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 IPR2024-01055
U.S. Patent No. 8,756,622

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,756,622

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1001	U.S. Patent No. 8,756,622 to Steuer et al. ("the '622 patent")
1002	Prosecution File History of U.S. Patent No. 8,756,622 ("Prosecution History")
1003	Declaration of Dr. Russ in Support of Petition for *Inter Partes* Review of U.S. Patent No. 8,756,622 ("Russ Dec.")
1004	*Curriculum Vitae* of Samuel H. Russ
1005	U.S. Publication No. 2007/0143777 to Wang ("Wang777")
1006	U.S. Publication No. 2002/0083060 to Wang ("Wang060")
1007	U.S. Provisional Application No. 60/545,879 to Wang ("'879 Appl.")
1008	International Application No. PCT/US05/05254 to Wang ("Wang254")
1009	U.S. Provisional Application No. 60/574,836 ("'836 Appl.")
1010	U.S. Application No. 11/139,330 ("'330 Appl.")
1011	U.S. Publication No. 2004/0260682 to Herley et al. ("Herley682")
1012	U.S. Patent Application No. 2005/0193016 to Seet et al. ("Seet")
1013	U.S. Publication No. 2002/0116195 Pitman et al. ("Pitman")
1014	U.S. Publication No. 2003/0018709 to Schrempp et al. ("Schrempp")
1015	U.S. Publication No. 2003/0086341 to Wells et al. ("Wells")
1016	U.S. Provisional Application No. 60/545,681, filed February 17, 2004 ("Seet provisional")
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, pp. 999-1013, November 2001. ("Myrtveit")
1018	Mong Li Lee, W. Hsu and Vijay Kothari, "Cleaning the spurious links in data," in IEEE Intelligent Systems, vol. 19, no. 2, pp. 28-33, March-April 2004. ("Lee")

Exhibit No.	Description
1019	Kamakshi Lakshminarayan, Steven A. Harp, Tariq Samid, "Imputation of Missing Data in Industrial Databases," Applied Intelligence 11, 259-275, (1999) ("Lakshminarayan")
1020	Eloi Batlle, Jame Masip, Enric Guaus, "Automatic Song Identification in Noisy Broadcast Audio," Audiovisual Institute and Department of Technology, Barcelona, Spain, (2002). ("Batlle")
1021	Interim Procedure for Discretionary Denials in AIA Post-Grant Proceeding with Parallel District Court Proceedings Memorandum, June 21, 2022.
1022	U.S. Patent No. 5,581,658 to O'Hagen et al. ("O'Hagan")
1023	Hernandez et al., "Real-world Data is Dirty: Data Cleansing and the Merge/Purge Problem," Klumer Academic Publishers, 1998

I. INTRODUCTION

Roku, Inc. ("Roku" or "Petitioner") petitions for *inter partes* review, seeking cancellation of claims 1-13 of U.S. Patent No 8,756,622 ("'622 patent"; EX1001), assigned to Anonymous Media Research Holdings LLC ("Anonymous Media Research" or "Patent Owner").

II. IDENTIFICATION OF THE CHALLENGE (37 C.F.R. §42.104(B))

The '622 patent was filed on September 11, 2008, is a division of U.S. Application No. 11/139,330, filed on May 26, 2005 (now abandoned), and claims priority to U.S. Provisional Application No. 60/574,836, filed May 27, 2004. For the reasons explained below, the earliest effective priority date of the '622 patent is May 26, 2005 because the '622 patent is not entitled to priority to the '836 Application. *See infra* Section IV.D.

U.S. Publication No. 2007/0143777 ("Wang777"; EX1005) was published on June 21, 2007, was filed on October 31, 2006, is a National State Entry of PCT/US05/05254, filed on February 18, 2005 (published in English and designating the U.S.), and claims priority to U.S. Provisional Application No. 60/545,879, filed February 19, 2004. **Wang777** is therefore prior art under 35 U.S.C. § 102(e) (pre-AIA) as of February 18, 2005 because the '622 patent's earliest effective priority date is May 26, 2005, *see infra* Section IV.D, and as of February 19, 2004 (*see infra* Section VI.A.1).

U.S. Publication No. 20020083060 ("Wang060"; EX1006) was published on June 27, 2002. **Wang060** is therefore prior art under 35 U.S.C. § 102(b) (pre-AIA).

U.S. Publication No. 2004/0260682 ("Herley682"; EX1011) was published on December 23, 2004, and filed on June 19, 2003. **Herley682** is therefore prior art under 35 U.S.C. § 102(a) (pre-AIA) as of December 23, 2004 because the '622 patent's earliest effective priority date is May 26, 2005 (*see infra* Section IV.D) and § 102(e) (pre-AIA) regardless of the '622 patent's priority date.

U.S. Publication No. 2005/0193016 ("Seet"; EX1012) published on September 1, 2005, was filed on February 17, 2005, and claims priority to provisional application No. 60/545,681 ("the '681 application") filed on February 17, 2004. Seet is therefore prior art under 35 U.S.C. § 102(e) (pre-AIA) as of February 17, 2004 because it is entitled to its provisional filing date for prior art purposes (see infra Section VI.B.1). Alternatively, Seet is prior art under 35 U.S.C. § 102(e) (pre-AIA) as of February 17, 2005 because the '768 patent's earliest effective filing date is May 26, 2005 (see infra Section IV.D).

U.S. Publication No. 2002/0116195 ("Pitman"; EX1013) was published on August 22, 2002. **Pitman** is therefore prior art under 35 U.S.C. § 102(b) (pre-AIA).

U.S. Publication No. 2003/0018709 ("Schrempp"; EX1014) was published

on January 23, 2003. **Schrempp** is therefore prior art under 35 U.S.C. § 102(b) (pre-AIA) because the '622 patent's earliest effective priority date is May 26, 2005 (*see infra* Section IV.D) and § 102(a) (pre-AIA) regardless of the '622 patent's priority date.

U.S. Publication No. 2003/0086341 ("Wells"; EX1015) was published on May 8, 2003. **Wells** is therefore prior art under 35 U.S.C. § 102(b) (pre-AIA).

Roku requests IPR based on the grounds summarized below.

Ground	35 U.S.C. Section	Claims	References
1	§ 103(a)	1, 5-6, 9-10, 13	Wang777, Wang060
2	§ 103(a)	2-4, 7-8, 11-12	Wang777, Wang060, Herley682, Seet
3	§ 103(a)	1-13	Pitman, Schrempp, Wells

III. LEVEL OF ORDINARY SKILL IN ART

A person of ordinary skill in the art ("POSA") at the time the '622 patent was filed 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. EX1003, ¶31.

IV. OVERVIEW OF THE '622 PATENT

A. Summary

The '622 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, 1:60-64. In particular, the '622 patent purports to "analyze sequence data" to "establish channel identification." EX1001, 2:3-5; EX1003, ¶50.

Figure 1 illustrates such a media usage monitoring and measurement system 1000 that includes a media measurement system 100 and monitoring devices 101. EX1001, 2:66-3:3, FIG. 1; EX1003, ¶51.

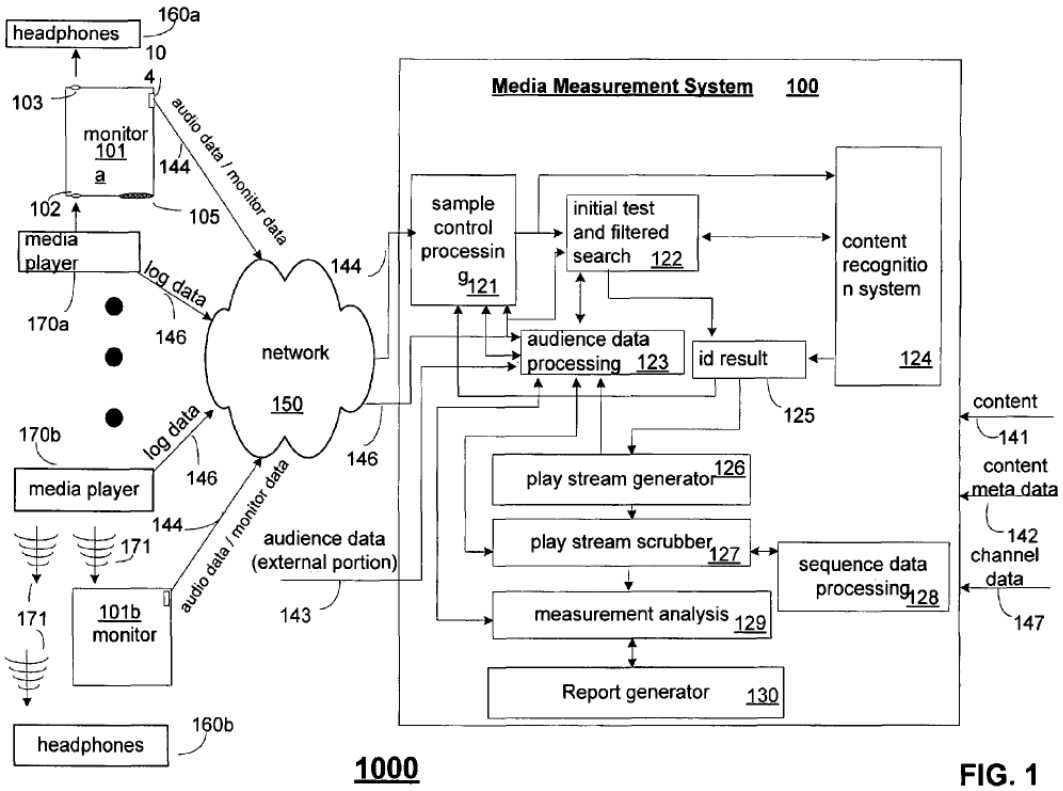


FIG. 1

EX1001, FIG. 1.

Figure 2 illustrates a media measurement method 200 carried out by system 100 of Figure 1. EX1001, 6:58-62, FIG. 2. At step 201, system 100 receives audio data from monitoring device 101 and caches a series of samples for content identification. EX1001, 6:62-65. This audio data is uploaded to the system 100 by monitoring device 101*a*, which includes a microphone 105 and a media player port 102 to capture audio energy from media player 170*a*. EX1001, 3:4-43, FIG. 2; EX1003, ¶52.

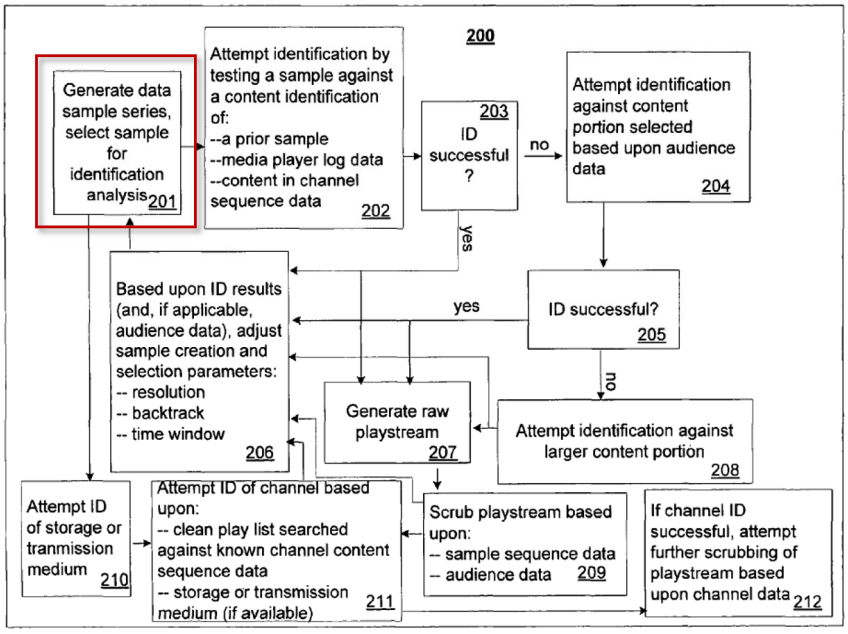


FIG. 2

EX1001, FIG. 2 (annotated).

The initial test and filtered search module 122 attempts to identify a sample via initial test methods (step 202). EX1001, 4:63-5:28, 7:17-24, FIG. 2; EX1003,

¶53.

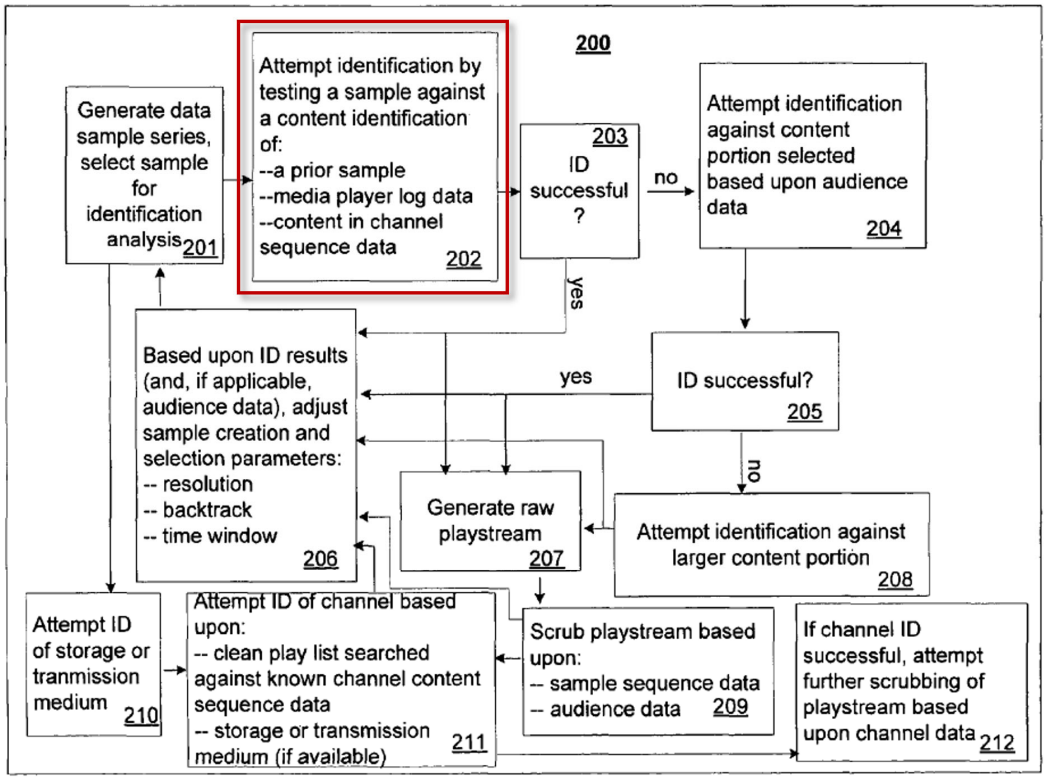


FIG. 2

EX1001, FIG. 2 (annotated).

If the sample is identified, the result is provided to play stream generator 126 (step 207). EX1001, 7:30-31. If not, then the initial test and filtered search module 122 may search (step 204) for a match against targeted content (e.g., audience data). EX1001, 7:24-27, FIG. 2; EX1003, ¶54.

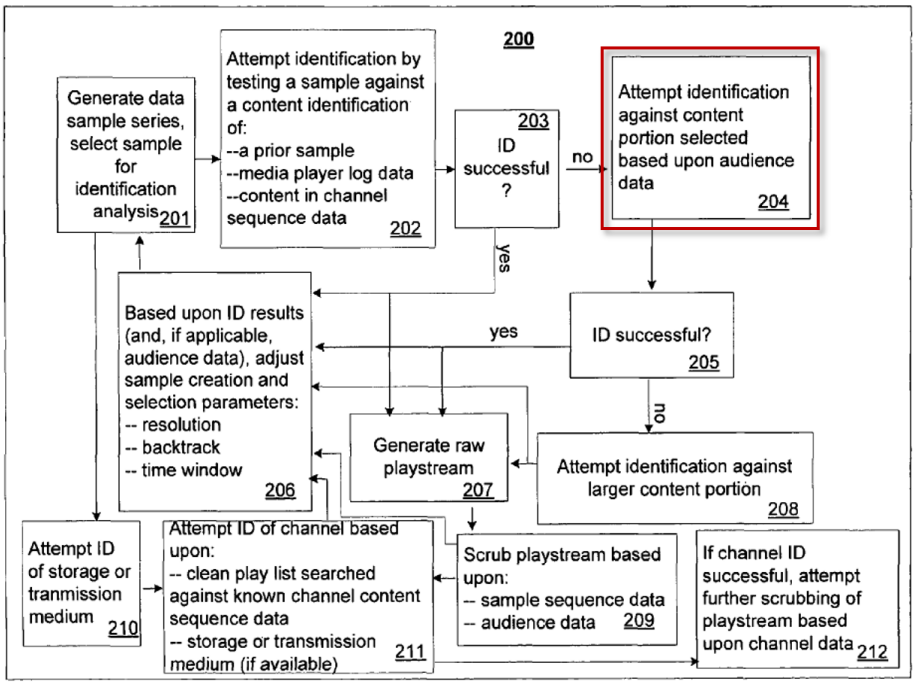


FIG. 2

EX1001, FIG. 2 (annotated).

If the sample is not identified, the system performs a search using a larger portion of its content at step 208. EX1001, 5:33-35, 7:31-35, FIG. 2; EX1003, ¶55.

