opinion, a POSA would have immediately understood the desirability and advantages of replacing missing data values with suitable data estimates in order to enhance the integrity and reliability of the data, given the known problem of “dirty data” and known desirability for “cleaned” or “scrubbed” data.

212. Looking back in time, the article to Hernandez, entitled “Real-world Data is Dirty: Data Cleansing and the Merge/Purge Problem” and published in 1998 describes the known problem of dirty data. Hernandez notes that “[e]rrors due to data entry mistakes, faulty sensor readings or more malicious activities, provide scores of erroneous data sets that propagate errors in each successive generation of data.” EX1012, p. 10. Hernandez describes a basic data cleansing solution utilizing a sorted neighbor method (considering neighbor data values to resolve data errors). EX1012, pp. 11-18.

213. The Lakshminarayan article, entitled “Imputation of Missing Data in Industrial Databases” and published in 1999, further evidences the well-known problem of dirty data and well-known data scrubbing techniques. The

Lakshminarayan article discusses well-known approaches for data imputation in incomplete data structures. Lakshminarayan notes “[i]ncomplete data is an unavoidable problem in dealing with most of the real world data sources, and various methods for dealing with such data have been developed.” EX1013, p. 261. In the article, Lakshminarayan concludes that the mining of databases is often hampered by missing and erroneous data entries, and notes reasons for completing incomplete databases and summarizes well-known statistical approaches for missing data imputation. EX1013, p. 274. Broadly, Lakshminarayan provides a brief overview of existing methods for dealing with missing data, as roughly grouped following known taxonomy as 1) ignoring and discarding incomplete records and attributes, 2) parameter estimation in the presence of missing data, and 3) imputation procedures. EX1013, p. 261-262.

214. Finally, I note the 2002 article by Batlle entitled “Automatic Song Identification in Noisy Broadcast Audio” as exemplifying that it was well known at the time of the ’896 patent that a problem with broadcast audio data is that the data is dirty. Batlle notes “[o]ne of the main problems with broadcast audio is that the received audio suffers several transformations before reaching the listener . . . and, therefore, the original and the broadcast songs are very different from the signal point of view.” EX1014, Abstract. This “dirty” data can impede proper automatic song identification. Although the Batlle reference pursues a different

solution to the problem of dirty data, it evidences that data cleansing was, at the time of the '896 patent, known as a necessary component in audio content identification systems, especially when analyzing broadcast audio.

215. Therefore, in my opinion, a POSA would have understood that Feininger teaches, or at least renders obvious, claim [6].

G. Dependent Claim 10

[10] <i>wherein play-altering actions include at least one of fast forwarding, rewinding, and pausing a media stream</i>
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216. It is my opinion that Feininger teaches, or at least renders obvious, this element.

217. As I discussed above with respect to claim elements [1.2] and [9.4], Feininger's apparatus 50 "detect[s] portions of a recorded program that were not played back in real time (e.g., that were skipped, *fast forwarded*, *paused*, and/or *rewound*).” EX1005, 4:4-7; *see* Sections IX.A.3, IX.B.5; *see also* EX1005, 18:34-40 (“If the recording interval (i.e., the presentation time difference) is smaller than the playback interval (i.e., the real time interval) between the data structures 58[,], the corresponding portion of the recorded program has been *paused* or *rewound*”), 18:54-63 (“If the recording interval (i.e., the presentation time difference) is not [less than or] equal to the playback interval (i.e., the real time interval) between the data structures 58[,], the corresponding portion of the recorded program has been

skipped and/or *fast forwarded*").

218. Therefore, in my opinion, a POSA would have understood that Feininger teaches, or at least renders obvious, claim [10].

H. Dependent Claim 11

[11] <i>wherein play-altering actions include at least one of skipping forward and skipping backward in a media stream</i>
--

219. It is my opinion that Feininger teaches, or at least renders obvious, this element.

220. As discussed above for elements [1.2] and [9.4], Feininger's apparatus 50 "detect[s] portions of a recorded program that were not played back in real time (e.g., that were *skipped*, fast forwarded, paused, and/or rewound)." EX1005, 4:4-7; see Sections IX.A.3, IX.B.5; see also EX1005, 18:54-63 ("If the recording interval (i.e., the presentation time difference) is not [less than or] equal to the playback interval (i.e., the real time interval) between the data structures 58[,], the corresponding portion of the recorded program has been *skipped* and/or fast forwarded"). A POSA would have understood that Feininger's teaching of detecting *skipped* portions include *at least one of skipping forward and skipping backward*.

221. Therefore, in my opinion, a POSA would have understood that Feininger teaches, or at least renders obvious, claim [11].

X. CLAIMS 1-4 AND 7-13 OF THE '896 PATENT ARE UNPATENTABLE UNDER 35 U.S.C. § 103 OVER RAMASWAMY IN VIEW OF CONKLIN

222. It is my opinion that a POSA would have found claims 1-4 and 7-13 of the '896 patent obvious in light of the disclosure from Ramaswamy (EX1006) and Conklin (EX1010).

A. A POSA would have combined Ramaswamy and Conklin.

223. In my opinion, a POSA would have been motivated to combine Ramaswamy and Conklin for multiple reasons.

224. For example, both Ramaswamy and Conklin relate to monitoring media consumption, and in particular relate to solving the problem of monitoring consumption when the media is viewed in a time shifted manner, such as when content is recorded and viewed later and/or is delivered by a DVR or other such local audio/video content delivery system. EX1006, ¶7; EX1010, ¶6.

225. Ramaswamy teaches a method of “measur[ing] time shifted consumption (e.g., viewing, listening, etc.) of media content.” EX1006, ¶18. Like Ramaswamy, Conklin teaches identifying time shifted media consumption activities. *See* EX1010, ¶72, FIG. 10. In particular, Conklin’s Figure 10 “is a graph that depicts an example of delayed viewing of video program via the DVR 304.” EX1010, ¶72.

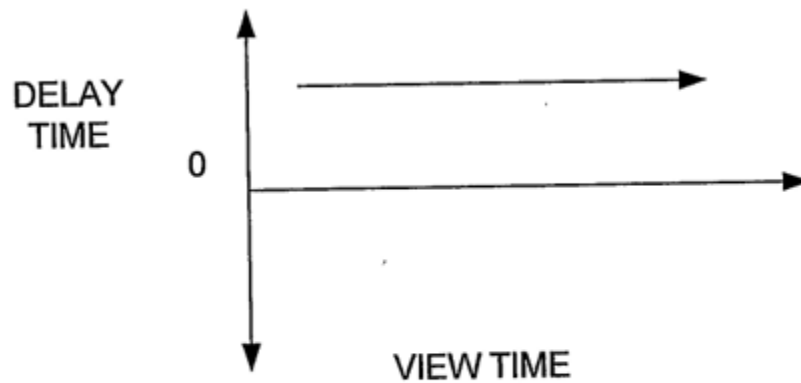


FIG. 10

EX1010, FIG. 10.

226. As shown in Figure 10, the delay time is constant for all view times. This indicates that a “part of or the entire video program currently being viewed was previously recorded by the DVR 304 and is now being viewed.” EX1010, ¶72.

227. In addition to problems with monitoring delayed viewing, Conklin recognizes that the use of DVRs, for example, “further complicates collection of viewing behavior information because viewers in households with these types of recording devices can rapidly change between live viewing of a program, a somewhat delayed viewing of a program, fast forwarding and rewinding a program, pausing a program, and recording a program for later viewing while watching another program live.” EX1010, ¶7.

228. Conklin provides a solution to this problem. Particularly, Conklin’s

digital information monitor/analyzer 302 generates event records (e.g., data records for segments of media content) that include at least source information, recording time information, and playback time (e.g., viewing time) information. EX1010, ¶70; *see, e.g.*, EX1010, ¶¶42-46 (describing exemplary event records). A sequence of events record may then be further analyzed. EX1010, ¶70. Based on the relationship between “the view time or playback time associated with the event record” and “the delay time (i.e., the difference between the playback or viewing time and the record time),” Conklin’s system determines viewing behavior associated with the DVR 304, such as pausing, rewinding, fast forwarding, etc.. *See* EX1010, ¶¶71-76, FIGs. 9-13.

229. It is my opinion that a POSA would have been motivated to implement Conklin’s additional analysis functionality (i.e., the ability to determine more complex time shifting viewing behaviors) in Ramaswamy’s media measurement method in order to provide the enhanced media consumption monitoring capabilities discussed in Conklin. In other words, adding the teaching of Conklin would have provided significant advantages and yield valuable insights into consumer behavior. The combination would have merely been the application of known techniques (Conklin’s sequence of events analysis) to a known system/method ready for improvement (Ramaswamy’s media measurement system/method) to yield the predictable result of providing enhanced media

consumption monitoring capabilities.