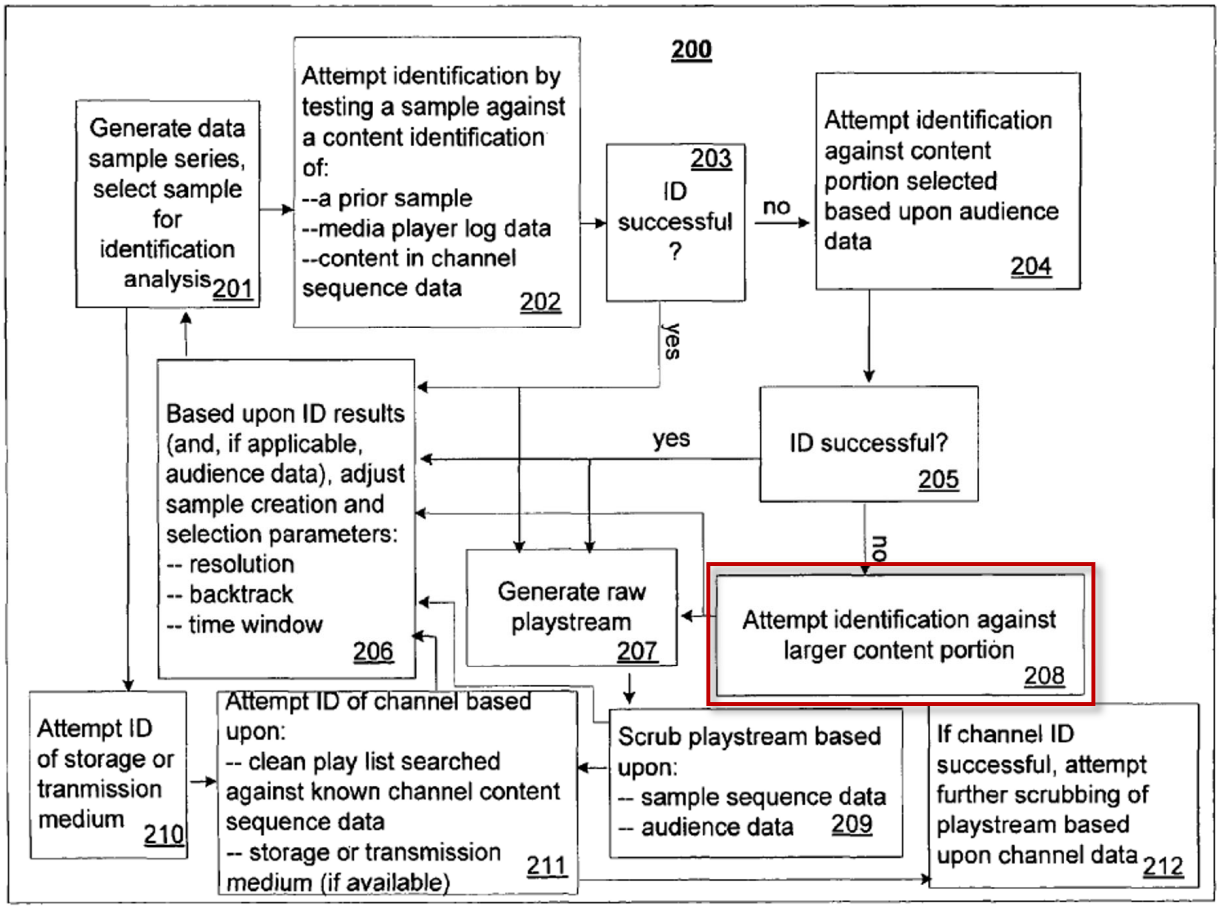


FIG. 2

EX1001, FIG. 2 (annotated).

The '622 patent, however, 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." EX1001, 5:38-62; EX1003, ¶56.

A raw play stream is generated by play stream generator 126, indicating a series of samples and corresponding identification results (step 207). EX1001, 5: 31-33, 7:57-60, FIG. 2; EX1003, ¶57.

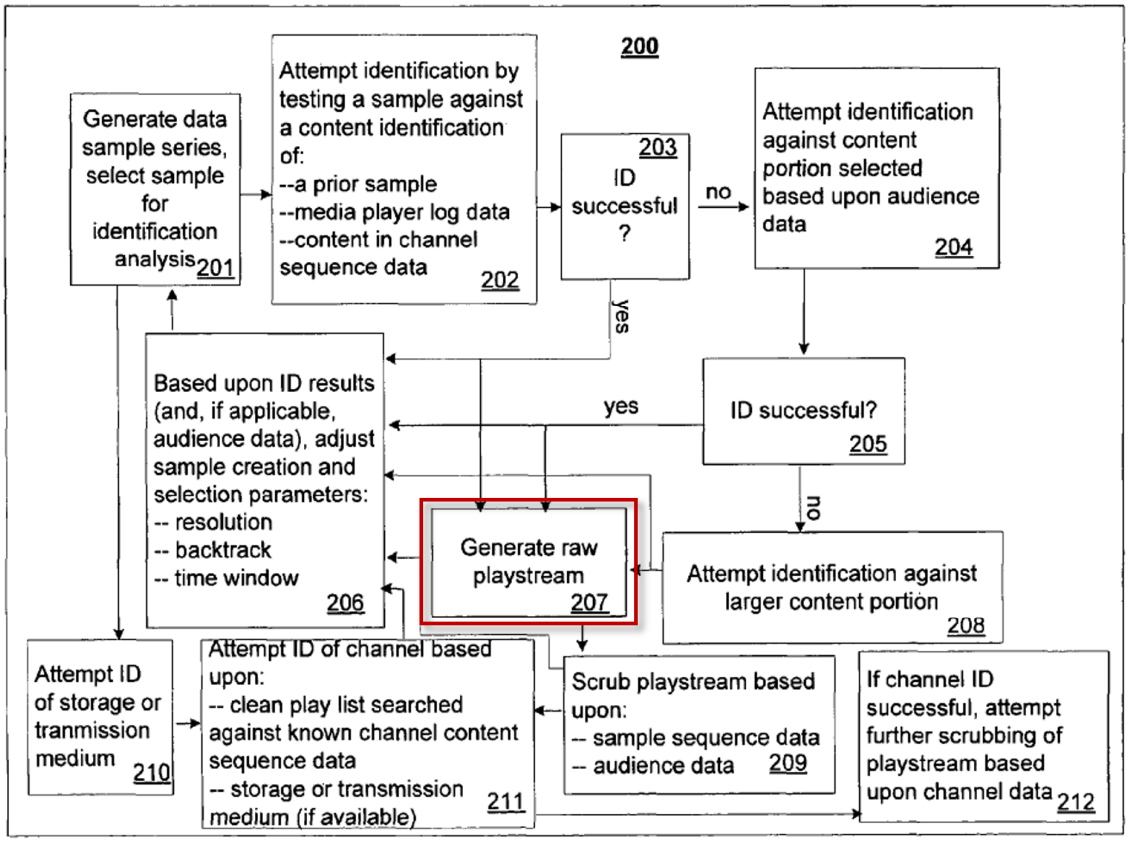
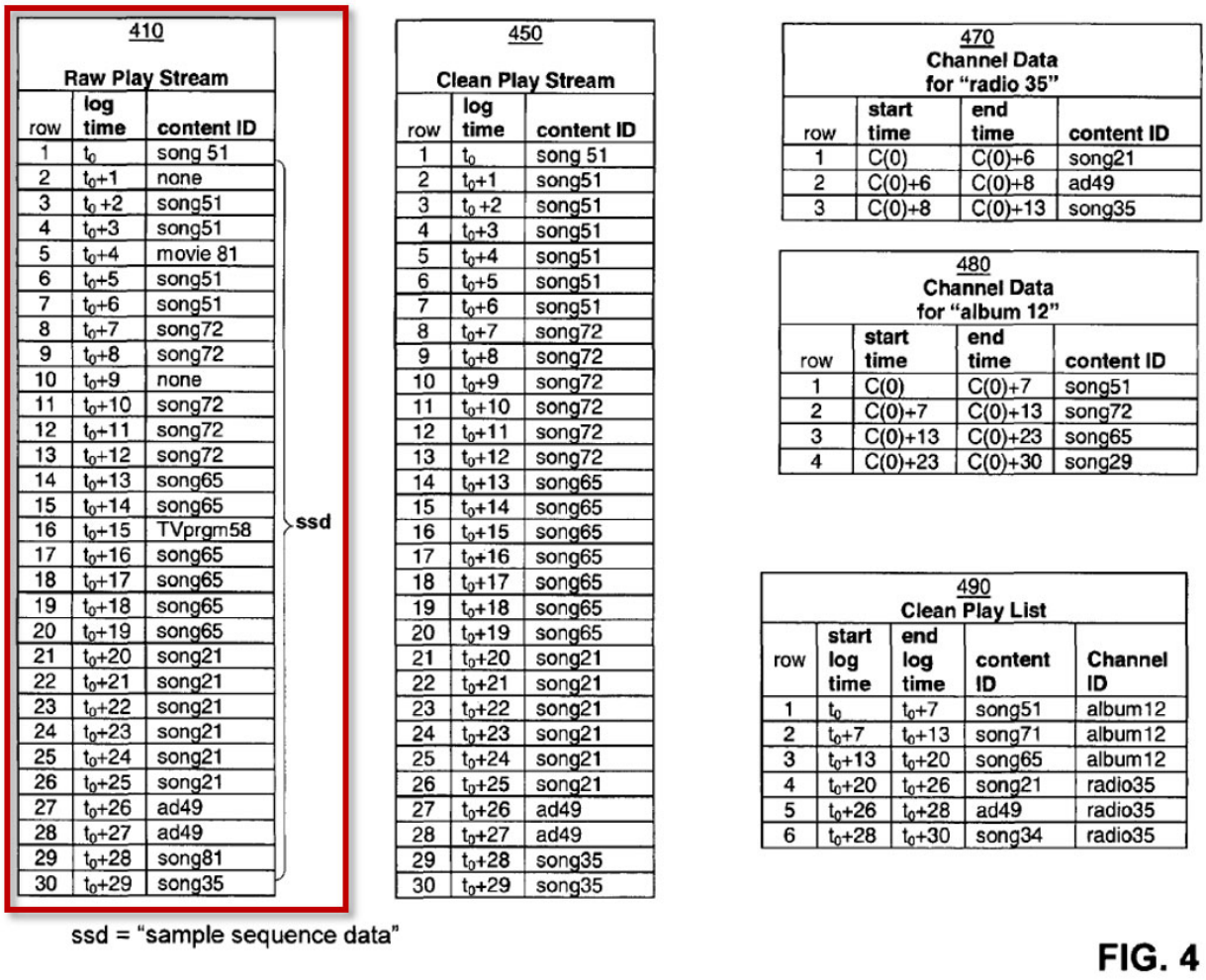


FIG. 2

EX1001, FIG. 2 (annotated).

Figure 4 illustrates raw play stream 410, which itemizes a sequence of analyzed samples 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 that no identification was made (e.g., none). EX1001, 9:12-31. The log times may be relative to an arbitrary value (e.g., "t_o") or indicate the actual time the sample started to be captured. EX1001, 9:27-31; EX1003, ¶58.



410 Raw Play Stream

row	log time	content ID
1	t_0	song 51
2	t_0+1	none
3	t_0 +2	song51
4	t_0+3	song51
5	t_0+4	movie 81
6	t_0+5	song51
7	t_0+6	song51
8	t_0+7	song72
9	t_0+8	song72
10	t_0+9	none
11	t_0+10	song72
12	t_0+11	song72
13	t_0+12	song72
14	t_0+13	song65
15	t_0+14	song65
16	t_0+15	TVprgm58
17	t_0+16	song65
18	t_0+17	song65
19	t_0+18	song65
20	t_0+19	song65
21	t_0+20	song21
22	t_0+21	song21
23	t_0+22	song21
24	t_0+23	song21
25	t_0+24	song21
26	t_0+25	song21
27	t_0+26	ad49
28	t_0+27	ad49
29	t_0+28	song81
30	t_0+29	song35

ssd

ssd = "sample sequence data"

450 Clean Play Stream

row	log time	content ID
1	t_0	song 51
2	t_0+1	song51
3	t_0 +2	song51
4	t_0+3	song51
5	t_0+4	song51
6	t_0+5	song51
7	t_0+6	song51
8	t_0+7	song72
9	t_0+8	song72
10	t_0+9	song72
11	t_0+10	song72
12	t_0+11	song72
13	t_0+12	song72
14	t_0+13	song65
15	t_0+14	song65
16	t_0+15	song65
17	t_0+16	song65
18	t_0+17	song65
19	t_0+18	song65
20	t_0+19	song65
21	t_0+20	song21
22	t_0+21	song21
23	t_0+22	song21
24	t_0+23	song21
25	t_0+24	song21
26	t_0+25	song21
27	t_0+26	ad49
28	t_0+27	ad49
29	t_0+28	song35
30	t_0+29	song35

470 Channel Data for "radio 35"

row	start time	end time	content ID
1	C(0)	C(0)+6	song21
2	C(0)+6	C(0)+8	ad49
3	C(0)+8	C(0)+13	song35

480 Channel Data for "album 12"

row	start time	end time	content ID
1	C(0)	C(0)+7	song51
2	C(0)+7	C(0)+13	song72
3	C(0)+13	C(0)+23	song65
4	C(0)+23	C(0)+30	song29

490 Clean Play List

row	start log time	end log time	content ID	Channel ID
1	t_0	t_0+7	song51	album12
2	t_0+7	t_0+13	song71	album12
3	t_0+13	t_0+20	song65	album12
4	t_0+20	t_0+26	song21	radio35
5	t_0+26	t_0+28	ad49	radio35
6	t_0+28	t_0+30	song34	radio35

FIG. 4

EX1001, FIG. 4 (annotated).

The "raw play stream" is scrubbed "based upon sample sequence data … [and] audience data," resulting in a clean play stream that may be a play list listing the content captured and indicating the order in which it was captured (step 209). EX1001, 8:3-8. The method then "attempts to identify the channel by searching known channel data to find an apparent content sequence match to the play list" (step 211). EX1001, 7:11-15, 8:9-11. "If step 211 successfully identifies the channel, information such as content sequence data for the identified channel may

be used by step 212 to further scrub or rescrub the play stream." EX1001, 8:17-22; EX1003, ¶59.

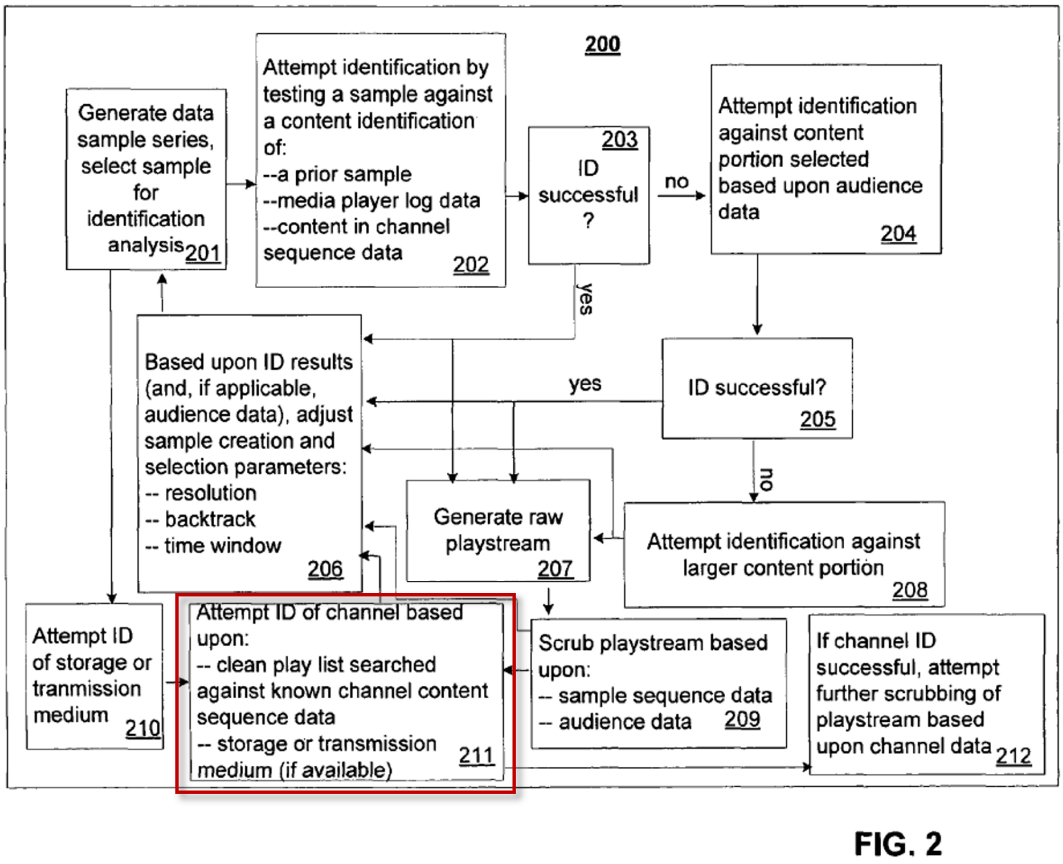


FIG. 2

EX1001, FIG. 2 (annotated).

Figure 3 illustrates another embodiment that includes functions similar to that of steps 207, 209, 211, and 212 of Figure 2. EX1001, 8:23-27. For example, step 303 converts a raw play stream into "a format useful in matching to a channel (e.g., converts a play stream to a play list where a play list format is useful for channel matching, or converts a play stream or play list to a mathematical representation that is useful for channel matching)." EX1001, 8:44-49; EX1003,

¶60.

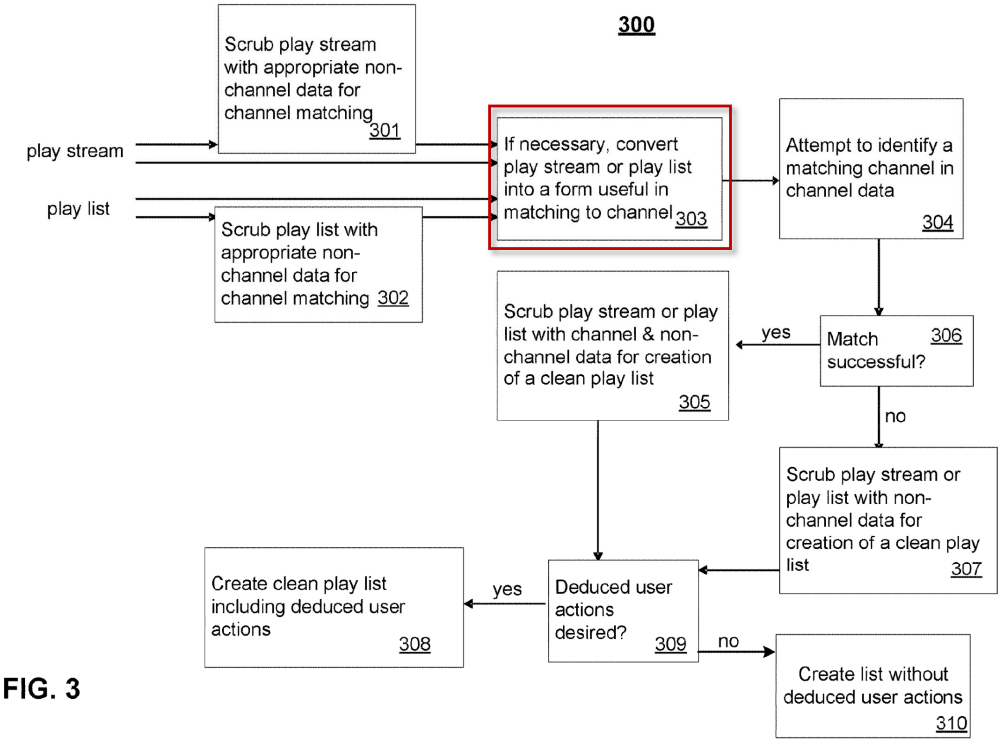


FIG. 3

EX1001, FIG. 3 (annotated).

Step 304 then "attempts to match the play stream or play list (or corresponding data format representing the play stream or play list) against known channel data to identify a channel (e.g., an album, samples of an album presented for marketing—e.g., on a web page—, radio broadcast, television broadcast, theater version of a movie, DVD version of a movie, etc.) associated with the elements of the play list or play stream." EX1001, 8:50-56. And at step 308, a clean play list can be created from the raw play stream. EX1001, 9:4-11; EX1003, ¶61.

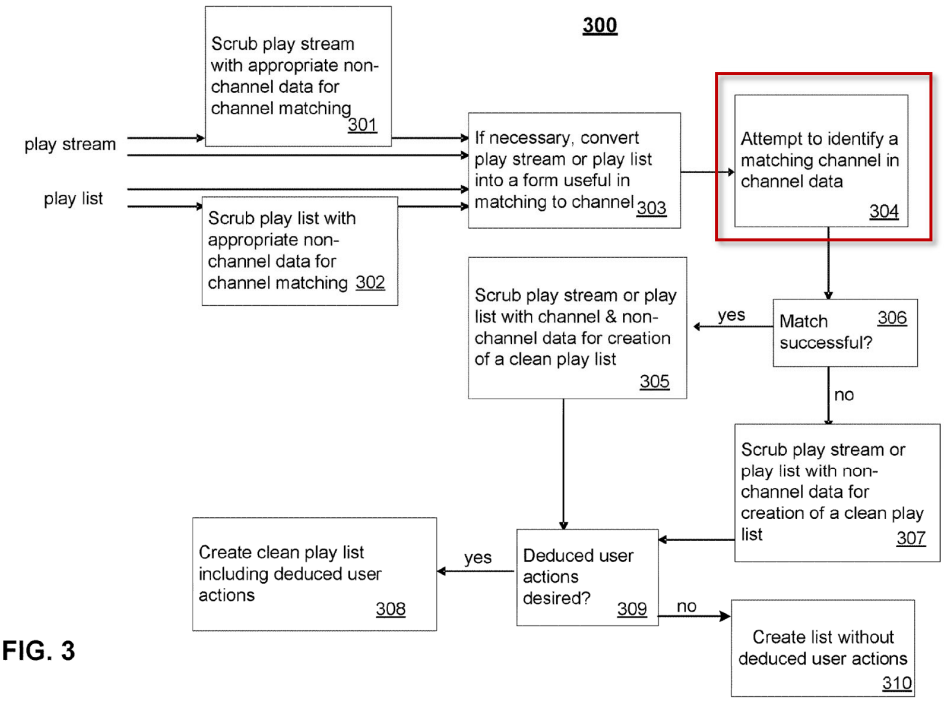


FIG. 3

EX1001, FIG. 3 (annotated).

Results of the media measurement analysis can then be obtained via report generator 130. EX1001, 6:13-16; EX1003, ¶62.

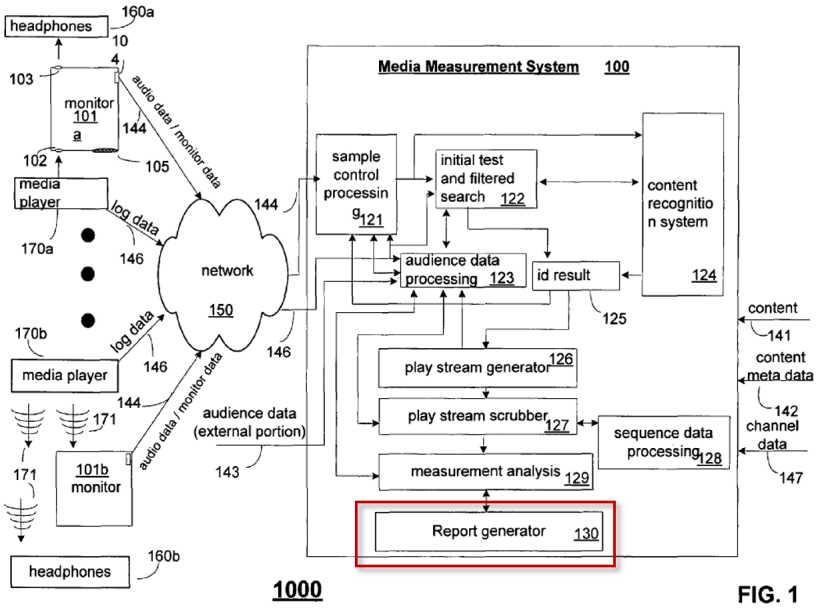


FIG. 1

EX1001, FIG. 1 (annotated).

B. Prosecution History

The '622 patent claims priority to U.S. Application No. 60/574,836, filed May 27, 2004, and is a division of U.S. Application No. 11/139,330, filed May 26, 2005. EX1001, Cover; EX1003, ¶63.

On February 2, 2011, the Examiner issued a non-final Office Action rejecting the pending claims as obvious over Wang777 in view of U.S. Publication No. 2002/0038456 to Hansen. EX1002, 0106-0110. The Applicants conducted interviews with the Examiner and in the June 30, 2011 Response, amended the only independent claim to require using "an order of at least two different content identifiers in the play stream." EX1002, 0137-0138. The Applicants argued, without substantive discussion, that "claim 1 is now allowable over the prior art of

record." EX1002, 0138; EX1003, ¶64.

On May 14, 2012, the Examiner issued a final Office Action rejecting the pending claims as obvious over Wang060 in view of U.S. Patent No. 8,131,389 to Hardwick and Hansen. EX1002, 0180-0185. The Applicants conducted an interview with the Examiner and amended the only independent claim to require "wherein a content identifier of the play stream's content identification results is obtained by using a corresponding data sample to search a computerized database of known content" and argued, without substantive discussion, that claim 1 "is now allowable over the prior art of record." EX1002, 0213-0216; EX1003, ¶65.

On April 11, 2013, the Examiner issued a non-final Office Action rejecting the pending claims as obvious over Wang060 in view of U.S. Publication No. 2004/0055445 to Iyoku and Hansen. EX1002, 0235-0241. The Applicants conducted an interview with the Examiner and in the October 11, 2013 Response, amended the only independent claim to require that "utilize[ing] an order of at least two content identifiers" is "in response to obtaining the content identifiers" and argued, again without any substantive discussion, that claim 1 "is now allowable over the prior art of record." EX1002, 0248-0251; EX1003, ¶66.

On January 29, 2014 the Examiner issued a Notice of Allowance and Examiner's amendment, which added claims 6-13 and amended claim 1 as follows:

3. The Application has been amended as follows:

Claim 1 is amended as follows:

A media measurement method comprising:

using one or more computers to generate a play stream of content identification results corresponding to a sequence of data samples, the data samples comprising representations of audio data captured at a media monitoring device, wherein content identifiers of the play stream's content identification results are obtained by using corresponding data samples to search a computerized database of known content; and

in response to obtaining the content identifiers, using one or more computers to utilize [[an]]a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples, the at least two different obtained content identifiers identifying different media content items.

EX1002, 0269-0279; EX1003, ¶67.

While the Examiner cited Wang777 and Wang060 individually during examination, the Examiner did not rely on a combination of the teachings of Wang777 and Wang060, and did not cite many of the portions of Wang777 and Wang060 that are relied upon below. EX1003, ¶68.

C. The '622 Claims

The '622 patent contains 13 claims, three of which (claims 1, 6, and 10) are independent. A Claim Appendix has been included with this Petition identifying the claims and claim elements.

Claim 1 recites:

> A media measurement method comprising:
>
> using one or more computers to generate a play stream of content identification results corresponding to a sequence of data samples, the data samples comprising representations of audio data captured at a media monitoring device,
>
> wherein content identifiers of the play stream's content identification results are obtained by using corresponding data samples to search a computerized database of known content; and
>
> in response to obtaining the content identifiers, using one or more computers to utilize a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples, the at least two different obtained content identifiers identifying different media content items.

Independent claims 6 and 10 recite similar limitations.

D. The ’622 patent is not entitled to provisional priority date.

Patent Owner bears the burden of establishing priority. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc*., 800 F.3d 1375, 1379-80 (Fed. Cir. 2015).

The ’622 patent claims priority to U.S. Provisional Application No. 60/574,836 (“the ’836 application”), filed May 27, 2004. However, none of the challenged claims are entitled to the May 27, 2004 priority date because the ’836 application does not contain adequate 35 U.S.C. §112 written description support for at least the claimed “in response to obtaining the content identifiers, using one or more computers to utilize a sequential order of at least two different obtained

content identifiers in the play stream to identify a channel corresponding to the data samples." EX1003, ¶¶[0069]-[0071].

The Board has the authority to analyze §112 issues when determining whether the challenged claims are entitled to a certain priority date. *Indivior UK Ltd. v. Reddy's Labs. S.A.*, 18 F.4th 1323 (Fed. Cir. 2021). And to satisfy the written description requirement, "the disclosure of the application relied upon [must] reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *See, e.g.*, *Ariad Pharms., Inc. v. Eli Lilly and Co*., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (citing *Ralston Purina Co. v. Far-Mar-Co, Inc.*, 772 F.2d 1570, 1575 (Fed. Cir. 1985)). The application's disclosure of the claimed subject matter must be: (1) expressly or necessarily present, *Tronzo v. Biomet, Inc*., 156 F.3d 1154, 1159 (Fed. Cir. 1998); (2) complete, *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997); and (3) unambiguous, *Hyatt v. Boone*, 146 F.3d 1348, 1354 (Fed. Cir. 1998).

The alleged invention here is that "in response to obtaining the content identifiers," one or more computers "utilize a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples." But the '836 application simply states "[a]nother exemplary method determines the source of transmission or storage of

the media played by an individual based on audio characteristics of that signal (e.g., recognizes particular types of encoding or compression, or hears screen refresh on tv or computer, or recognizes compression or frequency range of FM or AM radio, or CD or DVD)." EX1009, 0003. Moreover, the '836 application never uses the word "channel." In contrast, the '622 patent makes clear that a channel can be a non-broadcast collection of content, such as a CD, and that a sequential order of at least two different obtained content identifiers in the play stream are used to identify a channel (e.g., a CD). EX1001, 8:11-16, 9:55-59. The claimed subject matter is plainly not disclosed in the '836 application. EX1003, ¶¶[0070]-[0071].

It is also not enough that the claims would have been obvious in view of the ancestor application's disclosure. *Lockwood*, 107 F.3d at 1571-72 ("Entitlement to a filing date does not extend to subject matter which is not disclosed, but would be obvious over what is expressly disclosed. … A description which renders obvious the invention for which an earlier filing date is sought is not sufficient."); *Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1322 (Fed. Cir. 2017) (finding that the specification did not provide written description support for a claimed device even if the specification might render it obvious). Thus, to the extent this supposed invention was even supported by the '622 patent itself (which is questionable), the patentability of the '622 patent should be evaluated as of May 26, 2005 (i.e., not

May 27, 2004).

E. Other Challenged Patents

Petitioner has filed IPR petitions challenging other patents in the same family as the ’622 patent:

IPR2024-01053: Patent No. 8,296,791;

IPR2024-01054: Patent No. 8,510,768;

IPR2024-01056: Patent No. 10,572,896;

IPR2024-01057: Patent No. 10,719,848; and

IPR2024-01058: Patent No. 10,719,849.

V. CLAIM CONSTRUCTION

Claims must be given their ordinary and customary meaning in light of the specification—“the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-1313 (Fed. Cir. 2005) (en banc); *see also* 37 C.F.R. §42.100(b); 83 Fed. Reg. 51,340, 51,358 (Oct. 11, 2018).

Solely for purposes of the present Petition, Petitioner believes that none of the claim terms require explicit constructions. Accordingly, all claim terms have been given their plain and ordinary meaning, in the context of the ’622 patent specification, under the *Phillips* standard.

VI. OVERVIEW OF THE APPLIED REFERENCES

A. Wang777

1. Wang777 is prior art as of February 19, 2004.

Wang777 (EX1005) was published on June 21, 2007, filed on October 31, 2006, is a National State Entry of PCT/US05/05254 (EX1008) filed on February 18, 2005 (published in English and designating the U.S.), and claims priority to U.S. Provisional Application No. 60/545,879 (EX1007), filed February 19, 2004. EX1003, ¶72.

A non-provisional patent application is prior art as of the earlier filing date of a provisional application if the disclosure of the provisional provides §112 support for at least one claim in the publication, and the provisional describes the subject matter relied upon as prior art. *Dynamic Drinkware*, 800 F.3d at 1381-82; *Medtronic, Inc. v. Niazi Licensing Corp*., IPR2018-00609, Paper 8, 11 (PTAB Aug. 20, 2018); EX1003, ¶73.

The ’879 provisional application provides support for at least Wang777’s claim 1 and describes the subject matter relied upon as prior art, as shown below in the claim-by-claim analysis. *See infra* Sections VII-VIII; EX1003, ¶74

Wang777’s Claim 1	Wang777’s ’879 Provisional Appl.
1. A method for identifying a broadcast source of content comprising:	EX1007, Title.
recording an audio sample;	EX1007, 2:18-21, EX1007, 5:17-19.
recording a time at which the audio sample was recorded;	EX1007, 4:14, 5:24-25.

identifying characteristics of the audio sample and an estimated time offset of the audio sample, the estimated time offset defining from a time difference between a start time of the audio sample and the time at which the audio sample was recorded;	EX1007, 2:5-12, 3:24-26, 4:4-6.
comparing the characteristics and the estimated time offset of the audio sample with characteristics and time offsets of samples taken from broadcast stations and taken at approximately the time at which the audio sample was recorded; and	EX1007, 2:5-12, 4:4-9, 5:10-13, 6:3-9.
based on the comparison, identifying a broadcast station from which the audio sample was broadcast.	EX1007, 4:1-2, 4:18-22.

2. Overview

Wang777 explains that "[i]n the field of content identification, it may be desirable to identify not only content, but also a source (e.g., channel, stream, or station) of a broadcast transmission. For example, it may be desirable to detect from a free-field audio sample of a radio broadcast which radio station a user is listening to, as well as to what song the user is listening." EX1005, ¶[0018]; EX1003, ¶75.

Wang777 is thus directed to "a method for identifying a broadcast source of an audio sample" and, in particular, "matching audio or media file samples to a broadcast source from which the sample was transmitted." EX1005, ¶¶[0002]-[0003], [0009], [0017]; EX1007, 2; EX1003, ¶76.