230. It is my opinion that a POSA further would have had a reasonable expectation of success in combining these references because they both relate to processing data collected from media viewing records. Both Ramaswamy and Conklin teach that the data can be stored in well-known data structure formats and then analyzed. *See, e.g.*, EX1006, ¶¶25, 34, 49, 57; EX1010, ¶31, 44, 46, 53. In my opinion, various database processing techniques would have been well known to a POSA, and using and combining these techniques would have been well within the level of ordinary skill. Further, implementation of the concepts of Conklin merely requires the use of data already gathered and available in Ramaswamy, making clear to a POSA that adding the analysis would be straightforward.

B. Independent Claim 1

1. Preamble [1.P]

[1.P] <i>A media measurement method comprising:</i>

231. To any extent that the preamble is limiting, it is my opinion that Ramaswamy discloses a “media measurement method.”

232. For example, Ramaswamy discloses a “method . . . for media source identification and time shifted *media* consumption [(e.g., viewing)] *measurements*.” EX1006, Abstract, ¶21. The type of media that is measured includes video. EX1006, ¶18 (stating time-shifted consumption of television

programs and video games is measured), ¶31 (stating that video signature-based techniques may be utilized to generate a unique signature for media content).

2. Element [1.1]

[1.1] *using one or more computers to generate a play stream of content identification results corresponding to a sequence of submitted data samples, the submitted data samples corresponding to video data samples captured at a monitoring device associated with a monitored audience member; and*

233. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

234. Specifically, Figure 2 of Ramaswamy, reproduced and annotated below, illustrates a “system 200 that may be used to implement” a consumption site, for example a “monitored household” (*monitored audience member*).

EX1006, ¶¶28, 34.

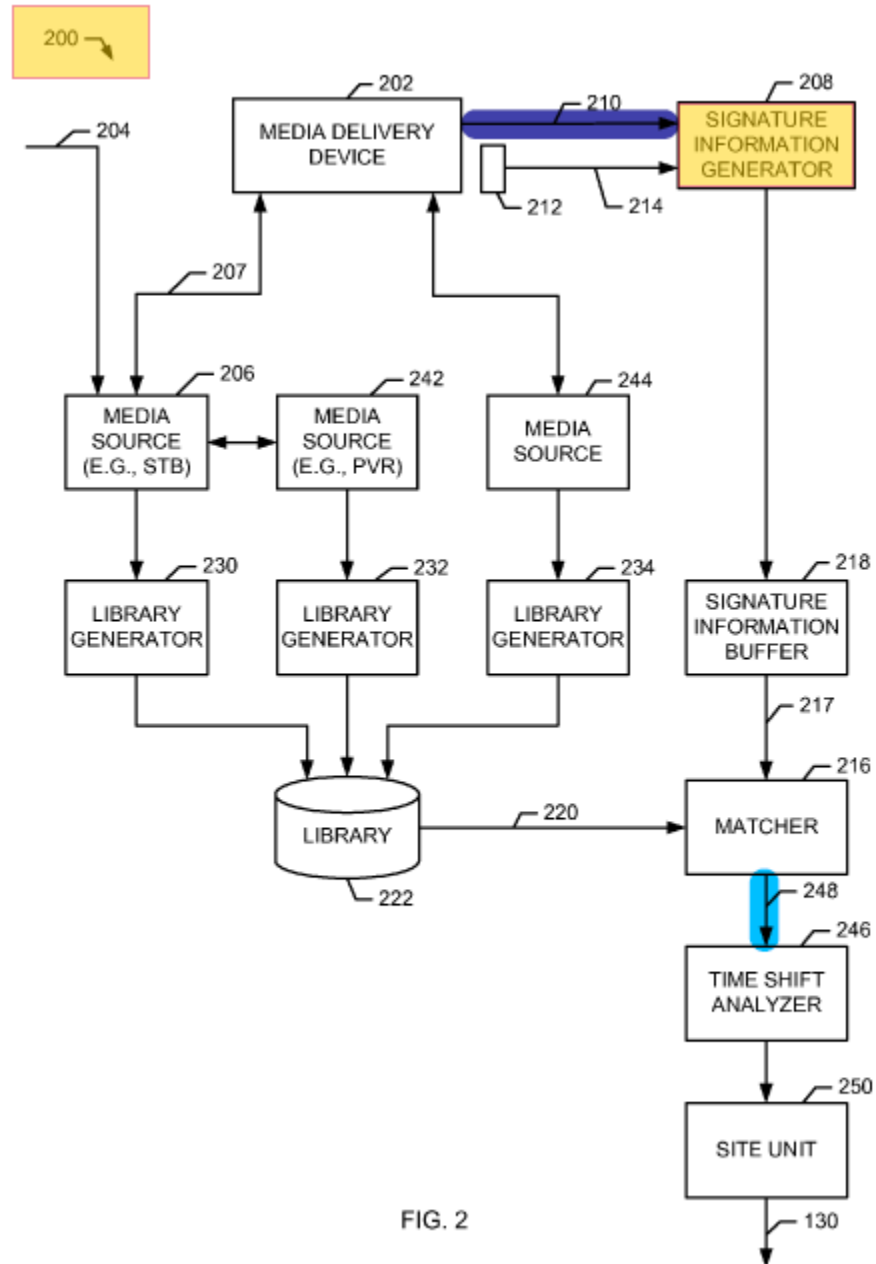


FIG. 2

EX1006, FIG. 2 (annotated).

235. As shown in Figure 2, “media delivery device 202 . . . receives . . . a media content signal 204 (e.g., an audio/video signal),” and outputs an audio output signal 210 to signature information generator 208 (*monitoring device*).

EX1006, ¶¶28, 30. Audio output signal 210 “contains audio information associated with the media content currently being presented by the media delivery device 202.” EX1006, ¶30. Signature information generator 208 may also receive audio output signal 214 from acoustic transducer 212 proximate to a speaker of media delivery device 202. EX1006, ¶30. Audio output signal 210 and/or audio output signal 214 correspond to the claimed *video data samples*.⁴

236. Using “well-known signature-based media . . . content identification techniques,” “signature information generator 208 generates signature information corresponding to media content presented by the media delivery device.” EX1006, ¶¶31, 33. In particular, “signature information generator 208 sequentially generates reference signatures for . . . any and all media content extracted or otherwise derived from the media content signal 204 and presented via the media delivery device 202.” EX1006, ¶33. This *sequence* of signature information 217 (generated

⁴ Ramaswamy describes signal 210 as an “audio output signal.” EX1006, ¶30. A POSA would have understood, however, that this output signal could also be a video output signal. In fact, the very next paragraph describes that signature information generator 208, into which output signal 210 is input, may use any known “audio or video signature-based techniques” to generate a signature. EX1006, ¶31, FIG. 2.

from the *submitted data samples*) is submitted (via signature information buffer 218) to matcher 216. EX1006, ¶¶32-33.

237. Matcher 216 obtains signature information 217 (which is representative of content being played back by media delivery device 202) from signature information buffer 218. *See* EX1006, ¶¶32-33. Matcher 216 compares signature information 217 to signature information 220 stored in a local reference library 222, which stores reference signatures uniquely representative of media content received by media sources 206, 242, and 244. EX1006, ¶¶24, 33-34. If the comparison yields a match, matcher 216 outputs a collection (referred to as a matcher collection) of “data that associates some or all of the signature information 220” with signature information 217. EX1006, ¶¶24, 33-34. It is my opinion that a POSA would have understood each match in the matcher collection to be a *content identification result* because, as Ramaswamy recognizes, matching of reference signature information and signature information associated with consumed media can be used to identify the particular programming contained in the consumed media. EX1006, ¶24; *see also* EX1006, ¶55 (“the match signature information process 600 obtains signature information (e.g., the signature information 220 of FIG. 2) from a library (e.g., the local reference library 222 of FIG. 2) that matches the signature information retrieved/received from the signature information buffer 218 (block 610)”).

238. Ramaswamy further discloses that matcher 216 “periodically or continuously sends matcher collections associated with media content presented via the media delivery device 202 to the time shift analyzer 246.” EX1006, ¶40. As each signature in the continuous stream of matcher collections uniquely represents a piece of media content being played back by media delivery device 202, the continuous stream of matcher collections corresponds to a *play stream of content identification results*. EX1006, ¶46 (the time shift analyzer 246 analyzes the matcher collection to create a consumption record, which may include, e.g., content identification (¶4)). Each identified match in the stream of matcher collections is a *content identification result*. EX1006, ¶¶33, 55, 59. Notably, the ’896 patent broadly characterizes what is a “play stream,” indicating that “the particular organization, division, and content of the data may vary considerably from that illustrated in FIG. 4 [(and FIG. 5)] without departing from the spirit and scope of the present invention,” and “the illustrated data sets might not be collected in the same table, but . . . might be spread out in different tables and/or relational structure.” EX1001, 10:51-63.