Wang777 Figure 1 illustrates a "system for identifying a broadcast source of desired content," which includes an audio sampling device 102 (e.g., a mobile phone, blue) used to "record an audio sample broadcast or transmitted by a broadcaster 104" (e.g., a radio or television content provider, red). EX1005, ¶[0020]; EX1003, ¶77.

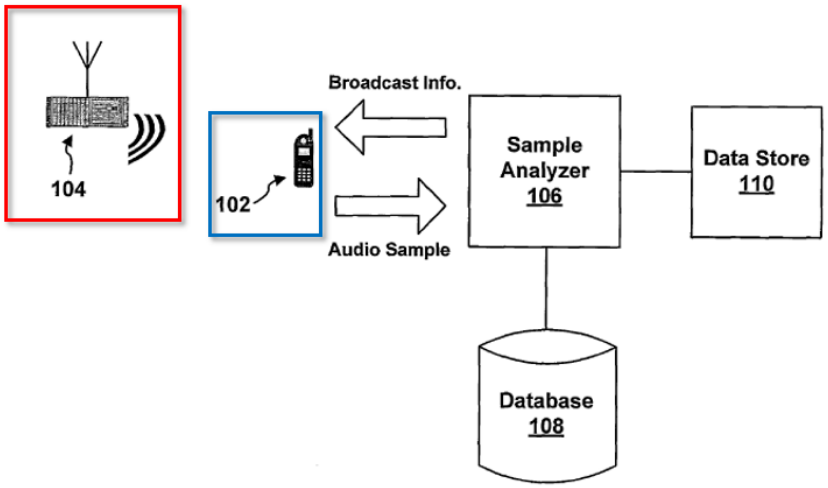


Figure 1

EX1005, FIG. 1 (annotated).

Figure 4 illustrates "a method of identifying a broadcast source" that includes identifying the content of a media sample (402) and ultimately identifying a broadcast source (422). EX1005, ¶¶[0016], [0047]-[0056], FIG. 4; EX1007, 2-3, FIG. 2; EX1003, ¶78.

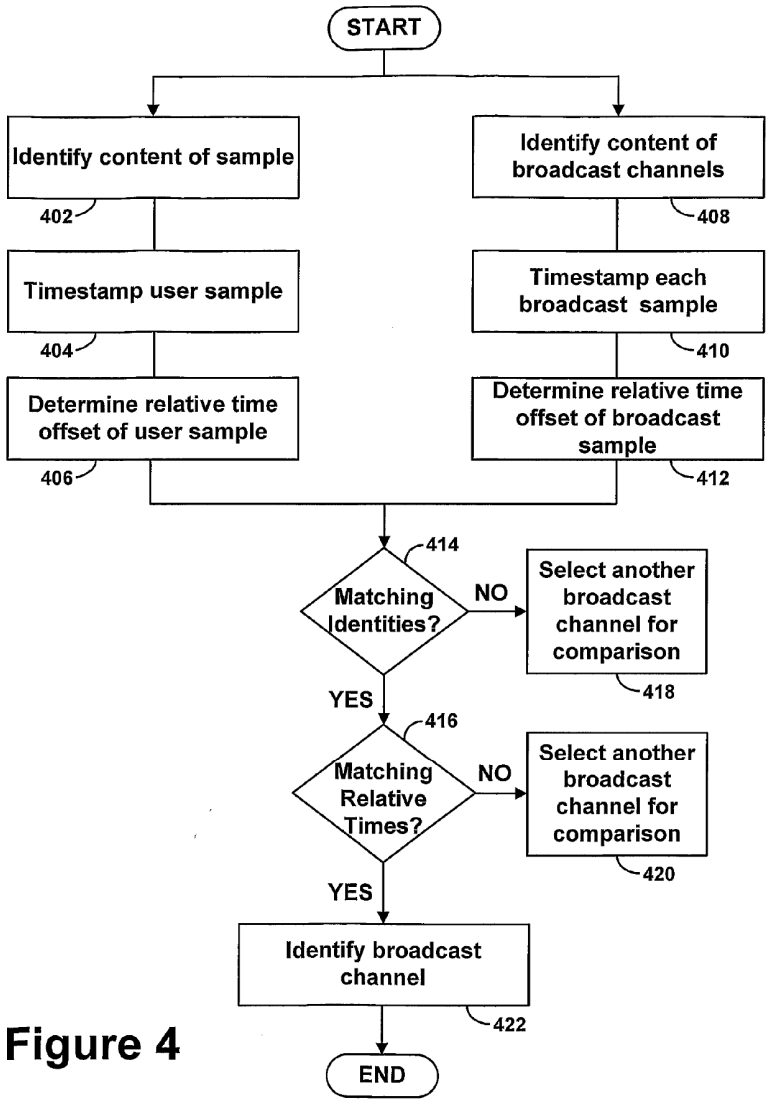
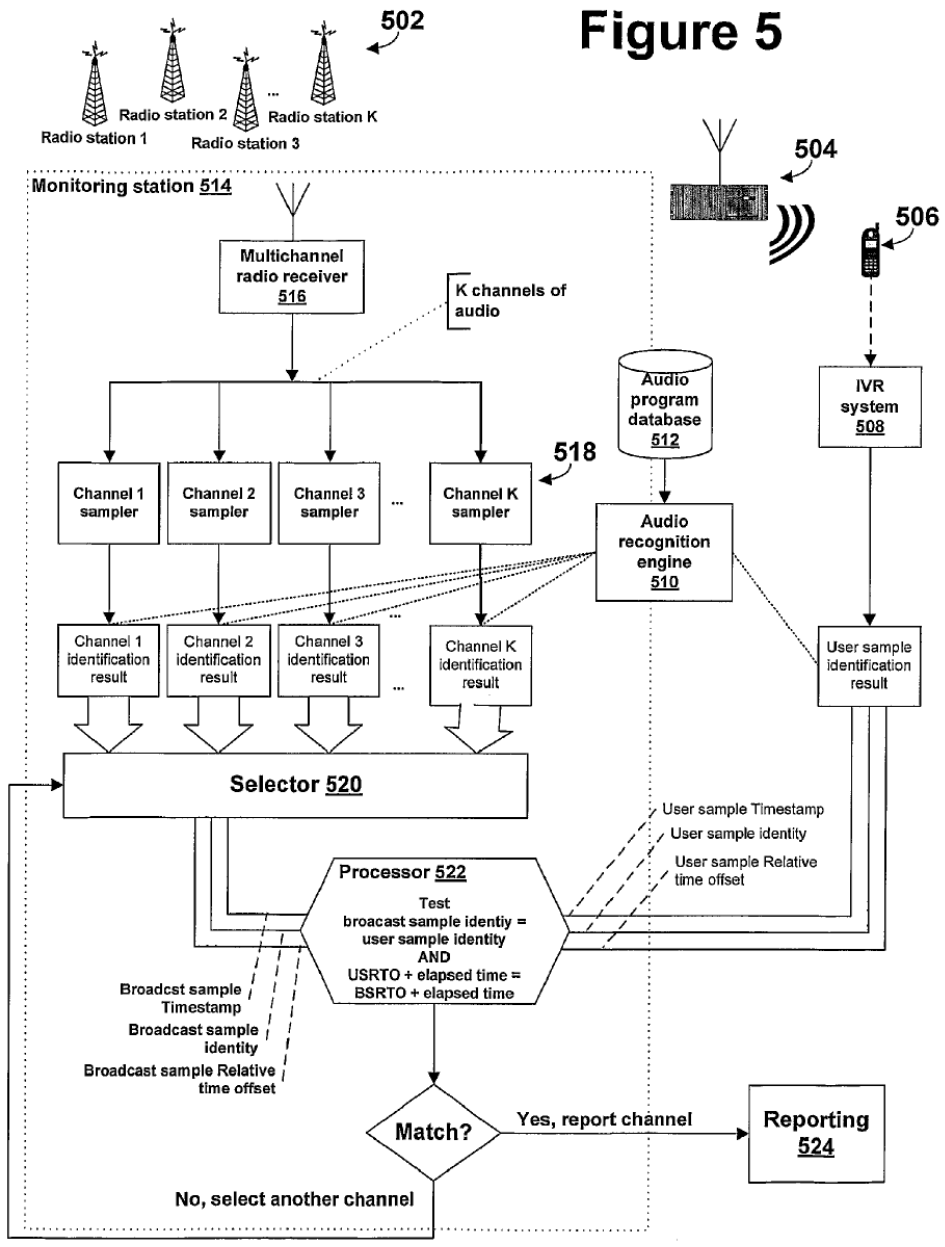


Figure 4

EX1005, FIG. 4.

Figure 5 "illustrates one example of a system for identifying a broadcast source of an audio sample according to the method illustrated in FIG. 4." EX1005, ¶[0057], FIG. 5; EX1003, ¶79.



EX1005, FIG. 5.

B. Wang060

Wang060 is directed to a "method for recognizing an audio sample locates an audio file that most closely matches the audio sample from a database indexing a large set of original recordings." EX1006, Abstract. Figure 1 illustrates a method

for recognizing a sound sample:

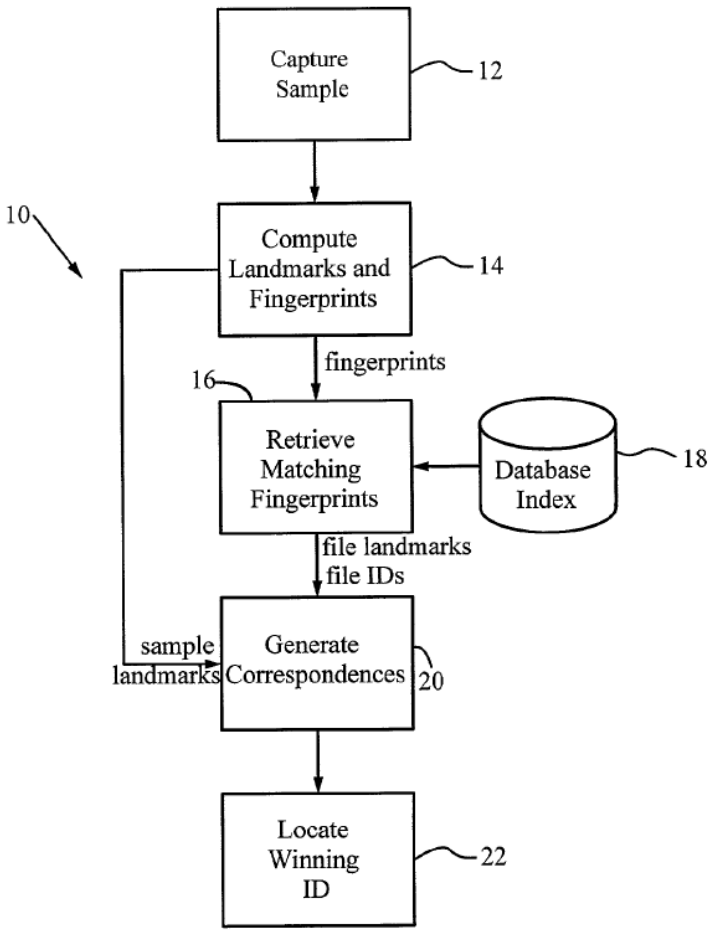


FIG. 1

EX1006, FIG. 1.

EX1006, ¶¶[0026], [0039]-[0042]; EX1003, ¶80.

Wang060 explains that after the content is identified, a report for the identified sound samples, such as a log file of information about the identified sound recordings (e.g., title, artist, album cover art, lyrics, or purchase information), as well as "a list of music played from any sound stream (radio, internet streaming radio, hidden microphone, telephone call, etc.)" can be created.

EX1006, ¶[0107]; EX1003, ¶81.

C. Herley682

Herley682 is directed to "a system and method for sampling one or more channels of a broadcast spectrum, such as a radio frequency spectrum, identifying and storing content information for each sampled channel, and providing a user interface for allowing interactive user queries and display of the stored content information." EX1011, ¶[0002]; EX1003, ¶82.

Herley682 Figure 2 illustrates an exemplary architectural diagram of an implementation of an embodiment thereof. EX1011, ¶[0038]; EX1003, ¶83.

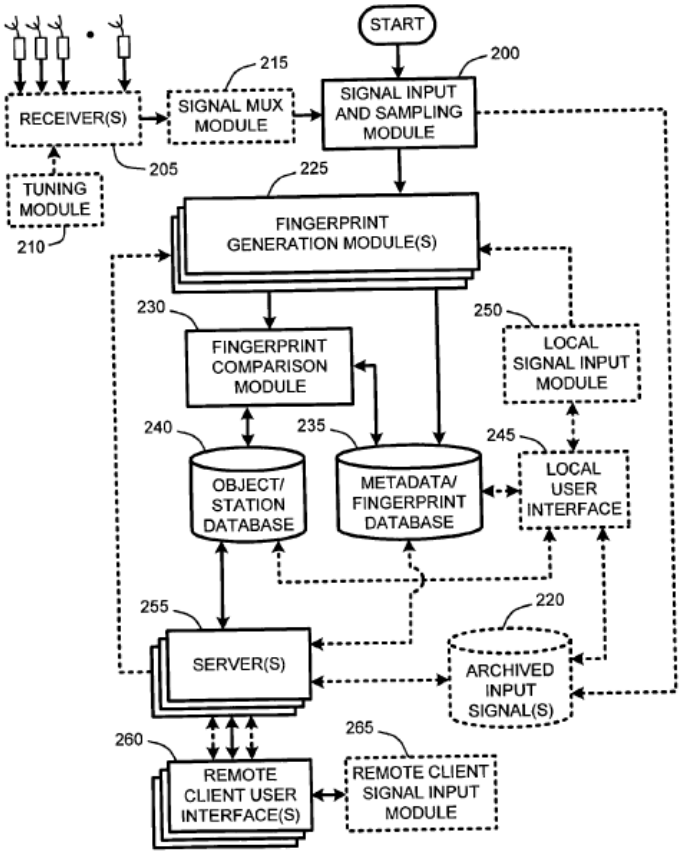


FIG. 2

EX1011, FIG. 2.

"[S]ampling module 200 . . . receive[s] and sample[s] one or more signals, such as, for example, audio broadcast signals, video broadcast signals, etc." EX1011, ¶[0075]. "[S]ignal samples are continuously provided in real-time to one or more fingerprint generation modules 225 for extracting fingerprints from samples of the input signals." EX1011, ¶[0084]; EX1003, ¶84.

Extracted fingerprints are provided to fingerprint comparison module 230, which searches a metadata/fingerprint database 235 to determine if there is a match to fingerprints stored in database 235. EX1011, ¶[0086]. If a match is identified, then the sampled portion of the input signal from which the fingerprint was extracted is identified as belonging to an object of interest corresponding to the fingerprint and metadata in the metadata/fingerprint database 235. EX1011, ¶[0086]. "This information, including the metadata, is stored in an object/station database 240." EX1011, ¶[0086]; EX1003, ¶85.

The object/station database 240 includes statistical information (e.g., the time that the object was identified, the station, channel, frequency, etc., where the input signal was monitored) and any metadata for each identified object of interest. EX1011, ¶[0086]. For a song, the metadata may include, for example, the song's name, artist, album title, copyright year, length, music genre, etc. EX1011, ¶¶[0026], [0028], [0068]; EX1003, ¶86.

"[I]f the fingerprint extracted from the sampled input signal does not match any entries in the metadata/fingerprint database 235, that fingerprint is stored to the metadata/fingerprint database [235] as an 'unknown object' entry." EX1011, ¶[0088]. A copy of the sample and any statistical information available for the sample also are stored in database 235. EX1011, ¶[0088]. Metadata/fingerprint database 235 allows for unknown objects to be manually identified by a user. EX1011, ¶[0089]; EX1003, ¶87.

D. Seet (EX1006)

1. Seet is prior art as of February 17, 2004.

Seet is prior art as of the February 17, 2004 filing date of U.S. provisional patent application 60/545,681 (EX1016, "Seet provisional") to which it claims priority. A nonprovisional patent application publication is prior art as of the earlier filing date of a provisional application if the disclosure of the provisional provides § 112 support for at least one claim in the publication, and the provisional describes the subject matter relied upon as prior art. *Dynamic Drinkware*, 800 F.3d at 1381-82; *Medtronic, Inc. v. Niazi Licensing Corp*., IPR2018-00609, Paper 8, 11 (Aug. 20, 2018); EX1003, ¶¶88-89

The Seet provisional provides support for at least Seet's claim 9, as shown below in the claim-by-claim analysis. EX1003, ¶90.

Seet Claim 9	**Seet '681 Provisional Appl. (EX1019)**

9. A method for generating entries for a media content database, the method comprising:	EX1016, 4, Title, Background.
receiving a first media stream;	EX1016, 7-8, The Invention, FIGs. 1-2.
receiving a second media stream;	EX1016, 4-5, The Invention, 8:3-5, FIGs. 1-2.
matching at least some of the second media stream to the first media stream to determine repeating content between the streams; and	EX1016, 8:3-5, 8:11-14, FIG. 1.
presenting the repeating content to a reviewer for identification.	EX1016, 8:14-16, 9:13-15, FIG. 1.

The Seet provisional also describes the subject matter relied upon as prior art. Figure 2 illustrates the "scrubbing" aspects relied upon. EX1003, ¶91

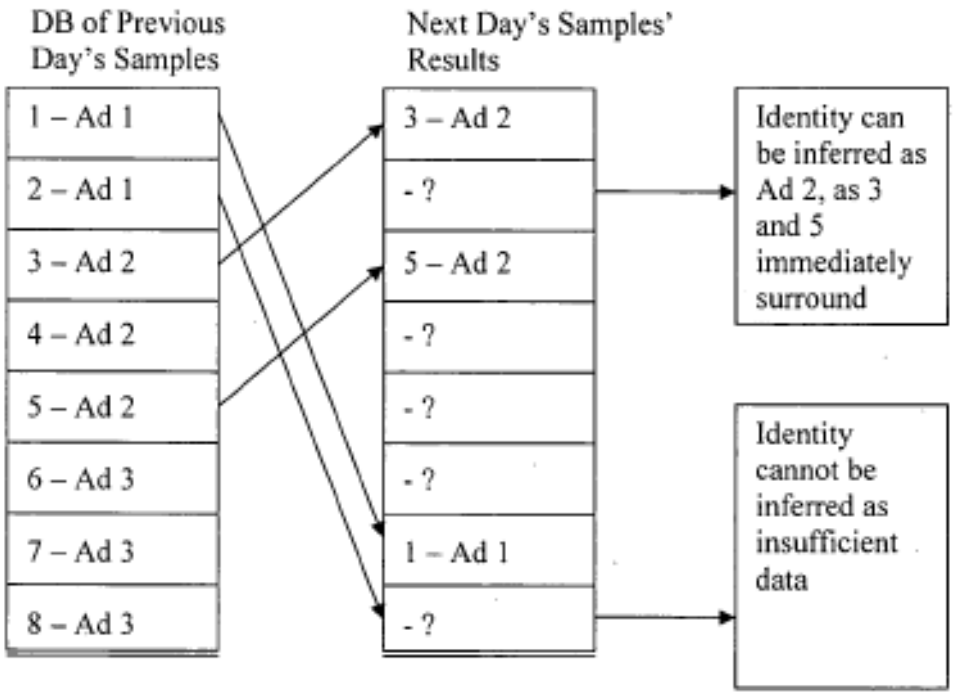


Figure 2. Auto-correlation Identity Inference Example

EX1016, FIG. 2.

The Seet provisional describes "[i]dentified content is left in the database for all future days until a set expiration date is reached since the last identification, and any samples from the current day that did not match are now added into the database for the next Day's identification; the cycle repeats." EX1016, 5. Thus, the Seet provisional makes clear that unidentified samples are stored in the database just as the identified data are stored. EX1003, ¶92.

"Additionally, should the database itself contain duplicates, the post-processing algorithm should include measures to group matches into sets correspond the duplicate sample sets." EX1016, 6. "This requires that the underlying fingerprinting software returns all matches, not just the first match." EX1016, 6. Further, "if some matches are not made, but surrounding samples are in the correct sequence and timing to infer the identity of the missing sample, that sample can thus be identified." EX1016, 6; EX1003, ¶93.

2. Overview

Seet is directed to "[g]eneration of a Media Content Database by Correlating Repeating Media Content in Media Streams." EX1012, Title. EX1003, ¶94.

Figure 1 illustrates a system for creating and maintaining a media content database. EX1012, ¶15; EX1003, ¶95.

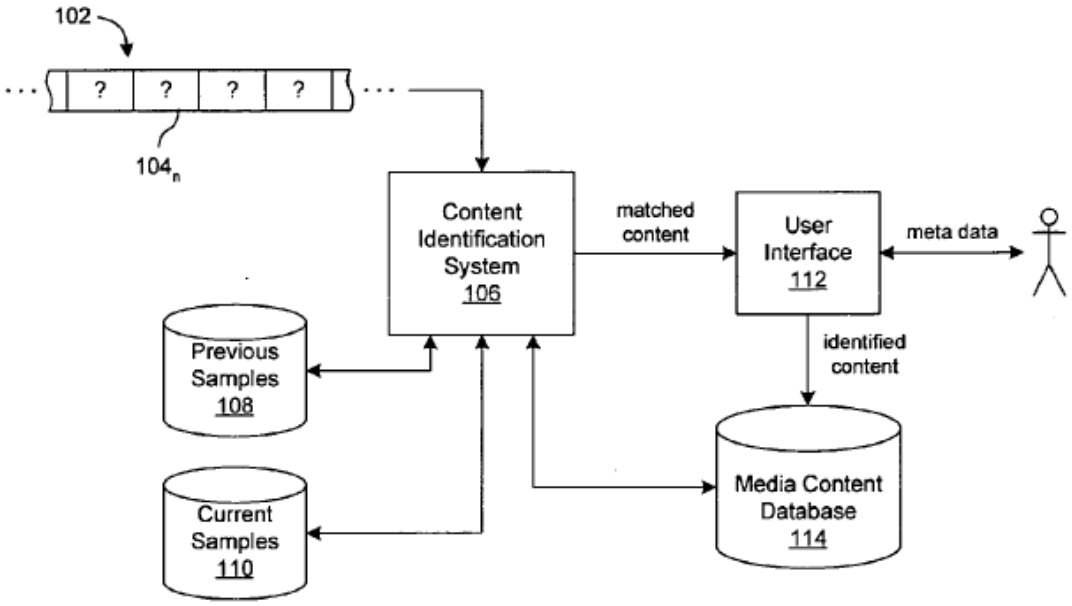


FIG. 1

EX1012, FIG. 1.

Content identification system 106 samples portions of media items 104_n from an incoming media data stream 102 to extract characteristic information and store that information in the previous samples database 108. EX1012, ¶19. Content identification system 106 attempts to match samples in the current samples database 110 with samples in the previous samples database 108. EX1012, ¶19. Matched samples are made accessible for review through user interface 112, allowing a reviewer to identify meta-data for matched content. EX1012, ¶19. The identified media content is then added to media content database 114, where it can be used by content identification system 106 at a later time in an application that requires media content recognition. EX1012, ABSTRACT, ¶¶14, 19; EX1003,

¶96.

Figure 2 shows Seet's general process for creating and maintaining media content database 114. EX1003, ¶97.

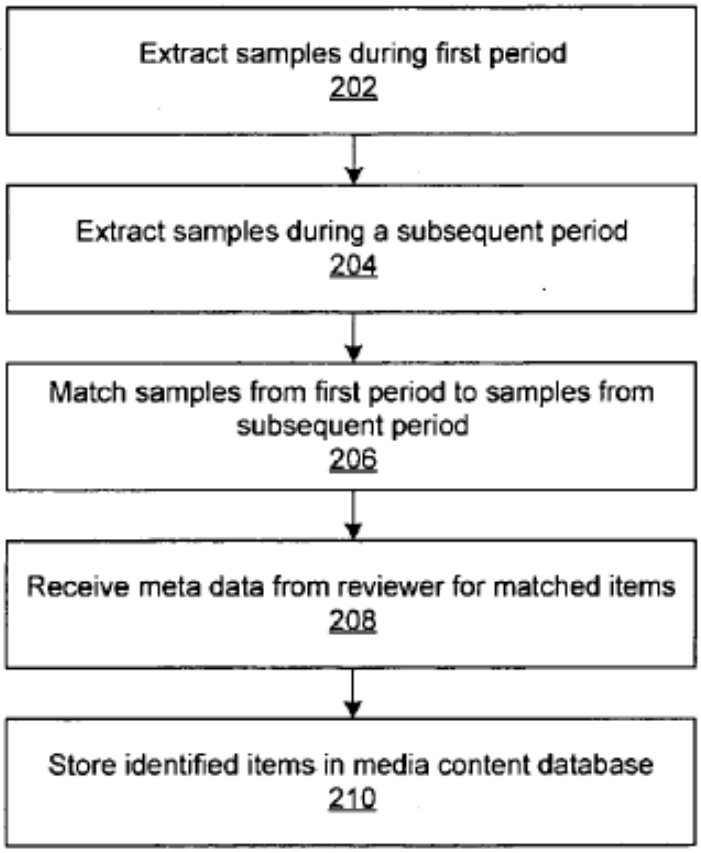


FIG. 2

EX1012, FIG. 2.

A set of samples is extracted from a first period of media stream 102 (202). EX1012, ¶23. Samples 104_n (unknown media) are subsequently extracted (204). EX1012, ¶23. The system then attempts to match (206) the second set of samples

to the first set of samples. EX1012, ¶24. Matched content is then provided to a reviewer, from which meta-data are received (208). EX1012, ¶24. This metadata and characteristic information of associated samples are stored (210) in media content database 114. EX1012, ¶24. The characteristic information (fingerprint) and a marker (a timestamp) are associated with each other. EX1012, ¶27; EX1003, ¶98.

Because the samples are typically obtained in noisy conditions, they may not match exactly (or within a predetermined tolerance) even where they are of the same content. EX1012, ¶31. Figure 4 illustrates a process for inferring a match for an unmatched sample. EX1012, ¶1; EX1003, ¶99.

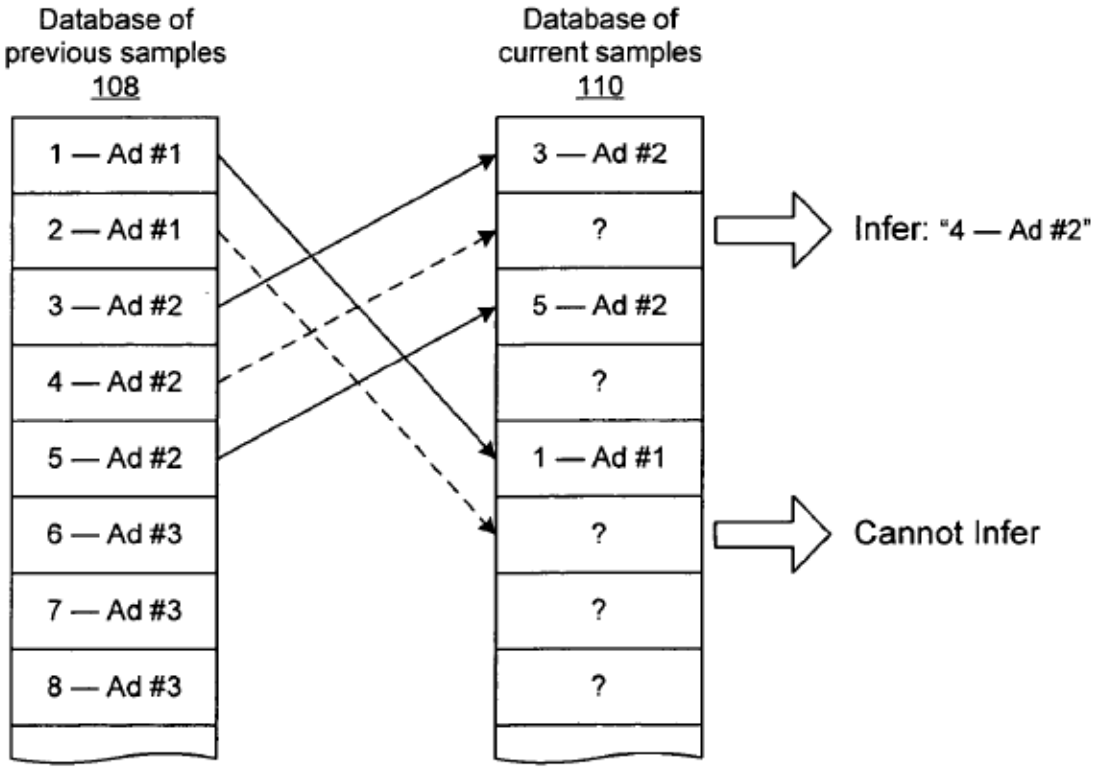


FIG. 4

EX1012, FIG. 4.

System 106 may infer additional matches based on a sample's temporal position in media stream 102 relative to other matched samples. EX1012, ¶32. "[I]f a match is not made for a particular sample, its surrounding samples may still be in the correct sequence and timing so that a match for the unmatched sample can be made." EX1012, ¶32. In Figure 4, the second sample in the current samples database 110 was not matched to any sample in the previous samples database 108. EX1012, ¶32. However, because its previous sample was matched to sample 3 and

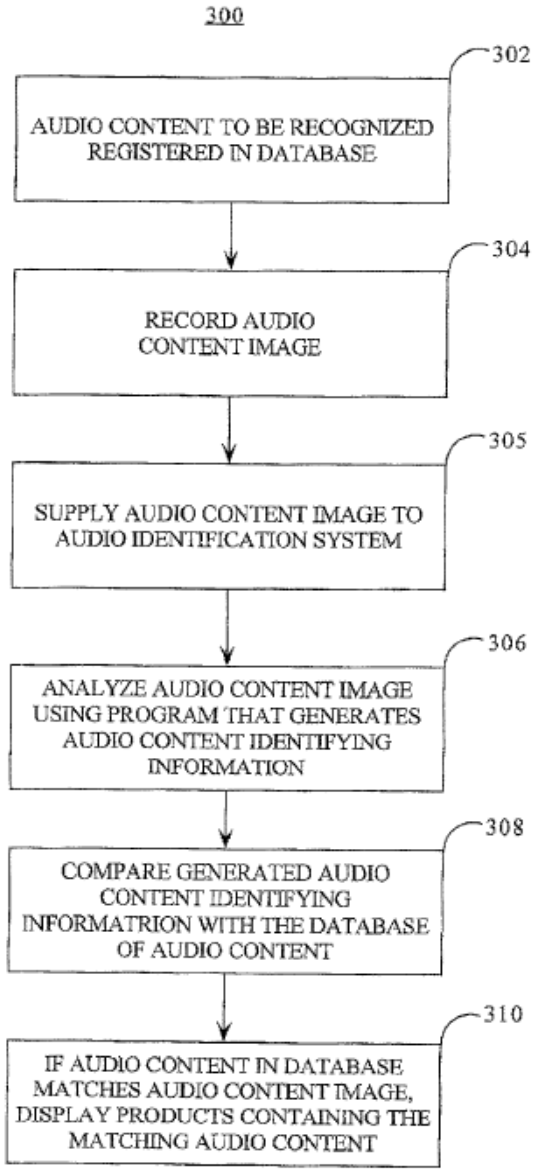
its following sample was matched to sample 5, the system can infer that the second sample matches sample 4 of the previous samples database. EX1012, ¶32. The temporal consistency of the bounding samples allows one to infer that they are of the same media item 104_n (e.g., advertisement labeled #2); therefore, the middle sample is also of the same media item 104_n. EX1012, ¶32; EX1003, ¶100.

E. Pitman

Pitman is directed to a method of identifying audio information generated for audio content that matches audio identifying information in an audio content database, and providing information to a user if the audio identifying information matches. EX1013, Abstract; EX1003, ¶101.

Figure 3 illustrates process 300 to automatically identify audio content that includes the steps of: recording content (304), generating a signature/fingerprint (306), comparing the signature/fingerprint to signatures/fingerprints in a database of known content (308), and, if the content is matched, identifying the matching content (e.g., the artist and title of a song) along with providing one or more products containing (or relating to) the matching content to a user. EX1013, ¶¶[0030]-[0036]; EX1003, ¶102.

FIG. 3



EX1013, FIG. 3.

F. Schrempp

Schrempp is directed to a method and system for playlist generation. EX1014, Abstract. Figure 1 illustrates playlist generation system 100 that includes detection module 102 for receiving content (e.g., a radio broadcast being listened

to) and lookup module 106 that identifies the received content by comparing the audio against database 108 of known reference signatures. EX1014, ¶[0007], FIG. 1. If a match is made, module 102 will keep a record of all matches made during a predetermined period of time in database 108 (e.g., a record of song titles detected during a 24-hour period). EX1014, ¶[0008]. Playlist server 110 may also receive information (e.g., titles of identified songs) from detection module 102 and generate a playlist of the identified content. EX1014, ¶¶[0009]-[0010]; EX1003, ¶103.

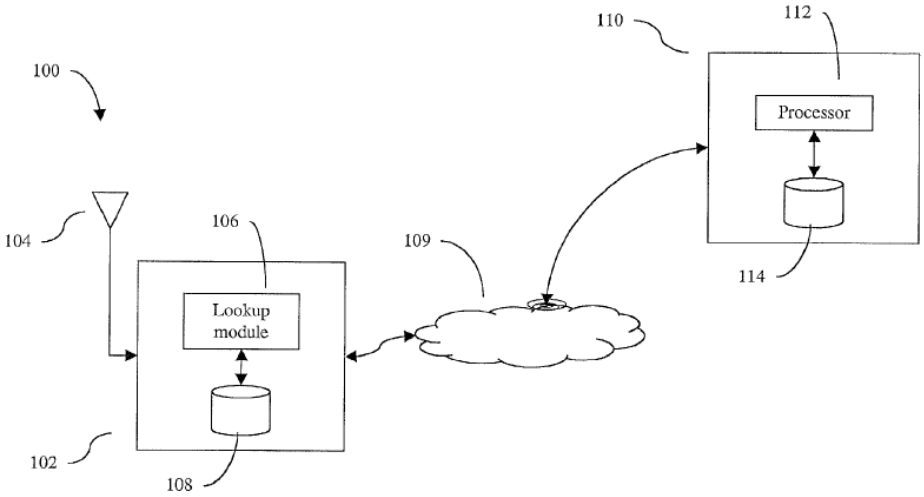


FIG. 1
Prior Art

EX1014, FIG. 1.