239. Ramaswamy also teaches that this generation of the *play stream of content identification results* is performed *using one or more computers*. For instance, Ramawamy expressly discloses that the apparatus and methods disclosed therein may be performed by “a server, a personal computer” or “any other

computing device.” EX1006, ¶¶67.

240. Therefore, in my opinion, a POSA would have understood that Ramaswamy teaches, or at least renders obvious, claim [1.1].

3. Element [1.2]

[1.2] using one or more computers to utilize sample sequence data and content offset data to deduce play-altering actions of the monitored audience member

241. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

242. As described in Ramaswamy, matcher 216 and time shift analyzer 246 of Figure 2 (reproduced and annotated below) are utilized to deduce “time shifted media consumption.” EX1006, ¶¶18, 40, 46.

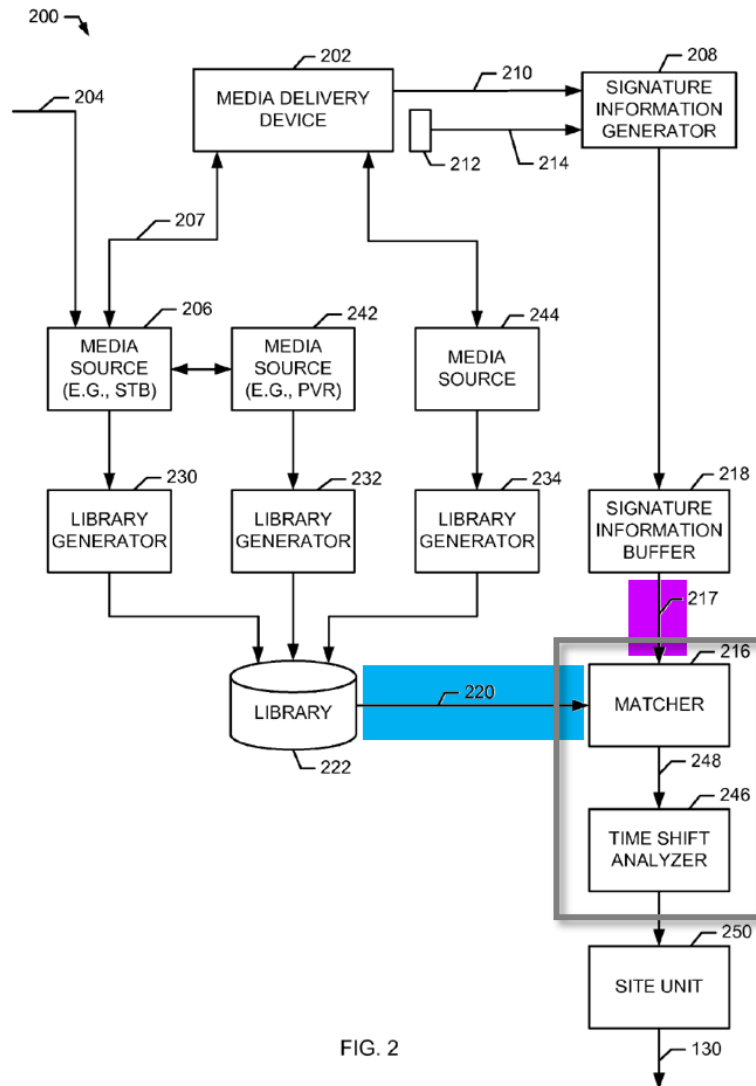


FIG. 2

EX1006, FIG. 2 (annotated).

243. Ramaswamy teaches a method of “measur[ing] time shifted consumption (e.g., viewing, listening, etc.) of media content.” EX1006, ¶18.

Ramaswamy describes:

time shifted media consumption occurs when an individual consumer causes one or more media sources (e.g., a PVR, a DVD player, a DVR, a VCR, an STB, a game console, and/or any other devices capable of

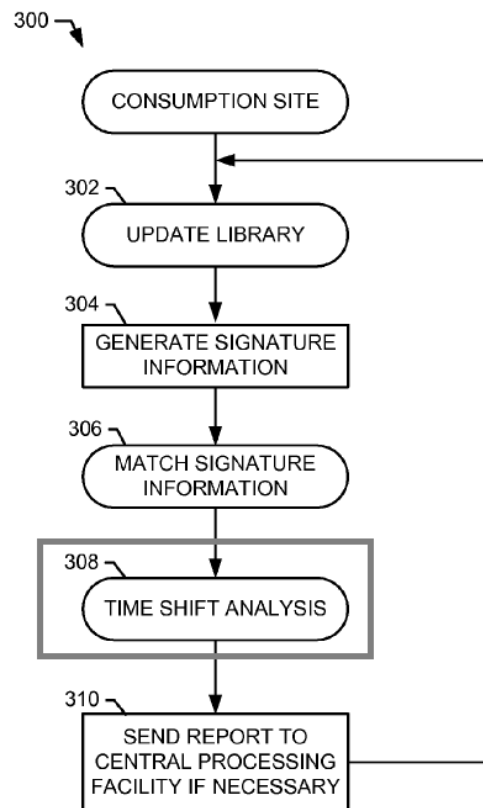
reproducing audio and/or video information) to present or deliver media content at a time convenient to the consumer (e.g., viewing broadcast or pre-recorded content at a time that is subsequent to the time at which the content was recorded and/or broadcast).

EX1006, ¶18. Ramaswamy's method "use[s] signature information (e.g., a signature, a source identifier, a time stamp, etc.) . . . to measure time shifted media consumption activities." EX1006, ¶18.

244. The '896 patent recognizes that "the traditional time shifting activity of, for example, recording a television broadcast and playing it at a later time," is part of the broader category of "play-altering activities," further specifying additional play-altering activities that "may be undertaken by an audience member," such as pausing, reversing, fast forwarding, and skipping. EX1001, 11:14-23. This also comports with my experiences in the industry at the time of the purported invention. It was well known that DVR enabled "trick play" and time-shift functions that included pausing, rewinding, and fast-forwarding. Indeed, the core of arguably the most successful DVR patent of all time (the Barton Time Warp patent) is about managing and enabling trick play. In other words, these activities were well known in the art and generally were considered and discussed collectively. It is my opinion that the language of independent claim 1, however, is broad enough to cover both these narrower examples and the broader category of play-altering activities more generally, including "time shifting" as taught by

Ramaswamy. Thus, in my opinion, a POSA would have understood that “to measure time shifted media consumption activities” corresponds to the claimed *to deduce play-altering actions of the monitored audience member*.

245. Time shift analyzer 246 of Ramaswamy receives the matcher collections from matcher 216. EX1006, ¶40. The data in the matcher collections is analyzed to determine (*deduce*) if there is time shifted information. EX1006, ¶46, FIG. 3 (step 308) (shown below).



EX1006, FIG. 3 (annotated).

246. As explained in more detail below, the data in the matcher collections of Ramaswamy includes both the claimed *sample sequence data* and the claimed

content offset data. See Sections X.A.4 (discussing sample sequence data), X.A.5 (discussing content offset data).

247. Ramaswamy also discloses that the utilization of the “*sample sequence data and content offset data to deduce play-altering actions*” is performed “*using one or more computers.*” For instance, Ramawamy discloses that the apparatus and methods disclosed in Ramawamy may be performed by “a server, a personal computer” or “any other computing device.” EX1006, ¶67.

248. To the extent Patent Owner argues that claim 1 is limited to the narrower examples of play-altering activities discussed in the specification of the ’896 patent, e.g., pausing, reversing, fast forwarding, and skipping (it is not), this element would have nonetheless been obvious in view of the Ramaswamy-Conklin combination.

249. Ramaswamy teaches a method of “measur[ing] time shifted consumption (e.g., viewing, listening, etc.) of media content.” EX1006, ¶18. Conklin, likewise, teaches identifying time shifted media consumption activities. EX1010, ¶72, FIG. 10. Conklin’s method additionally identifies pause and rewind operations, fast forward operations, and skipping (e.g., a “‘go back’ command”). EX1010, ¶¶73-76, FIGs. 11-13. These are the same activities identified in the ’896 patent as examples of *play-altering actions*. EX1001, 11:14-23.

250. As discussed above, in my opinion, a POSA would have been

motivated to implement Conklin's additional analysis functionality in Ramaswamy's method in order to provide the enhanced media consumption monitoring capabilities discussed in Conklin. Section X.A.

251. Thus, the Ramaswamy-Conklin combination renders obvious *to deduce play-altering actions of the monitored audience member*, even under a narrower interpretation limited to the examples disclosed in the '896 patent.