G. Wells

Wells is "directed to the identification of recordings" "such as recordings of

music or spoken words." EX1015, ¶[0003]. In particular, methods to identify streams of music (e.g., a radio broadcast), by extracting fingerprints at regular intervals and searching a database for matches. EX1015, ¶[0249]. Wells further explains that using multiple fingerprints will reduce the likelihood of mismatch errors that occur with the use of just one fingerprint. EX1015, ¶[0251]; EX1003, ¶104.

In particular, Wells imposes a condition that multiple (consecutive) fingerprints must be matched to identify the stream as shown in Figure 12, which includes the steps of: extracting a fingerprint every frame (e.g., a 3 second frame) of a stream (1602), comparing the extracted fingerprints to a database (1603), and if one or more fingerprints match, determining whether a number of consecutive candidate fingerprints (e.g., 10) match with the same song in the database (1606). EX1015, ¶¶[0259]-[0265], FIG. 12; EX1003, ¶105.

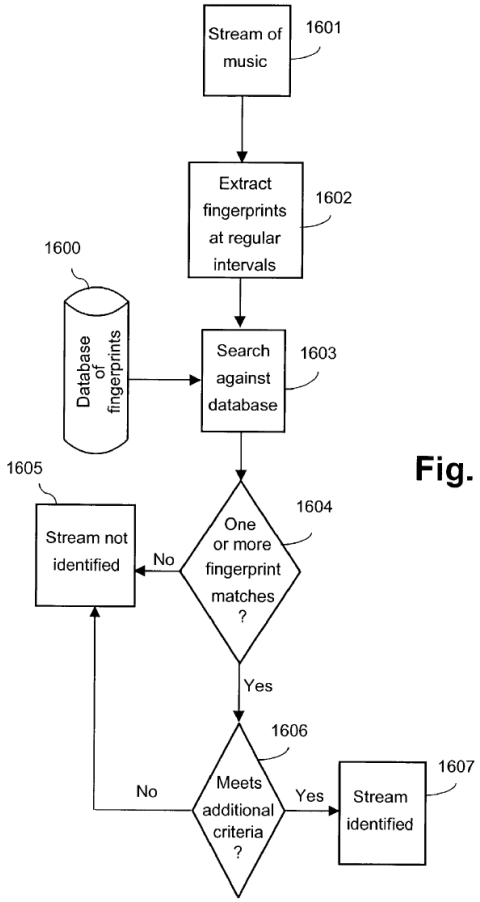


Fig. 12

EX1015, FIG. 12.

VII. GROUND 1: CLAIMS 1-13 ARE OBVIOUS OVER WANG777 AND WANG060.

A. A POSA would have combined Wang777 and Wang060.

A POSA would have found it obvious to combine Wang777 and Wang060 for multiple reasons. EX1003, ¶¶108-109.

Wang777, as an initial matter, incorporates Wang060 by reference. EX1005, ¶[0022]; EX1007, 2. Wang777 also explicitly describes using the technique of Wang060 in the system for identifying a broadcast source. *See* EX1005, ¶¶[0022]-[0023], [0033], [0035], [0042], [0045], [0047], [0058], [0062]-[0065], [0074].

These explicit statements alone would have motivated a POSA to combine the teachings of Wang777 and Wang060. EX1003, ¶110.

Wang777 explains that "[o]nce the correct audio sound has been identified, the result is reported to the user or a system 324 by any suitable method." EX1005, ¶[0044]. Wang060 similarly teaches that a report for the identified sound samples, such as a log file of information about the identified sound recordings (e.g., title, artist, album cover art, lyrics, or purchase information) as well as "a list of music played from any sound stream (radio, internet streaming radio, hidden microphone, telephone call, etc.)," can be created. EX1006, ¶[0107]; EX1003, ¶111.

To the extent that it is argued that Wang777 does not disclose a "play stream" of the content identification results of the identified sample along with its UST and USRTO in sequential time order (e.g., n, n+1, etc. where [n] is the nth sample in time), this feature would have been obvious in view of Wang060. Wang060 teaches generating a candidate list of the identified sound samples that includes a sound_ID for each match and landmark timepoints. EX1006, ¶[0081], FIG. 9B; EX1003, ¶112. It would have thus been obvious to store the content identification results of Wang777 in a play stream with their corresponding USTs and USRTOs (e.g., user sample identity[n] and user sample identity[n+1]) in chronological order in a play stream such that each user sample can then be compared to identified broadcast samples having similar timestamps (i.e., in a play

stream) in view of Wang060. EX1003, ¶113.

In addition, a POSA would have been motivated to combine Wang777 and Wang060 because they are in the same field and are directed to the same thing—identifying audio samples and the songs or stations from which the samples originate. *See* EX1005, Abstract; EX1006, Abstract. In particular, they are both directed to identifying audio samples from various sources and reporting that information to a user. EX1003, ¶114.

A POSA would have combined the system of Wang777 with the teachings of Wang060 by known methods, and the results of the combination would have been predictable to a POSA (e.g., identifying audio samples and reporting that information to a user). Indeed, as Wang777 states, it is desirable to identify the audio content of a broadcast transmission. EX1005, ¶[0018]; EX1003, ¶115.

Further, the proposed combination of Wang777 and Wang060 would have involved nothing more than incorporating a well-known concept (i.e., Wang060's process for identifying audio samples and generating a log file) into a well-known system (i.e., Wang777's monitoring system). *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 419-421 (2007); EX1003, ¶116.

B. Claim 1

1. [1.P]

Wang777 discloses this preamble to the extent it is limiting. EX1003, ¶117.

Wang777 discloses a method for identifying a broadcast source of an audio sample and matching media file samples to a broadcast source from which the sample was transmitted. EX1005, ¶¶[0002]-[0003], [0009], [0017]; EX1007, 2. Figure 4 illustrates "a method of identifying a broadcast source" that includes identifying the content of a media sample (402) and ultimately identifying a broadcast source (422). EX1005, ¶¶[0016], [0047]-[0056], FIG. 4; *compare* EX1007, 2-3, FIG. 2 *with* EX1001, 6:58-60, FIG. 2. EX1003, ¶118.

Wang777 further discloses that broadcast information is "reported to a consumer tracking agency, or otherwise aggregated for statistical examples, for example." EX1005, ¶[0018]; *see also* EX1005, ¶¶ [0019]; [0020]. Thus, Wang777's "method for identifying a broadcast source of an audio sample" is a "media measurement method." EX1005, ¶[0009]; EX1001, 2:3-5; EX1003, ¶119.

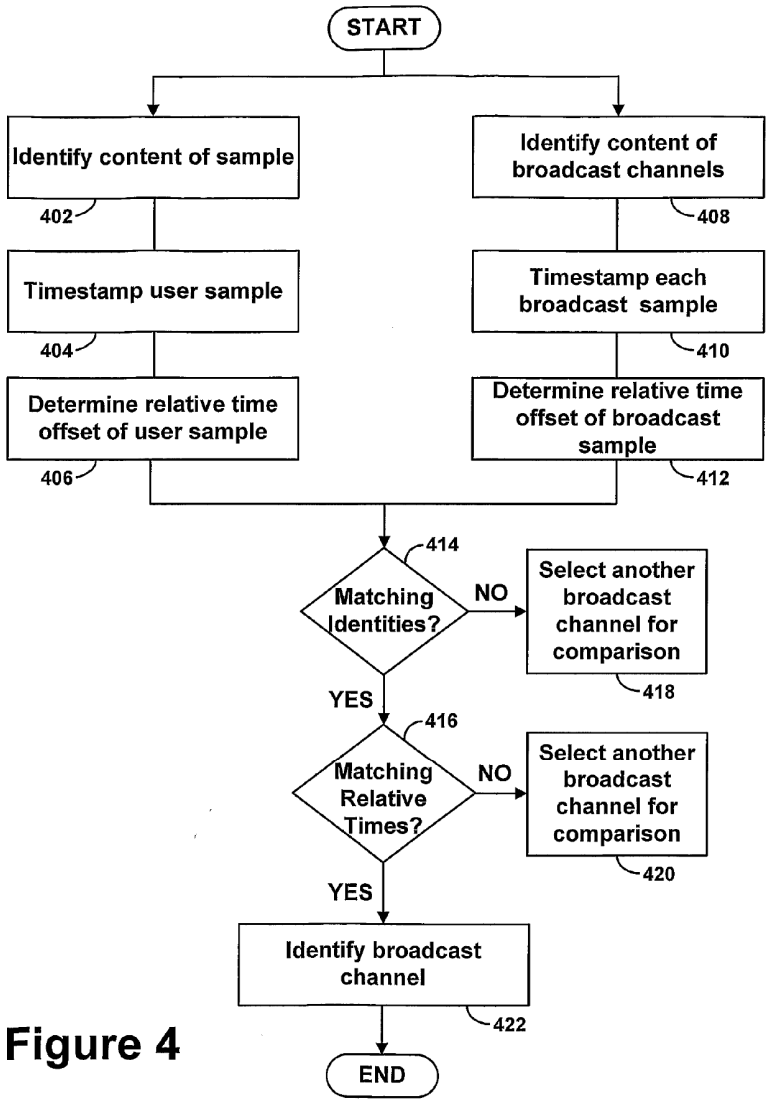
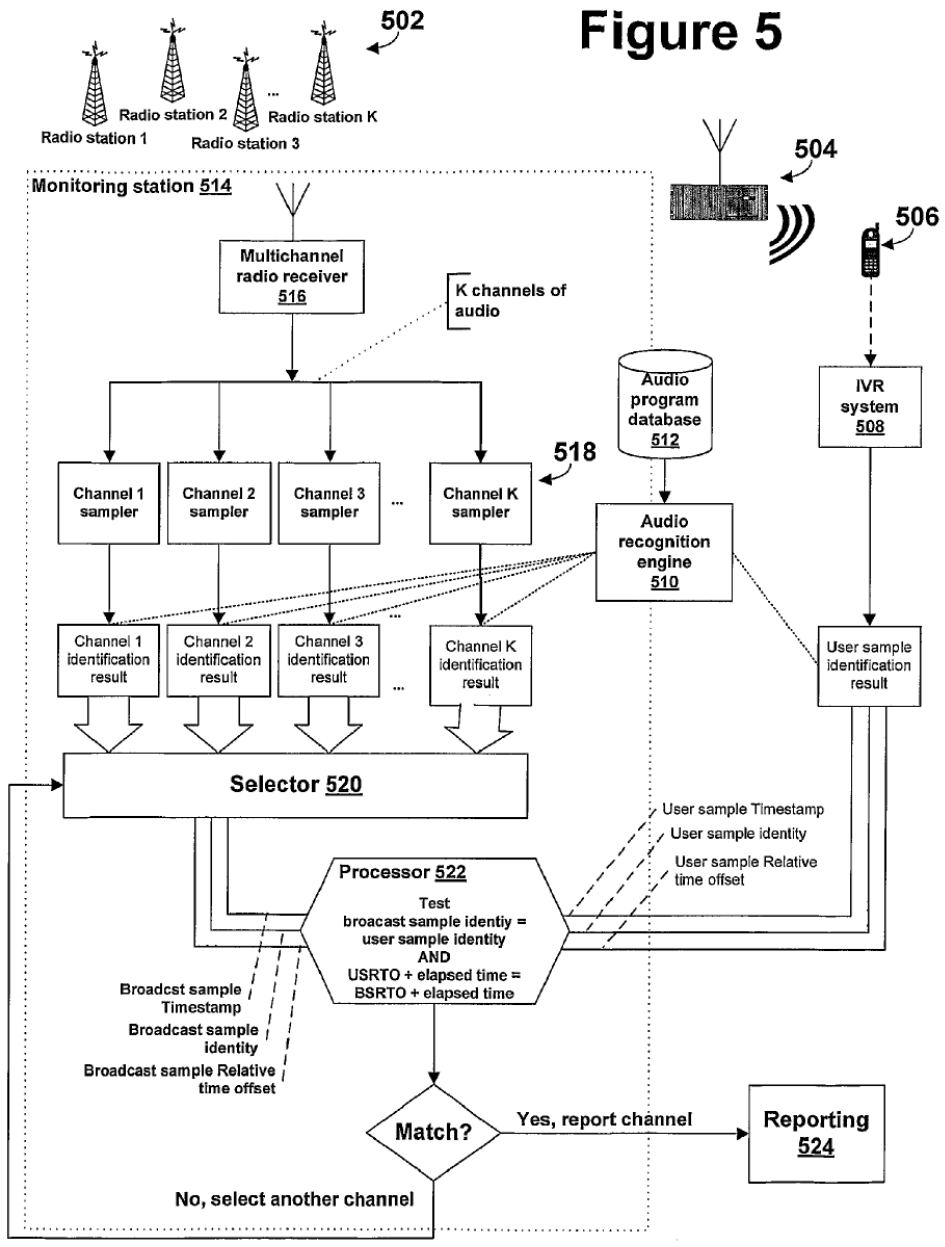


Figure 4

EX1005, FIG. 4.



EX1005, FIG. 5.

2. [1.1]

Wang777 discloses and/or renders obvious this element in view of Wang060. EX1003, ¶120.

Wang777 teaches first capturing a sequence of data samples (e.g., audio

samples) comprising representations of audio data (e.g., broadcast radio) captured at a media monitoring device (e.g., audio sampling device 102, 506, blue). EX1005, ¶¶[0009], [0019]-[0020], [0022], [0047], [0057], FIGs. 1-2, 4-5; EX1007, 2-3. The audio sampling device "may be a mobile cellular telephone" and the samples may be from any source such as a radio station, television, internet streaming, etc. (e.g., broadcaster 104, 502/504, red). EX1005, ¶¶[0018]-[0020], [0057], FIGs. 1-2, 4-5; EX1007, 2-3; EX1003, ¶121.

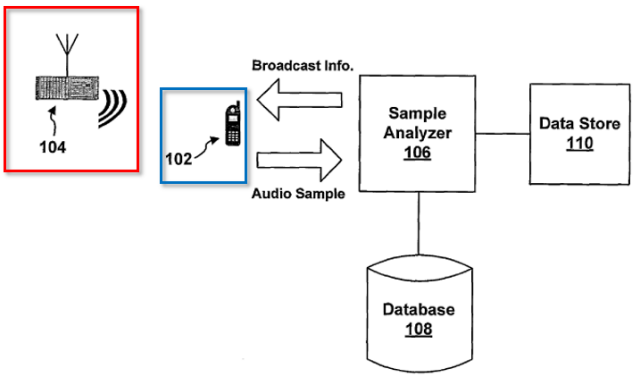
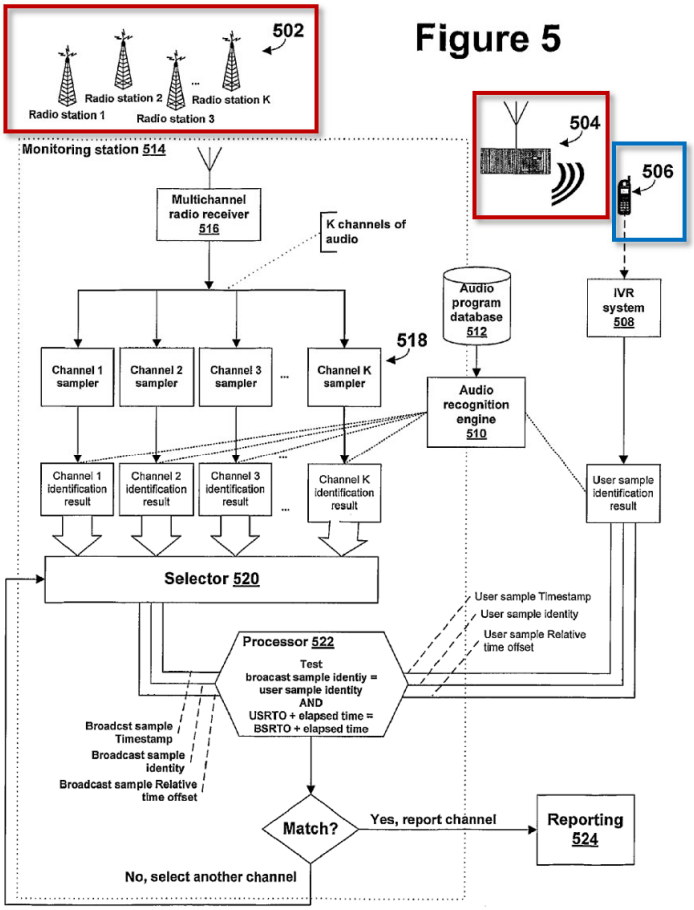


Figure 1

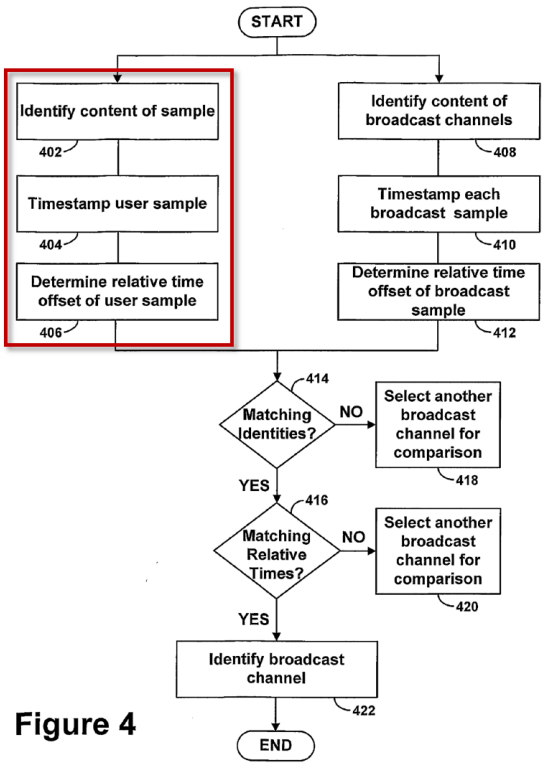
EX1005, FIG. 1 (annotated).



EX1005, FIG. 5 (annotated).

Wang777 also teaches generating content identification results (e.g., title, artist(s), and record label) corresponding to the sequence of audio data samples (e.g., the audio samples captured by audio sampling device 102, 506 over time). EX1005, ¶¶[0004], [0072]; EX1007, 1, 5-6, FIG. 2. Figure 4 illustrates that each sample collected by the audio sampling device 102/506 is identified (402), a user sample timestamp (UST) is taken to mark the beginning time of the sample based on a standard reference clock (404), and a user sample relative time offset (USRTO) is determined (406). EX1005, ¶¶[0047], [0022], [0024]; EX1007, 5-6,

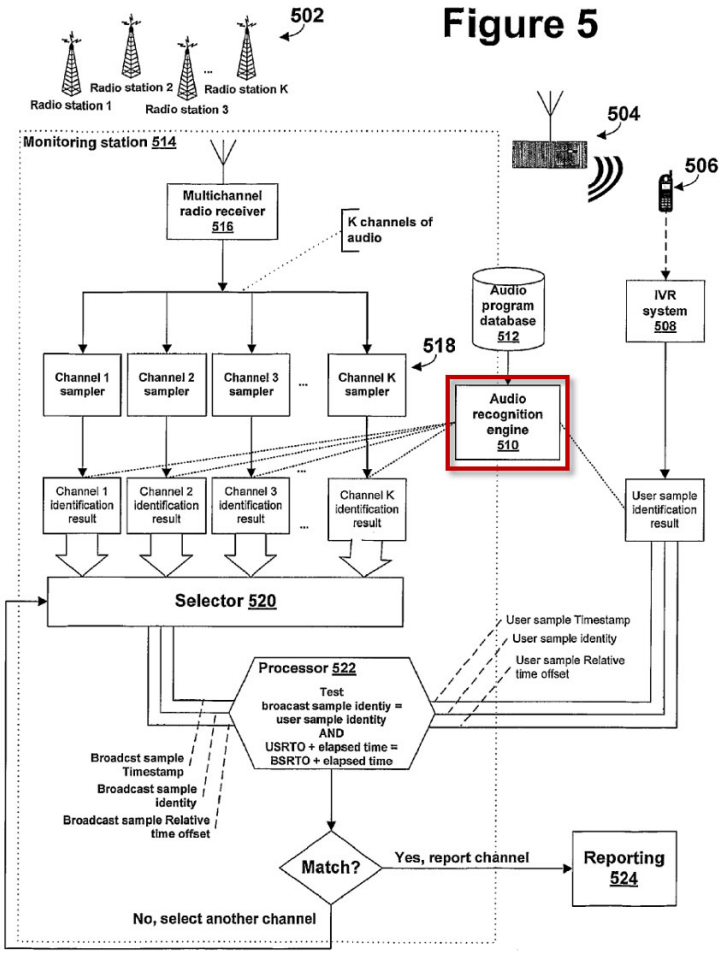
FIG. 2. USRTO is a time offset between a beginning of the identified content file from the database and a beginning of the audio sample being analyzed, e.g., a user may record a ten second sample of a song beginning 67 seconds into a song. EX1005, ¶[0047]; EX1007, 5; EX1003, ¶¶122-123.



EX1005, FIG. 4 (annotated).

Figure 5 illustrates a system for identifying a broadcast source of an audio sample. EX1005, ¶[0057]; EX1007, 5-6, FIG. 2. The audio recognition engine 510 will identify each audio sample by performing a lookup within an audio program database 512 using the technique described within Wang060. EX1005, ¶[0058], *see also id.*, ¶¶[0020], [0028]-[0033], [0039]-[0040], [0059]-[0065]; EX1007, 1, 5-

6, FIG. 2. As such, Wang777 discloses the exact same technique for generating content identification results corresponding to a sequence of data samples as the '622 patent. *See* EX1001, 5:42-62 (citing Wang060 as a known technique); *supra* Section IV.A; EX1003, ¶¶124-125.



EX1005, FIG. 5 (annotated).

The audio recognition engine 510 will then return the identity of the audio sample (e.g., song title) to the sampling device 506, along with a relative time offset of the audio sample. EX1005, ¶¶[0065], [0044]; EX1007, 1, 5-6, FIG. 2; EX1003, ¶126.

Wang777 further discloses generating a play stream of the content identification results. As explained above, Wang777 identifies each sample along with its UST and USRTO. EX1005, ¶[0047]; EX1007, 1, 5-6, FIG. 2. Samples (e.g., "user sample identity[n]" and "user sample identity[n+1]" where "[n] is the nth sample in time") captured over a period of time (e.g., longer than a typical audio program) can then be compared to identified broadcast samples. EX1005, ¶[0072]; EX1007, 7. A POSA would have understood from Wang777 that to compare multiple content identification results captured over a period of time to identified broadcast samples, the content identification results would have been stored with their corresponding USTs and USRTOs such that each user sample can be compared to identified broadcast samples having similar timestamps. EX1005, ¶[0072]. And it would have been obvious to store the identified samples in a known format such as a play stream for later comparison to the identified broadcast samples. *See* EX1001, 10:34-56 (broadly describing "play stream"); EX1003, ¶¶127-129.

To the extent that it is argued that Wang777 does not disclose a "play stream" of the content identification results of the identified sample along with its UST and USRTO in sequential time order (e.g., n, n+1, etc. where [n] is the nth sample in time), this feature would have been obvious in view of Wang060. Wang060 teaches generating a candidate list of the identified sound samples that

includes a sound_ID for each match and landmark timepoints. EX1006, ¶[0081], FIG. 9B. It would have thus been obvious to store the content identification results of Wang777 in a play stream with their corresponding USTs and USRTOs (e.g., user sample identity[n] and user sample identity[n+1]) in chronological order in a play stream such that each user sample can then be compared to identified broadcast samples having similar timestamps (i.e., in a play stream) in view of Wang060. EX1003, ¶¶130-131.

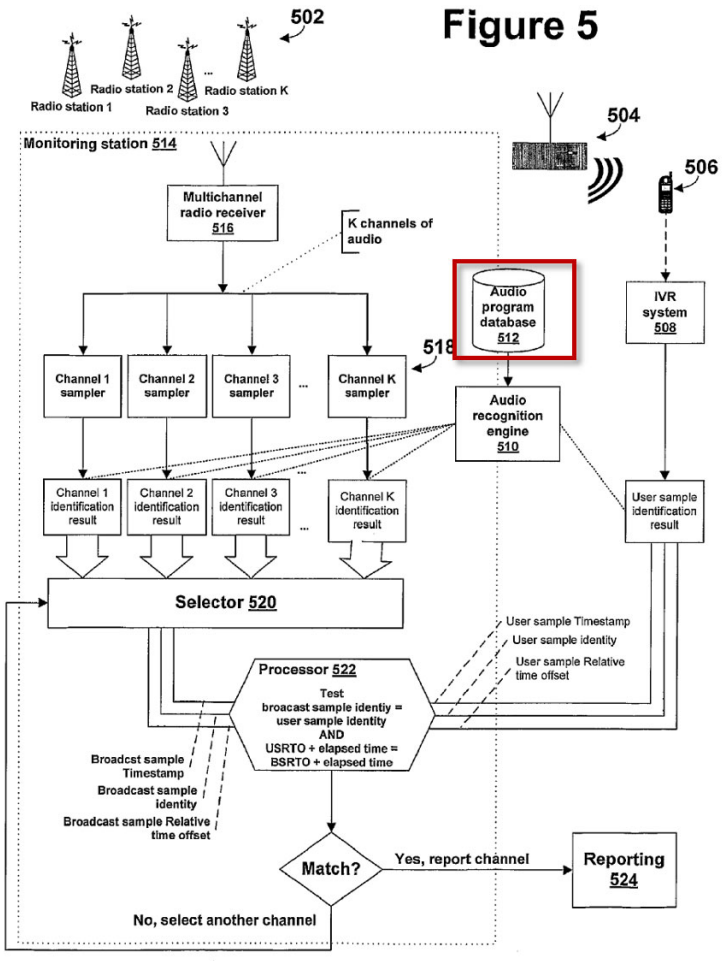
Lastly, Wang777 teaches generating the play stream of content identification results using one or more computers. For example, "the apparatus and methods described herein may be implemented in hardware, software, or a combination, such as a general purpose or dedicated processor running a software application through volatile or non-volatile memory." EX1005, ¶[0078], *see also id.*, ¶¶[0011], [0068]-[0070]; EX1007, 1; EX1003, ¶132.

3. [1.2]

Wang777 discloses and/or renders obvious this element in view of Wang060. EX1003, ¶133.

As described above, audio recognition engine 510 will identify each audio sample by performing a lookup within an audio program database 512 using the technique described within Wang060 and generate a play stream of the content identification results. *See supra* Section VII.B.2; EX1006, ¶[0058]; EX1007, 1, 5-

6, FIG. 2. This again is similar to the disclosure of the '622 patent. EX1001, 5:42-62; EX1003, ¶134.



EX1005, FIG. 5 (annotated).

4. [1.3]

Wang777 discloses and/or renders obvious this element in view of Wang060. EX1003, ¶135.

As explained above for element [1.2], Wang777 obtains content identifiers (e.g., title, artist(s), and record label) corresponding to a sequence of audio data

samples (e.g., the audio samples captured by audio sampling devices 102, 506 over time, [n]) at steps 402-406. EX1005, ¶¶[0004], [0072]; EX1007, 1, 5-6, FIG. 2; EX1003, ¶136.

After the content identifiers have been obtained (i.e., in response to obtaining the content identifiers), Wang777 identifies a broadcast source/channel corresponding to the audio data sample (steps 414-422). EX1005, ¶¶[0051]-[0056], FIG. 4; EX1007, 1, 5-6, FIG. 2. Specifically, the content identification of each audio data sample is compared to identified broadcast audio samples (414); if a match is found, the "relative times" are compared (416), and if matched, the broadcast source/channel is identified and can be reported back to the user (422). EX1005, ¶[0051]. The comparisons of the user and broadcast samples are performed according to the following equations:

"(User sample identity)=(Broadcast sample identity)

Equation (1)

USRTO+(ref. time−UST)=BSRTO+(ref. time−BST)+delay

Equation (2)

where the ref. time is a common reference clock time, and (ref. time−UST) and (ref. time−BST) take into account the possibility for different sampling times by the user audio sampling device and the monitoring station (e.g., (ref. time−BST)=elapsed time since last broadcast sample and now)." EX1005, ¶[0052];

EX1007, 1, 5-6, FIG. 2; EX1003, ¶137.

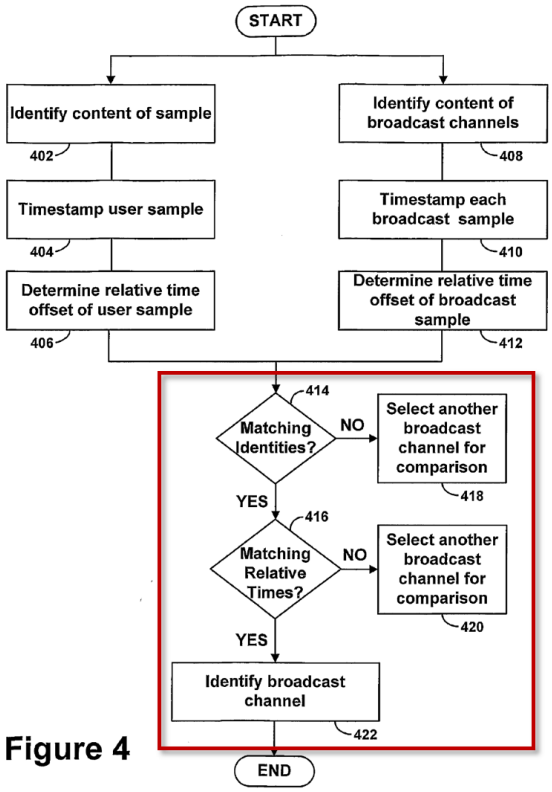
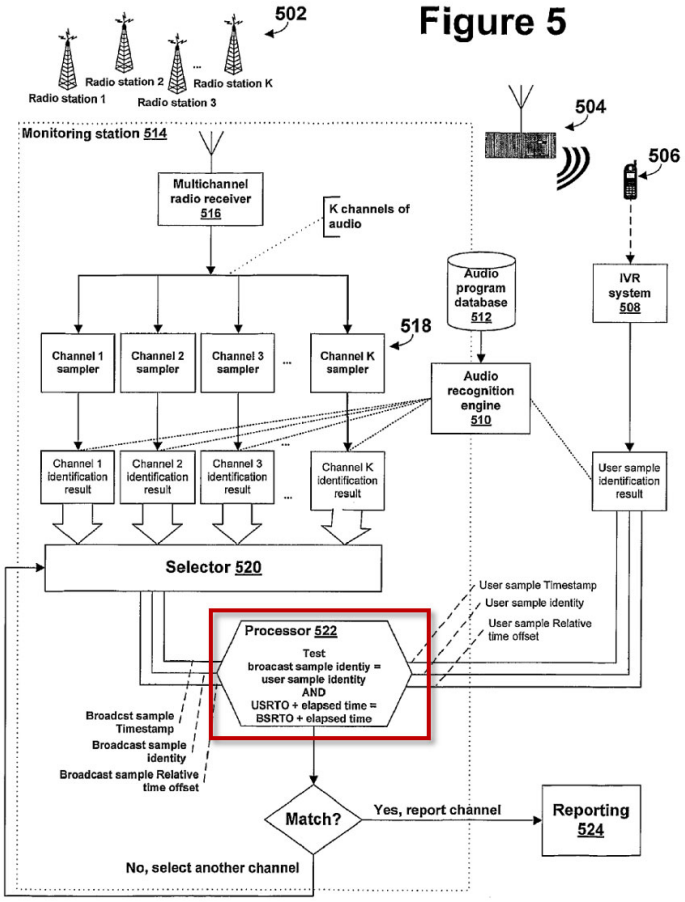


Figure 4

EX1005, FIG. 4 (annotated).

Figure 5 illustrates processor 522 implementing steps 414-422 of Figure 4 to determine a broadcast source/channel using the content identification result, UST, and USRTO. EX1005, ¶¶[0068]-[0070], FIG. 5; EX1007, 5-6, FIG. 2; EX1003, ¶138.



EX1005, FIG. 5 (annotated).

While the description of Figures 4-5 focus on identifying the source/channel for a single audio data sample, Wang777 further discloses identifying a source/channel corresponding to the audio data samples using a sequential order of at least two different obtained content identifiers in the play stream. In particular, to verify which channel a user is actually listening to, content identifiers obtained over a period of time (e.g., longer than a typical audio program, such as over a transition between audio programs on the same channel) are used. EX1005, ¶[0072]; EX1007, 7. If the correct channel is identified, the content identifiers

(e.g., user sample identity[n] and user sample identity[n+1]) will match even across a transition between audio programs (e.g., a transition from one song to another). EX1005, ¶[0072]; EX1007, 7; EX1003, ¶139.

Specifically, to provide further confidence that a correct match has been made (e.g., when both the user and the broadcast sources change synchronously), the following equations are used:

"User sample identity[n]=Broadcast sample identity[n]

Equation (3)

User sample identity[n+1]=Broadcast sample identity[n+]

Equation (4)

User sample identity[n]≠User sample identity[n+1]

Equation (5)

where[n] is the nth sample in time." EX1005, ¶[0072]; EX1007, 7. As such, in response to obtaining the user sample identities (content identifiers), Wang777 alone or in view of Wang060 teaches using one or more computers to utilize user sample identity[n] and user sample identity[n+1] (a sequential order of at least two different obtained content identifiers) in the play stream, *see supra* Section VII.A, to identify a broadcast source (channel) corresponding to the data samples. EX1003, ¶¶140-142.

5. [1.4]

Wang777 discloses this element. EX1003, ¶143.

Wang777 teaches that the content identifiers, user sample identity[n] and user sample identity[n+1], used to determine the source/channel can be from different songs (i.e., different media content items). EX1005, ¶[0072]; EX1007, 7; *see supra* Section VII.B.4; EX1003, ¶¶144-145.