252. Therefore, in my opinion, a POSA would have understood the combination of Ramaswamy and Conklin teaches, or at least renders obvious, element [1.2].

4. Element [1.3]

[1.3] <i>the sample sequence data corresponding to a sequence of the content identification results</i>
--

253. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

254. Particularly, As discussed, in Ramaswamy, each identified match in the stream of matcher collections is a *content identification result*. EX1006, ¶¶33, 55, 59. As described with reference to Figure 2 (shown and annotated below) Ramaswamy discloses that signature information generator 208 “generates signature information corresponding to media content presented by the media delivery device 202” and stores the generated signature information in signature information buffer 218. EX1006, ¶¶32-33. The signature information includes a

signature, source identifier and a time stamp. EX1006, ¶18.

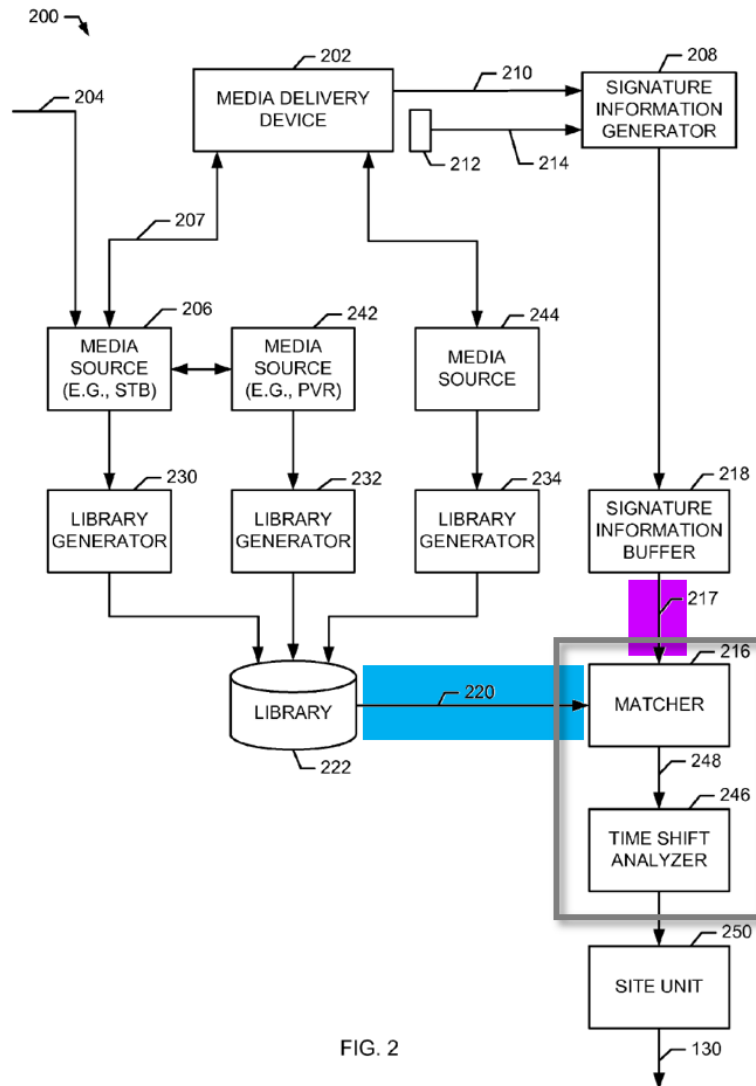


FIG. 2

EX1006, FIG. 2 (annotated).

255. Matcher 216 obtains the signature (shown as signature 217) from signature information buffer 218 and compares signature 217 to signature information 220 stored in a local reference library 222. EX1006, ¶33. If the comparison yields a match, matcher 216 outputs a collection of “data that

associates some or all of the signature information 220” (i.e., a matcher collection) with signature 217. EX1006, ¶33.

256. This data from signature information 217, 220, included in a matcher collection for a particular *content identification result*, includes at least a source identifier and a time stamp for the unique signature associated with a particular consumed signature information 217, as well as for any matching reference signature information 220. EX1006, ¶¶18, 48, 53, 59, FIG. 7 (an example of a matcher collection). Thus, in my opinion, a POSA would have understood Ramaswamy’s collection of associated signature information included in the stream of matcher collections includes *sample sequence data* (e.g., at least, a signature, a source identifier, time stamp(s) of reference signature information 220, and the time stamp of consumed signature information 217) *corresponding to a sequence of the content identification results* as recited in element [1.3]. See EX1006, ¶33 (describing that signature information generator 208 “sequentially generates” signatures, which are then processed through matcher 216); EX1001, 10:51-11:7 (broadly characterizing how the data making up the play stream, and thus the sample sequence data, may be collected and stored).

257. Therefore, in my opinion, a POSA would have understood that Ramaswamy discloses claim [1.3].

5. Element [1.4]

[1.4] the content offset data including content offsets associated with the content identification results, a content offset indicating a time position of a content identification result within identified content

258. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

259. The '896 patent describes an example of *content offsets* with reference to Figure 5, reproduced below.

510 Clean Playstream				
row	log time	content ID	content offset	
1	t ₀	TVprgm 27	(0)	
2	t ₀ +1	TVprgm 27	(0)+1	
3	t ₀ +2	none	n/a	
4	t ₀ +3	none	n/a	
5	t ₀ +4	none	n/a	
6	t ₀ +5	TVprgm 27	(0)+2	
7	t ₀ +6	TVprgm 27	(0)+3	
8	t ₀ +7	TVprgm27	(0)+9	
9	t ₀ +8	TVprgm27	(0)+10	
10	t ₀ +9	TVprgm27	(0)+9	
11	t ₀ +10	TVprgm27	(0)+10	
12	t ₀ +11	none	n/a	
13	t ₀ +12	TVprgm27	(0)+29	
14	t ₀ +13	TVprgm27	(0)+30	
15	t ₀ +14	ad23	(0)	
16	t ₀ +15	none	n/a	
17	t ₀ +16	ad25	(0)+2	
18	t ₀ +17	TVprgm28	(0)	
19	t ₀ +18	TVprgm28	(0)+1	
20	t ₀ +19	TVprgm28	(0)+2	

560 Clean Play List				
row	start log time	end log time	content ID	content offset
1	t ₀	t ₀ +2	TVprgm27	(0)
2	t ₀ +2	t ₀ +5	none	n/a
3	t ₀ +5	t ₀ +7	TVprgm27	(0)+2
4	t ₀ +7	t ₀ +9	TVprgm27	(0)+9
5	t ₀ +9	t ₀ +11	TVprgm27	(0)+9
6	t ₀ +11	t ₀ +12	none	n/a
7	t ₀ +12	t ₀ +14	TVprgm27	(0)+29
8	t ₀ +14	t ₀ +15	ad23	(0)
9	t ₀ +15	t ₀ +16	none	n/a
10	t ₀ +16	t ₀ +17	ad25	(0)+2
11	t ₀ +17	t ₀ +20	TVprgm28	(0)

570 Channel Data for TV C4			
row	start time	end time	content ID
1	C(0)	C(0)+31	TVprgm27
2	C(0)+31	C(0)+34	ad23
3	C(0)+34	C(0)+37	ad24
4	C(0)+37	C(0)+40	ad25
5	C(0)+40	C(0)+50	TVprgm28

590 Clean Play List with Deduced Actions				
row	log time	end log time	content ID and <deduced action>	content offset
1	t ₀	t ₀ +2	TVprgm27	(0)
2	t ₀ +2	t ₀ +5	<pause for 3 units>	n/a
3	t ₀ +5	t ₀ +7	TVprgm27	(0)+2
4	t ₀ +7	t ₀ +7	<skip frwd 5 units>	n/a
5	t ₀ +7	t ₀ +9	TVprgm27	(0)+9
6	t ₀ +9	t ₀ +9	<skip bckwrd 2 units>	n/a
7	t ₀ +9	t ₀ +11	TVprgm27	(0)+9
8	t ₀ +11	t ₀ +12	<fast frwd 18 units>	n/a
9	t ₀ +12	t ₀ +14	TVprgm27	(0)+29
10	t ₀ +14	t ₀ +15	ad23	(0)
11	t ₀ +15	t ₀ +16	<fast frwd 7 units>	n/a
12	t ₀ +16	t ₀ +17	ad25	(0)+2
13	t ₀ +17	t ₀ +20	TVprgm28	(0)

FIG. 5

EX1001, FIG. 5 (annotated).

260. In this example, “[e]ach content offset value represents a time offset from the beginning of a particular piece of content.” EX1001, 11:41-43. “For

example, row 8 of Play Stream 510 corresponds to a sample whose beginning is located 9 time units from the beginning of TV program 27, thus the content offset is referenced as (0)+9.” EX1001, 11:43-46. In other words, a *content offset* is determined in relation to the beginning time of reference content (as opposed to the consumed content). The *content offset* is characterized broadly, and may be determined relative to an “arbitrary start time value ‘C(0)’” or from the “absolute time” for a broadcast channel for example. EX1001, 10:10-19.

261. In Ramaswamy, the “matcher 216 compares the signature information associated with the media content presented via the media delivery device 202 to *signature information 220 stored in a local reference library 222.*” EX1006, ¶33. Thus, the signature information 220 corresponds to the reference content.

262. Ramaswamy describes that media source 206 may be a set-top box that receives a broadcast signal. EX1006, ¶29, FIG. 2. Library generator 230 generates signature information for the content received from set-top box 206, and this signature information is stored in reference library 222. EX1006, ¶¶34, 36, 50-52, FIG. 5. At least in this instance, time stamps in the signature information 220 stored in local reference library 222 that originate from library generator 230 would be the absolute time of the broadcast data. *See* EX1006, ¶¶36-38 (explaining that signature information generated by the library generators (e.g., library generators 230 and 232) includes time stamps; EX1006, ¶50 (“The time stamp is a

well-known technique for representing a time (e.g., *a current time*) at which an event occurs.”).

263. As the '896 patent recognizes, for some channels “(e.g. broadcasts, concerts, etc.), absolute time might be both available and useful.” EX1001, 10:15-17. In my opinion, a POSA would have, thus, understood that the claimed *content offset* would encompass at least using absolute times, as opposed to arbitrary reference times, for broadcast channels. A POSA would have further understood that the difference between the time stamp of an identified segment of the broadcast (e.g., a match included in a matcher collection) and the time stamp of the beginning of that broadcast corresponds to the claimed *content offset indicating a time position of a content identification result within identified content* for that particular identified segment. Further, the time stamp of an identified segment of the broadcast *indicat[es] a time position of a content identification result within identified content* because the time stamp for a piece of reference signature information 220 indicates the time at which that particular section of the recorded program was broadcasted. When considering the broadcast time for that particular piece of reference signature information 220 relative to the broadcast of the recorded program as a whole, the *time position* of that section (*content identification result*) within the content as a whole (*identified content*) is

determinable. The claim language does not require the *content offset* to be relative to any specific start time, such as zero. *See* EX1001, 10:10-19.

264. Thus, in my opinion, Ramaswamy renders obvious using *content offset data* in its media measurement method.

265. Therefore, in my opinion, a POSA would have understood that Ramaswamy teaches, or at least renders obvious, claim [1.4].

6. Element [1.5]

[1.5] wherein to utilize comprises, for a particular plurality of submitted data samples and corresponding content identification results, comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results

266. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

267. As disclosed in Ramaswamy, matcher 216 compares the time stamps of the signature information 217 stored in signature information buffer 218 with the time stamps of the signature information 220 in local reference library 222. EX1006, ¶38. If the time stamps are the same or similar, matcher 216 compares the signature information associated with the matching time stamps and outputs a matcher collection associated with media content presented via media delivery device 202 to time shift analyzer 246. EX1006, ¶¶38, 40.

268. Time shift analyzer 246 analyzes the data in the matcher collection for time shifted information. EX1006, ¶46. For example, time shift analyzer 246 may analyze a number of records of the matcher collection. EX1006, ¶46. Figure 4 of Ramaswamy depicts a collection of records, which is reproduced and annotated below:

400 ↘

404				
402	TIME STAMP	SIGNATURE	SOURCEID	406
	TS1	SIG1	ID1	
	TS2	SIG1	ID2	
	TS3	SIG3	ID3	

EX1006, FIG. 4 (annotated).

269. As shown in Figure 4, each record includes a time stamp, a signature, and a source ID. Time shift analyzer 246 checks whether the matcher collection includes at least two records with the same signature values. EX1006, ¶46. In the example shown in Figure 4, the first two records have the same signature (i.e., SIG1). Time shift analyzer 246 then checks whether these records have different time stamps. EX1006, ¶46. In the example shown in Figure 4, the first two records

have two different time stamps (i.e., TS1 and TS2), which means that the same media content was played back at different times. Thus, time shift analyzer 246 determines that these two records are associated with time-shifted consumption. EX1006, ¶46. Based on this determination, time shift analyzer 246 generates a time shift analysis data structure, which is shown in Figure 9 of Ramaswamy (reproduced below):

900 ↘

```
902:  Struct {
904:      bool      TimeShift;
906:      if(TimeShift) {
908:          SourceID  TimeShiftSource;
910:          Time      TimeShiftSourceTime;
912:      }
914:      SourceID  TuningSource;
916:      Time      TuningTime;
918:  }
```

EX1006, FIG. 9.

270. “Alternatively, a time shift analysis data structure containing data that is time shifted may be represented as shown below”:

```
{  
  TimeShift = true;  
  TimeShiftSource = ID1;  
  TimeShiftTime = TS1;  
  TuningSource = ID2;  
  TuningTime = TS2;  
}
```

EX1006, ¶65.

271. In response to determining that matcher collection has been time shifted, time shift analyzer 246 sets a time shift flag (e.g., TimeShift) to indicate that the time shift analysis data structure contains time shifted information.

EX1006, ¶62. Time shift analyzer 246 also sets a time shift source variable (i.e., TimeShiftSource) (which indicates the source at which the content was downloaded, stored, and/or recorded), and a time shift time variable (i.e., TimeShiftSourceTime/TimeShfitTime) (which indicates the time at which the content was downloaded, stored, and/or recorded). EX1006, ¶¶62, 66. Time shift analyzer 246 also sets a tuning source variable (i.e., TuningSource) (which indicates the source (e.g., a television) via which the content was played back) and a tuning time variable (i.e., TuningTime) (which indicates the time the content is played back). EX1006, ¶¶62, 66.

272. Accordingly, Ramaswamy recognizes, in time-shifted content, the time stamp in reference signature information 220 and the time stamp in consumed

signature information 217 will be different. EX1006, ¶46; *see also* EX1006, ¶56 (stating that time stamps associated with identical (or substantially identical) signatures may be different). Ramaswamy, thus, teaches comparing the two time stamps (from reference signature information 220 and consumed signature information 217) in order to detect a difference, and, thus, time shifted content. In particular, time shift analyzer 246 analyzes the data in a matcher collection for time-shifted information. EX1006, ¶¶46, 61-66, FIG. 3 (block 308), FIGs. 8, 9.

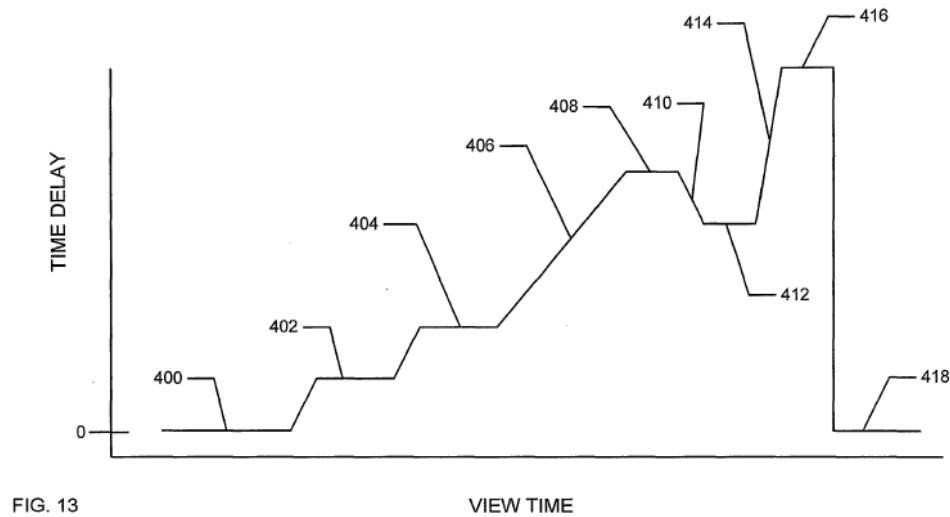
273. As discussed above for element [1.1], signature information 217 corresponds to the *submitted data samples*. As Ramaswamy recognizes, the “time stamp is a well-known technique for representing a time (e.g., a current time) at which an event occurs.” EX1006, ¶50. Thus, in my opinion, a POSA would have recognized that the time stamps in the consumed signature information 217 correspond to the claimed *log times associated with capture timing of each of the particular plurality of submitted data samples*. As discussed above for element [1.4], the claimed *content offsets of the corresponding content identification results* are determined based on the time stamps in the reference signature information 220. In Ramaswamy’s stream of matcher collections discussed with respect to element [1.1], it would have been obvious to a POSA, in my opinion, that a *progression* of such comparisons will be made because a single comparison would not be useful in the context of Ramaswamy’s system. In other words, it was well

known in the art that the way to detect time-shift behavior was by examining the timing of content being played back, requiring analysis of multiple samples in order to identify the time-shifted portions of content.

274. Accordingly, because Ramaswamy teaches comparing time stamps of consumed signature information 217 (*log times*) and time stamps in the reference signature information 220 (which correlate to *content offsets*), it would have been obvious to compare the *log times* to the *content offsets* as recited in element [1.5]. The difference is merely comparing the collected data in a slightly different way. As the '896 patent recognizes, “the particular organization, division, and content of the data may vary considerably . . . without departing from the spirit and scope of the present invention.” EX1001, 10:51-58. To the extent not expressly disclosed by Ramaswamy, a POSA would know that comparing time stamps (*e.g.* to confirm that content was or was not being viewed at the same rate at which it was originally recorded) would be a simple way to detect “trick play” behavior such as fast-forward or rewind. As explained in the Technology Background section (*i.e.*, Section V) of this Declaration, this was well understood in the art.

275. To the extent Patent Owner argues that element [1.5] is not met by Ramaswamy alone, it is my opinion that Ramaswamy in combination with Conklin renders obvious element [1.5].

276. Conklin’s Figure 13 is reproduced below.



EX1010, FIG. 13.

277. In Figure 13, the “horizontal axis represents the view time or playback time” associated with the event records. EX1010, ¶71. The playback time “is preferably a current local time” associated with an event record. EX1010, ¶33; EX1010, ¶36 (“time stamp generator 52 . . . generate[s] a time stamp including current local date information and time of day information”). Similarly, the ’896 patent describes that “in many instances, a log time will in fact indicate the actual time the sample started to be captured.” EX1001, 9:40-45. Thus, a POSA would have understood Conklin’s view/playback times to correspond to the claimed *a progression of log times associated with capture timing of each of the particular plurality of submitted data samples*.

278. Also in Figure 13, the “vertical axis represents the delay time (i.e., the difference between the playback or viewing time and the record time).” EX1010,

¶71. The record time is the time at which a segment of content was recorded.

EX1010, ¶¶46, 70; EX1010, ¶44 (Table 4). The record time, thus, corresponds to the broadcast time of the content. A POSA would have understood that the claimed *content offsets of the corresponding content identification results* are a function of Conklin's record time. In my opinion, it would have been obvious, knowing the start time of the full program and the broadcast/record time of the identified segment of content, to determine the *content offset* for the identified segment of content, e.g., the amount of time the segment is located from the beginning of the full program. This is consistent with how the '896 patent describes a "content offset," with respect to Figure 5. In my opinion, a POSA, thus, would have understood Conklin's record times to render obvious the claimed *a progression of content offsets of the corresponding content identification results*.

279. Conklin further teaches relating the playback time (*log times associated with capture timing of each of the particular plurality of submitted data samples*) to the record time (of which the *content offsets of the corresponding content identification results* are a function) in order to *deduce play altering actions* (element [1.2]). EX1010, ¶¶71-76, FIGs. 9-13. In particular, Conklin's Figure 13 is "a graph of an example viewing behavior" associated with a DVR. EX1010, ¶75. The graph "may be generated based on a sequence of events record." EX1010, ¶75. Conklin teaches that the viewing behavior can be interpreted based

on the relationship between the view time and delay time. EX1010, ¶¶71-76, FIGs. 9-13. For example, in region 406 of Figure 13, the slope equals one, indicating the DVR is paused, and in region 410, the slope is negative, indicating a fast forward operation. EX1010, ¶76, FIG. 13; EX1010, ¶¶73, 74, FIGs. 11, 12. In this way, Conklin teaches *comparing a progression of log times and a progression of content offsets*.

280. Therefore, in my opinion, a POSA would have understood that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, claim [1.5].

7. Element [1.6]

281. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

282. Ramaswamy teaches “send[ing] a collection of consumption records (i.e., a *consumption report*, viewing records, etc.) to a central processing facility [124].” EX1006, ¶41. I note that the ’896 patent’s discussion of *media measurement report* is limited. See EX1001, 6:35-37 (“Results of the media measurement analysis can be obtained via report generator 130”). In my opinion, a POSA would have understood Ramaswamy’s consumption report to teach the claimed *media measurement report*.

C. Dependent Claim 2

[2] *generating a play list including content offset data as part of deducing media play-altering actions of a monitored audience member.*

283. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element.

284. The '896 patent broadly characterizes a play list, indicating that “the particular organization, division, and content of the data may vary considerably from that illustrated in” Figures 4 and 5. EX1001, 10:51-58.

285. Conklin’s event record generator 56 maintains a sequence of events record (*play list*) such as that in Table 4. EX1010, ¶45.

TABLE 4

Storage location (LBA)	Event Record Generated (date, time of day, source)	Playback Time (Read Time)
11EF240H	7/30/02 16:05:31 011	7/30/02 16:30:00
11EF340H	7/30/02 16:05:32 011	7/30/02 16:30:01

EX1010, ¶44 (Table 4).

286. Each event record in the sequence of events record (*play list*) includes at least source information, recording time information, and playback time information. EX1010, ¶¶42-46, 70. As discussed for element [1.5], the claimed *content offsets* are a function of Conklin’s record time, and render obvious using the *content offsets* in the sequence of events analysis. It is my opinion that it would

further have been obvious to include *content offset data* in the sequence of events record (*play list*) in place of or in addition to the record time information. This sequence of events record is analyzed to determine viewing behavior associated with the DVR 304 (*deducing media play-altering actions of a monitored audience member*). EX1010, ¶¶70-76, FIGs. 9-13.

287. Therefore, in my opinion, a POSA would have understood that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, claim [2].

D. Dependent Claim 3

[3] <i>utilizing sample sequence data together with corresponding channel data to deduce play-altering actions of a monitored audience member.</i>
--

288. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

289. As I discussed above for element [1.3], a POSA, in my opinion, would have understood Ramaswamy's collection of associated signature information included in the stream of matcher collections includes *sample sequence data* (e.g., at least, a signature, a source identifier, time stamp(s) of reference signature information 220, and the time stamp of consumed signature information 217). EX1006, ¶33. Ramaswamy further teaches using *channel data* to efficiently identify time-shifted content. *See* EX1006, ¶60. For example, not only

does signature information generator 208 generate a signature for each program, but it also may generate a signature for a channel on which the program is broadcasted. EX1006, ¶33. If the “initial delivery of the media content corresponds to a *broadcast channel having a known lineup*, then the signature information associated with the download may be compared to the lineup to identify the television programming contained in the media content in an efficient manner.” EX1006, ¶60. The identified programming content can then be “credited with having been consumed at the times indicated by the signatures captured in connection with the playback of the programming, i.e., the signatures associated with the subsequent display of the media content.” EX1006, ¶60. In this manner, “behaviors and characteristics” associated with “time-shifted media consumption” can be “accurately and efficiently captured and analyzed.” EX1006, ¶60.

290. Therefore, in my opinion, a POSA would have understood that Ramaswamy teaches, or at least renders obvious, claim [3].

E. Dependent Claim 4

[4] <i>wherein a clean play list is generated including deduced play-altering actions.</i>
--

291. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

292. The '896 patent broadly characterizes a clean play list, indicating that “the particular organization, division, and content of the data may vary considerably from that illustrated in” Figures 4 and 5. EX1001, 10:51-58.

293. Ramaswamy teaches that a “collection of consumption records (i.e., a consumption report, viewing records, etc.)” may be sent to a central processing facility. EX1006, ¶41. These consumption reports include consumption records of viewed content (*a clean play list*), created by time shift analyzer 246 based on the analysis of the matcher collection. EX1006, ¶46. An example of a time shift analysis data structure that identifies time-shifted content data is represented as below. EX1006, ¶65.

```
{  
  TimeShift = true;  
  TimeShiftSource = ID1;  
  TimeShiftTime = TS1;  
  TuningSource = ID2;  
  TuningTime = TS2;  
}
```

EX1006, ¶65.

294. The variable TimeShift = true” indicates that the content has been time-shifted (*includ[es] deduced play-altering actions*). EX1006, ¶62.

295. Therefore, in my opinion, a POSA would have understood that Ramaswamy teaches, or at least renders obvious, claim [4].

F. Dependent Claim 7

[7] wherein utilizing further comprises determining if one or more discontinuities exist in the progression of content offsets.

296. In my opinion, that Conklin teaches, or at least renders obvious, this element.

297. The '896 patent describes *discontinuities*, with reference to Figure 5. See EX1001, 11:49-12:10.

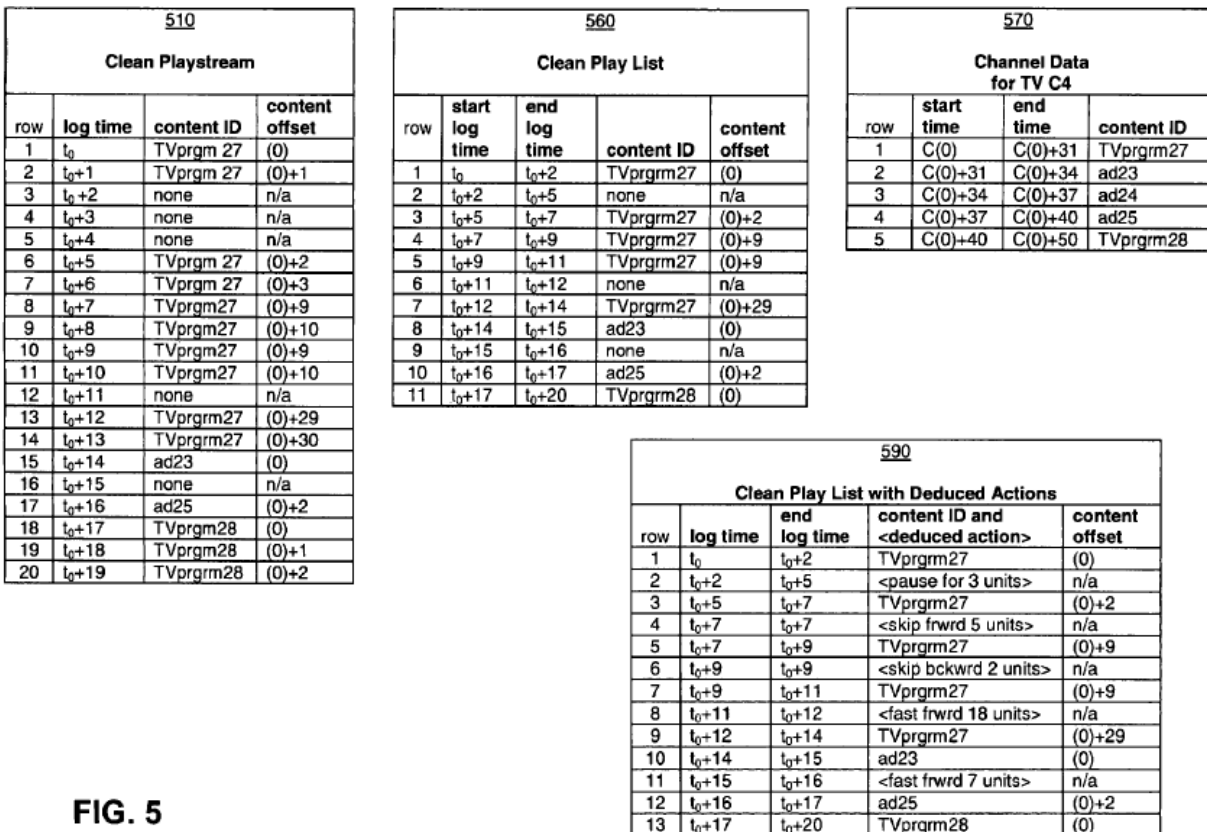
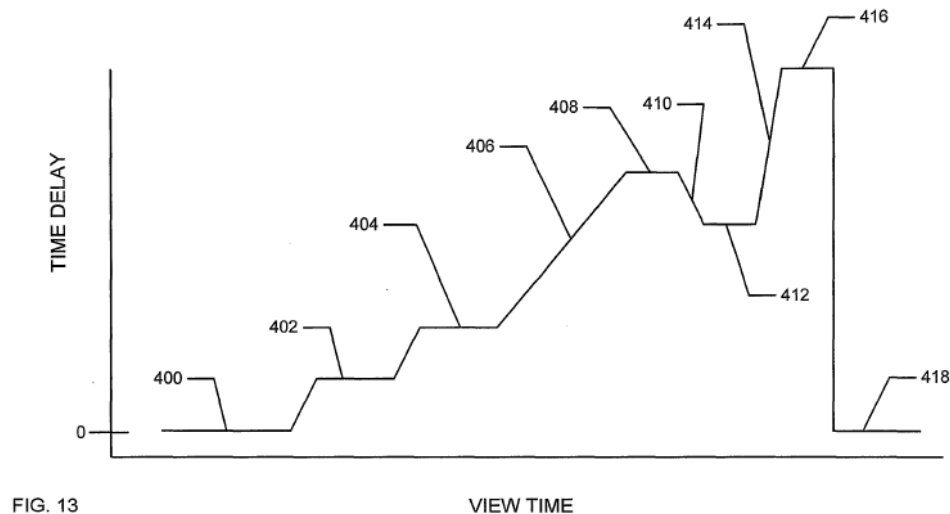


FIG. 5

EX1001, FIG. 5.

In my opinion, a POSA would have understood from this disclosure that a *discontinuity* may identify non-continuous values in the progression of content offsets.

298. Conklin's Figure 13 is reproduced below.



EX1010, FIG. 13.

299. As discussed for element [1.5] in Section X.B.6, the “vertical axis [of Figure 13] represents the delay time (i.e., the difference between the playback or viewing time and the record time),” EX1010, ¶71, and, in my opinion, a POSA would have understood that the claimed *content offsets* are a function of Conklin's record time. Section X.B.6. It is further my opinion that a POSA would have understood that the transition point between each identified region of Figure 13 (i.e., regions 400, 402, 404, 406, etc.) would correspond to a *discontinuity* as described in the '896 patent. For example, between first region 400 and second

region 402, “a time shift occurs, indicating . . . a ‘go back’ command . . . causing the DVR to rewind and then resume delayed playback.” EX1010, ¶76. At the transition from fourth region 406 to fifth region 408, the DVR transitions from a paused state to resuming playback. EX1010, ¶76. Finally, at the transition from eighth region 414 to ninth region 416, the DVR transitions from rewinding to resuming playback. EX1010, ¶76. I note that these are similar to the examples of discontinuities illustrated in Figure 5 of the ’896 patent, such as, for example, the pause event indicated by the progression of content offsets from rows 2 to 5 of playstream 510, the fast forward/skip ahead event indicated by the progression of content offsets between rows 7 and 8, or the rewind/skip back event indicated by the progression of content offsets between rows 9 and 10. EX1001, FIG. 5

G. Dependent Claim 8

[8] *wherein the content offset data is derived from a comparison conducted by a computerized content identification system comparing the submitted data samples against known content such that content offset data is obtainable without using time codes accompanying the captured video data samples.*

300. In my opinion, Ramaswamy teaches, or at least renders obvious, this element.

301. As I discussed above for element [1.1], in Ramaswamy, consumed signature information 217 (*submitted data samples*) is compared to reference

signature information 220 (*known content*) stored in a local reference library 222.

See Section X.A.2; EX1006, ¶¶24, 32-34, 55. As further discussed above for element [1.4], the *content offset data* of Ramaswamy is determined based on the reference signature information 220 (*known content*). *See* Section X.A.5. Thus, Ramaswamy teaches obtaining the content offset data *without using time codes* (time stamps) *accompanying the captured video data samples* (consumed signature information 217).

302. Therefore, in my opinion, a POSA would have understood that Ramaswamy teaches, or at least renders obvious, claim [8].

H. Independent Claim 9

1. Preamble [9.P]

[9.P] <i>A media measurement method comprising:</i>

303. To any extent that the preamble is limiting, it is my opinion that Ramaswamy teaches, or at least renders obvious, this element for at least the reasons set forth above for claim element [1.P]. *See* Section X.B.1.

2. Element [9.1]

[9.1] using one or more computers to generate a play stream of content identification results corresponding to a sequence of submitted data samples, the submitted data samples corresponding to video data samples captured at a monitoring device associated with a monitored audience member

304. Element [9.1] corresponds to element [1.1]. It is my opinion that Ramaswamy teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.1]. *See* Section X.B.2.

3. Element [9.2]

[9.2] using one or more computers to utilize sample sequence data and content offset data to deduce play-altering actions of the monitored audience member

305. Element [9.2] corresponds to element [1.2]. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.2]. *See* Section X.B.3

4. Element [9.3]

[9.3] the sample sequence data corresponding to a sequence of the content identification results

306. Element [9.3] corresponds to element [1.3]. It is my opinion that Ramaswamy teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.3]. *See* Section X.B.4.

5. Element [9.4]

[9.4] *wherein play-altering actions include actions that alter at least one of a pace and a sequence of a media stream*

307. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element. As discussed above for element [1.2], Conklin's method teaches the same activities identified in the '896 patent as examples of *play-altering actions*, e.g., pause, rewind, fast forward, and skipping. See Section XI.B.1; EX1010, ¶¶73-76, FIGs. 11-13; EX1001, 11:14-23. In my opinion, a POSA would have also understood that at least rewinding and fast forwarding *alter . . . a pace . . . of a media stream* and that at least skipping (forward or backward) *alter[s] . . . a sequence of a media stream* as recited. See also EX1010, FIG. 13 (illustrating pace and sequence).

308. Therefore, in my opinion, a POSA would have understood that Ramaswamy and Conklin teaches, or at least renders obvious, claim element [9.4].

6. Element [9.5]

[9.5] *the content offset data including content offsets associated with the content identification results, a content offset indicating a time position of a content identification result within identified content*

309. Element [9.5] corresponds to element [1.4]. It is my opinion that Ramaswamy teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.4]. *See* Section X.B.5.

7. Element [9.6]

[9.6] wherein to utilize comprises, for a particular plurality of submitted data samples and corresponding content identification results, comparing a progression of log times associated with capture timing of each of the particular plurality of submitted data samples and a progression of content offsets of the corresponding content identification results

310. Element [9.6] corresponds to element [1.5]. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.5]. *See* Section X.B.6.

8. Element [9.7]

[9.6] using one or more computers to utilize deduced play altering actions of the monitored audience member to generate a media measurement report.

311. Element [9.7] corresponds to element [1.6]. It is my opinion that Ramaswamy teaches, or at least renders obvious, this element for at least the reasons set forth above for element [1.6]. *See* Section X.B.7.

I. Dependent Claim 10

[10] *wherein play-altering actions include at least one of fast forwarding, rewinding, and pausing a media stream.*

312. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element.

313. As discussed above for elements [1.2] and [9.4], Conklin's method identifies *pause* and *rewind* operations, *fast forward* operations, and skipping (e.g., a "go back" command"). EX1010, ¶¶73-76, FIGs. 11-13; *see* Sections XI.B.1, XI.C.4. As also discussed above, it is my opinion that a POSA would have been motivated to implement Conklin's additional analysis functionality in Ramaswamy's method in order to provide the enhanced media consumption monitoring capabilities discussed in Conklin. *See* Section X.A

314. Therefore, in my opinion, a POSA would have understood that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, claim [10].

J. Dependent Claim 11

[11] *wherein play-altering actions include at least one of skipping forward and skipping backward in a media stream.*

315. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element.

316. As discussed above for elements [1.2] and [9.4], Conklin’s method identifies *pause* and *rewind* operations, *fast forward* operations, and skipping (e.g., a “‘go back’ command”). EX1010, ¶¶73-76, FIGs. 11-13; *see* Sections X.B.3, X.H.5. As also discussed above, it is my opinion that a POSA would have been motivated to implement Conklin’s additional analysis functionality in Ramaswamy’s method in order to provide the enhanced media consumption monitoring capabilities discussed in Conklin. *See* Section X.A

317. Therefore, in my opinion, a POSA would have understood that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, claim [11].

K. Dependent Claim 12

[12] <i>wherein at least one of a play list and a play stream is generated, by one or more computers, including content offset data as part of deducing media play-altering actions of a monitored audience member.</i>
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318. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element.

319. As I discussed above for claim 2, Conklin teaches a *play list generated including content offset data as part of deducing media play-altering actions of a monitored audience member*. Section X.C.

320. Further, the ’896 patent teaches that its process 300 can be applied in the same way to a “play stream” input and a “play list” input, making no real

distinction between the two. EX1001, 6:30-35, 8:42-9:16. Referring to Figure 5, the apparent difference is a combination of rows of data having the same content ID. EX1001, FIG. 5 (compare 510 with 560). But the '896 patent also makes clear that “the particular organization, division, and content of the data may vary considerably from that illustrated in” Figures 4 and 5. EX1001, 10:51-60.

321. Thus, Conklin’s sequence of events record (see discussion for claim 2) renders obvious either a play stream or a play list, as recited in claims 2, 12 and 13.

322. Therefore, in my opinion, a POSA would have understood that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, claim 12.

L. Dependent Claim 13

[13] <i>wherein the at least one of a play stream and play list including content offset data comprises the play stream of content identification results.</i>

323. It is my opinion that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, this element.

324. As I discussed for claim 12, Conklin similarly teaches a *play stream including content offset data*. Section X.K.

325. Therefore, in my opinion, a POSA would have understood that the combination of Ramaswamy and Conklin teaches, or at least renders obvious, claim 13.

XI. CLAIMS 2, 7, 12, and 13 OF THE '896 PATENT ARE UNPATENTABLE UNDER 35 U.S.C. § 103 OVER FEININGER AND CONKLIN

326. It is my opinion that a POSA would have found claims 2, 7, 12 and 13 of the '896 patent obvious in light of the disclosure from Feininger and Conklin.

A. A POSA would have combined Feininger and Conklin.

327. In my opinion, a POSA would have been motivated to combine Feininger and Conklin for multiple reasons.

328. Both Feininger and Conklin relate to monitoring media consumption, and in particular relate to solving the problem of monitoring consumption when the media is viewed in a time shifted manner. EX1005, 1:14-17; EX1010, ¶6. Feininger teaches detecting “portions of a recorded program that were not played back in real time (e.g., that were skipped, fast forwarded, paused, and/or rewound).” EX1005, 4:4-7. Like Feininger, Conklin teaches identifying time shifted media consumption activities, including pause and rewind operations, fast forward operations, and skipping. EX1010, ¶¶72-76, FIGs. 10-13.

329. Both rely on comparing a progression of log entries/event records in identifying time-shifted media consumption. EX1005, 18:1-19:9; EX1010, ¶¶44

(Table 4), 72-76. In my opinion, a POSA would have been motivated to implement details of Conklin's analysis functionality in Feininger's method because it would simply have been the use of a known technique (Conklin's sequence of events analysis) to improve a similar method (Feininger's method of detecting time-shifted content) in the same way.

330. In my opinion, a POSA further would have had a reasonable expectation of success in combining these references because they both relate to processing data collected from media viewing records. Both Feininger and Conklin teach that data can be stored in well-known data structure formats and then analyzed. *See, e.g.*, EX1005, 4:49-5:27, 18:1-19:9; EX1010, ¶¶31, 44, 46, 53. In my opinion, various database processing techniques would have been well known to a POSA, and using and combining these techniques would have been well within the level of ordinary skill.

B. Dependent Claim 2

[2] <i>generating a play list including content offset data as part of deducing media play-altering actions of a monitored audience member</i>

331. It is my opinion that the combination of Feininger and Conklin teaches, or at least renders obvious, this element. As discussed above, Conklin teaches, or at least renders obvious, the elements of claim 2. *See* Section X.C.

332. Therefore, in my opinion, a POSA would have understood that the combination of Feininger and Conklin teaches, or at least renders obvious, claim [2].

C. Dependent Claim 7

[7] *wherein utilizing further comprises determining if one or more discontinuities exist in the progression of content offsets.*

333. It is my opinion that the combination of Feininger and Conklin teaches, or at least renders obvious, this element. As discussed above, Conklin teaches, or at least renders obvious, the elements of claim 7. *See* Section X.F.

334. Therefore, in my opinion, a POSA would have understood that the combination of Feininger and Conklin teaches, or at least renders obvious, claim [7].

D. Dependent Claim 12

[12] *wherein at least one of a play list and a play stream is generated, by one or more computers, including content offset data as part of deducing media play-altering actions of a monitored audience member.*

335. It is my opinion that the combination of Feininger and Conklin teaches, or at least renders obvious, this element. As discussed above, Conklin teaches, or at least renders obvious, the elements of claim 12. *See* Section X.K.

336. Therefore, in my opinion, a POSA would have understood that the combination of Feininger and Conklin teaches, or at least renders obvious, claim 12.

E. Dependent Claim 13

[13] <i>wherein the at least one of a play stream and play list including content offset data comprises the play stream of content identification results.</i>

337. It is my opinion that the combination of Feininger and Conklin teaches, or at least renders obvious, this element. As discussed above, Conklin teaches, or at least renders obvious, the elements of claim 13. *See* Section X.L.

338. Therefore, in my opinion, a POSA would have understood that the combination of Feininger and Conklin teaches, or at least renders obvious, claim 13.

XII. CONCLUSION

339. In signing this declaration, I recognize that the declaration will be filed as evidence in an *inter partes* review before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required, I will appear for cross-examination within the United States during the time allotted.

340. I hereby declare that all statements made herein of 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.

Executed on this 12th day of July, 2024, in Mobile, AL.



Samuel H. Russ, Ph.D.