C. Claims 6, 10

1. [6.P], [10.P]

Wang777 discloses these preambles to the extent they are limiting for the reasons set forth above for element [1.P]. In particular, Wang777 states that "the apparatus and methods described herein may be implemented in hardware, software, or a combination, such as a general purpose or dedicated processor running a software application through volatile or non-volatile memory. EX1005, ¶[0078], *see also id.*, ¶¶[0011], [0068]-[0070]; EX1007, 1; EX1003, ¶¶146-148.

2. [6.1], [10.1]

Wang777 discloses and/or renders obvious this element in view of Wang060 for at least the reasons set forth above for element [1.1]. EX1003, ¶149.

3. [6.2], [10.2]

Wang777 discloses and/or renders obvious this element in view of Wang060 for at least the reasons set forth above for element [1.2]. EX1003, ¶150.

4. [6.3], [10.3]

Wang777 discloses and/or renders obvious this element in view of Wang060 for at least the reasons set forth above for element [1.3]. EX1003, ¶151.

5. [6.4], [10.4]

Wang777 discloses this element for at least the reasons set forth above for element [1.4]. EX1003, ¶152.

D. Claims 2, 7, 11

Wang777 in combination with Wang060 discloses this element. EX1003, ¶153.

As explained above, Wang777-Wang060's content identification results are stored with their corresponding USTs and USRTOs (e.g., user sample identity[n] and user sample identity[n+1]) in chronological order in a play stream. And a POSA would have understood that this play stream is a "raw play stream." EX1001, 10:34-40 (describing "raw play stream" broadly); EX1003, ¶154.

Wang060 further teaches generating a log file of information about the identified sound recordings (e.g., title, artist, album cover art, lyrics, or purchase information) as well as "a list of music played from any sound stream (radio, internet streaming radio, hidden microphone, telephone call, etc.)" based on the determined identities of the sound content. EX1006, ¶[0107]. Wang060 states that the list may also be made "only when the identity of recognized sound changes" "to avoid redundancy." EX1006, ¶[0107]; EX1003, ¶155.

A POSA would have thus understood that in Wang777-Wang060, the content identification results stored with their corresponding USTs and USRTOs (raw play stream) are converted to a list of music played (a play list), which would also be a format usable for searching channel data to identify a channel to associate with content of the raw play stream because it includes the information necessary to determine the source/channel (e.g., songs identified over a specific period of time). EX1001, 10:34-40 (describing "play list" broadly); *see also* EX1014, ¶¶[0004]-[0005] (describing known play lists); EX1003, ¶156.

E. Claims 3, 8, 12

Wang777 in combination with Wang060 discloses this element. EX1003, ¶157.

As explained above, Wang777-Wang060 teaches converting the content identification results stored with their corresponding USTs and USRTOs (raw play stream) to a list of music played (a play list). *See supra* Section IX.D; EX1003, ¶158.

F. Claim 4

Wang777 in combination with Wang060 discloses this element. EX1003, ¶159.

Wang060 explains that when the log is created, the reported results can include an "absolute score of the sound file or its score in comparison to the next

highest scored file," which corresponds to the identified content. EX1006, ¶¶[0040], [0089]-[0090], [0097]-[0099], [0101], [00105]. A POSA would have thus understood the scores in the log generated from the content identification results (raw play stream) are a mathematical representation converted from the raw play stream. *See* EX1001, 8:44-49 (describing the mathematical representation without detail); EX1003, ¶160.

G. Claims 5, 9, 13

Wang777, alone or in combination with Wang060, discloses this element. EX1003, ¶161.

Wang777 teaches "using one or more computers to utilize a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples." *See supra* Section VII.B.4. EX1003, ¶162.

Wang777 also explains that "[i]n the field of content identification, it may be desirable to identify not only content, but also a source (e.g., channel, stream, or station) of a broadcast transmission." EX1005, ¶[0018]; EX1007, 1. And the audio sample being analyzed can be "from any number of analog or digital sources, such as a stereo system, television, radio broadcast, Internet streaming broadcast, or any other suitable means of transmitting such recorded material." EX1005, ¶[0027]; EX1007, 1, 4. "Depending on the source, the sample can be in the form of acoustic

waves, radio waves, a digital audio PCM stream, a compressed digital audio stream (such as Dolby Digital or MP3), or an Internet streaming broadcast." EX1005, ¶[0027], *see also* ¶[0019]; EX1007, 1-2, 4; EX1003, ¶163.

A POSA would have thus understood that Wang777's identification of a broadcast source corresponds to searching channel information that includes a plurality of channel types including at least a broadcast media channel type (e.g., radio broadcast over radio waves) and a non-broadcast playable media channel type (e.g., a stereo system playing recorded material in MP3 format). EX1005, ¶[0027]; EX1003, ¶164.

To the extent that it may be argued that Wang777 does not disclose this element, Wang060 does. Wang060 explains that the system provides "a method for recognizing an exogenous media sample given a database containing a large number of known media files" and "a method for generating a database index that allows efficient searching using the recognition method." EX1006, ¶[0037]. "The sound database index contains an index set for each file or recording in the selected collection or library of recordings, which may include speech, music, advertisements, sonar signatures, or other sounds." EX1006, ¶[0047]. "To index the sound database, each recording in the collection is subjected to a landmarking and fingerprinting analysis that generates an index set for each audio file." EX1006, ¶[0049]; EX1003, ¶165.

Thus, after the sound database is generated, a "microphone or other source of sound is continually sampled," analyzed, and identified from the database, and a log file of information about the identified sound recordings (e.g., title, artist, album cover art, lyrics, or purchase information) as well as "a list of music played from any sound stream (radio, internet streaming radio, hidden microphone, telephone call, etc.)" can be created. EX1006, ¶[0107]. Wang060 also explains that the audio sample can be "from any number of analog or digital sources, such as a stereo system, television, compact disc player, radio broadcast, answering machine, telephone, mobile telephone, Internet streaming broadcast, FTP, computer file as an email attachment." EX1006, ¶[0079]; EX1003, ¶166.

It would have thus been obvious to a POSA in view of Wang060 for the audio program database 512 of Wang777 to store not only the identified content from ratio stations 502 but to also store content identified from other non-broadcast playable media channel type sources (e.g., compact disc player) to enable proper identification of a source of the audio. Thus, for example, if a user is listening to an album played from a compact disc player via a stereo system, audio sample device 506 may sample that audio and Wang777 can properly identify the album on the compact disc and report back to the user "an advertisement of a promotion, prize notification, discount offers" as well as "biographical information, information about concerts in the vicinity, and other information of interest to fans can be

provided" (i.e., searching channel information that includes a plurality of channel types including at least a broadcast media channel type and a non-broadcast playable media channel type). EX1005, ¶¶[0019], [0044]. Otherwise, Wang777 would not be able to identify the source unless a radio station broadcasts the album. EX1003, ¶177.

VIII. GROUND 2: CLAIMS 2-4, 7-8, AND 11-12 ARE OBVIOUS OVER WANG777, WANG060, HERLEY682, AND THE DATA IMPUTATION REFERENCES.

A. A POSA would have combined Wang777, Wang060, Herley682, and Seet.

A POSA would have found it obvious to combine Wang777, Wang060, Herley682, and Seet for multiple reasons. EX1003, ¶¶168-169.

Each reference relates to methods and systems of identifying objects of interest (e.g., songs) within signals (e.g., a radio broadcast). EX1005, ¶¶[0002]-[0003], [0009], [0017]; EX1006, Abstract, ¶¶[0026], [0039]-[0042]; EX1011, ¶[0002]; EX1012, ¶ [0019]; EX1003, ¶170. They all do so by extracting fingerprints from samples and comparing these to fingerprints of other, e.g., known, objects in order to determine if there is a match. EX1005, ¶¶ [0021] and [0061] (stating that "fingerprints" of recordings taken as similar times can be compared"); EX1006 ¶¶[0026], [0039]-[0042] (illustrating that fingerprints of an audio sample are compared to fingerprints of audio samples stored in a database); EX1011, ¶[0086] (stating that fingerprints extracted from a sample are compared

to fingerprints stored in a database); EX1012, ¶¶ [0021] (stating that a fingerprint of audio of a radio broadcast is compared to fingerprints of a media content database). Herley682 and Seet both also describe how to handle the situation when there is not a match. EX1003, ¶170.

In particular, Herley682 discloses a "system and method for sampling one or more channels of a broadcast spectrum, such as a radio frequency spectrum, identifying and storing content information for each sampled channel, and providing a user interface for allowing interactive user queries and display of the stored content information." EX1011, ¶2. Herley682's "interactive signal analyzer" among other things, "monitors one or more signals, identifies objects of interest within such signals, [and] stores statistical and metadata information describing such objects to an object database." EX1011, ¶10. Herley682 teaches that these monitored signals may be, for example, audio signals, video signals, or combined audio/video signals. EX1011, ¶11. In Herley682, unmatched objects are stored as "unknown objects" and can be manually identified by a user. EX1011, ¶¶16-17, 71. In view of Herley682, a POSA would have understood that content in Wang777-Wang060 may not be matched. EX1003, ¶171.

Seet teaches using system 106 to "infer additional matches" for unmatched samples "based on their position in a media stream." EX1012, ¶32; EX1016, 6. In particular, an unmatched sample may be identified using "surrounding samples

[that are] in the correct sequence and timing so that a match for the unmatched sample can be made." EX1012, ¶32; EX1016, 6. Seet Figure 4 identifies unmatched samples in the same way as the '622 patent Figure 4. Namely, to identify the unmatched second sample, Seet looks to the previous sample and the following sample, and "[t]he temporal consistency of the bounding samples allows one to infer that they are of the same media item … (in this case, an advertisement labeled #2); therefore, the middle sample is also of the same media item." EX1012, ¶32; EX1016, 6. Using data imputation techniques, such as that disclosed in Seet, to correct missing and/or incorrect data in a data set, such as the unidentified sample/fingerprint in Wang777-Wang066, was well-known to a skilled artisan. EX1003, ¶164; *see*, *e.g.*, EX1017, EX1018, EX1019, EX1020, and EX1023. EX1003, ¶172.

While Herley682 provides a way to manually correct an unmatched sample/fingerprint in Wang777-Wang066, a POSA would have been motivated to use Seet's teachings of inferring matches to identify unmatched content in Wang777-Wang060 at least because a POSA would have been motivated to automate that which is done manually because it would be faster. *See* EX1011, ¶80. *See also Application of Venner*, 262 F.2d 91, 95 (C.C.P.A. 1958). A POSA would have further understood that using Seet's method to automatically correct the unmatched content in Wang777-Wang060 would have increased data

reliability. Further, Seet provides express motivation for using its methods to improve media identification systems, such as that of unmatched content in Wang777-Wang060. *See* EX1012, ¶¶11-13. In particular, Seet's method provides "[s]ignificant operational and competitive advantages" and "improve[d] accuracy of matches," as well as "largely automat[ing]" "creating and maintaining the media content database." EX1012, ¶13; EX1003, ¶¶173-174.

Further still, Wang777, Wang060, Herley682, and Seet are in the same field of endeavor. *Compare* EX1005, ¶2, with EX1006, ¶2, EX1011, ¶2, EX1012, ¶3. A POSA would have been motivated to combine these references, and would have had a reasonable expectation of success in doing so, because they both relate to methods of identifying objects of interest in a broadcast signal. Applying the teachings of Seet to Wang777-Wang060 would have simply been the combination of prior-art elements according to known methods to yield predictable results. Similarly, the combination would have merely been the application of known techniques (Seet's method of inferring additional matches for unmatched samples) to a known system/method ready for improvement (Wang777-Wang060's system/method) to yield the predictable result of identifying objects of interest in a broadcast signal. EX1003, ¶¶175-176.

It would have been well within the level of ordinary skill to implement Seet's teachings in Wang777-Wang060 because they are similar media content

identification methods implemented in conventional database systems implemented in conventional hardware/software. EX1005, ¶50; EX1006, ¶51. Additional motivations for including specific features of Herley682 and Seet are discussed with respect to particular claim elements herein. EX1003, ¶¶177-178.

B. Claims 2, 7, 11

Wang777-Wang060 in view of Herley682 and Seet render obvious this element. EX1003, ¶179.

The ’622 specification, in one example, states that “[p]lay stream generator 126 generates a raw play stream relating a sequence of samples to content identification results (for an example of a portion of a raw play stream, see FIG. 3[ ] and accompanying text).” EX1001, 6:14-17, FIG. 4; *see also id*., 8:1-3. Figure 4 illustrates such a “series of samples and corresponding identification results” as a table including columns for “row,” “log time,” and “contentID” but is clear that a “raw play stream” “may vary considerably from that illustrated in FIG. 4” EX1001, 10:34-40, FIG. 4; EX1003, ¶180.

The ’622 specification further states that a raw play stream may be prepared for further processing by “scrubbing (i.e., reviewing for missing or incorrect data).” EX1001, 8:32-35. However, the ’622 patent does not claim “scrubbing” nor does the specification describe how this “scrubbing” is actually performed. The ’622 specification simply discusses the “scrubbing” process with reference to

Figure 4, stating that:

> Sample sequence data may be used to "scrub" Raw Play Stream 410. By analyzing the sequence of data on Raw Play Stream, it is possible to locate and correct any identifications that are likely to be incorrect or to supply missing identifications where the system has not otherwise been able to provide an indication.

EX1001, 9:32-37. Figure 4 illustrates an example of missing identifications as "none" entries in 410, which are replaced to create Clean Play Stream 450, and ultimately identify a channel. EX1001, 9:38-55; EX1003, ¶¶181-182.

Thus to the extent it is argued that the claimed "converting" corresponds to reviewing data in a "raw play stream" for missing or incorrect data and correcting this data, this would have been obvious in view of Wang070-Wang060-Herley682-Seet. EX1003, ¶183.

As noted above, Wang777-Wang060 identifies samples (e.g., "user sample identity[n]" and "user sample identity[n+1]" where "[n] is the nth sample in time") along with corresponding USTs and USRTOs, which would have been stored in a known format such as a play stream for later comparison to the identified broadcast samples, also referred to as a "candidate list." *See supra* Section VII.B.2. Herley682 teaches that certain samples/fingerprints may not be identified and thus discloses a method for handling these unmatched samples/fingerprints, which

correspond to the '622 patent's "none" entries in the raw play stream. EX1001, 9:42-44, FIG. 4; *see also* EX1006, ¶84. In Herley682, where "fingerprints generated from samples do not match any fingerprints in the database, those trace fingerprints are added as fingerprints to the fingerprint database as 'unknown objects.'" EX1011, ¶¶17-18, 71, 89, 164-165. A POSA would have thus understood that samples in Wang777-Wang060 may not be identified and it would have been obvious to store an indication that they were not identified together with the identified samples as taught by Herley682 ("raw play stream"). EX1003, ¶¶184-185.

Herley682 teaches that the unidentified sample/fingerprint may be manually changed via a user interface. EX1011, ¶¶17-18, 71, 89, 164-165. Seet further teaches inferring matches as an improved way to identify Herley682's unmatched samples/fingerprints, which would have motivated a POSA to automate that which is done manually in Herley682 because it would be faster. EX1012, ¶¶26-32; EX1011, ¶80. Moreover, it was well-known in the art to use other surrounding data in order to clean (scrub) a data set, as explicitly suggested by Seet. EX1012, ¶32; EX1016, 6; EX1003, ¶¶180-186; *see also* EX1017, EX1018, EX1019, EX1020, EX1023. And a POSA would have been motivated to identify and correct any unmatched samples/fingerprints in Wang070-Wang060 in order to obtain a complete and accurate data set to identify a broadcast source (channel)

corresponding to the data samples. EX1003, ¶¶186-194.

C. Claims 3, 8, 12

Wang777-Wang060 in view of Herley682 and Seet renders obvious this element. EX1003, ¶195.

As noted above, in Wang777-Wang060-Herley682-Seet, a raw play stream of identified samples (e.g., "user sample identity[n]" and "user sample identity[n+1]" where "[n] is the nth sample in time") and unidentified samples is created and then reviewed/corrected. *See supra* Section VIII.B. And Wang060 teaches that once the samples have been identified, "a log file can be collected, or a display can be shown on a device indicating information about the music, such as title, artist, album cover art, lyrics, or purchase information." EX1006, ¶107; EX1007, 1. A POSA would have thus understood that in the Wang777-Wang060-Herley682-Seet combination, the raw play stream of identified and unidentified samples is ultimately converted to a play list. EX1001, 10:34-40, 10:46-50 (describing play list broadly); EX1003, ¶196.

D. Claim 4

Wang777-Wang060 in view of Herley682 and Seet renders obvious this element. EX1003, ¶197.

As noted above, in the Wang777-Wang060-Herley682-Seet combination, a raw play stream of identified samples (e.g., "user sample identity[n]" and "user

sample identity[n+1]" where "[n] is the nth sample in time") and unidentified samples is created. *See supra* Section VIII.B. For example, Wang060's candidate list includes the identified samples (e.g., sound_IDs, landmarks). EX1006, ¶81; EX1007, 1. Wang060 explains that there are a variety of techniques for computing landmarks, including Power Norm, which is a special case of the more general Spectral Lp Norm in which p=2. EX1006, ¶[0052]; EX1007, 1. "The general Spectral Lp Norm is calculated at each time along the sound signal by calculating a short-time spectrum, for example via a Hanning-windowed Fast Fourier Transform (FFT)." EX1006, ¶[0052]; EX1007, 1; EX1003, ¶198.

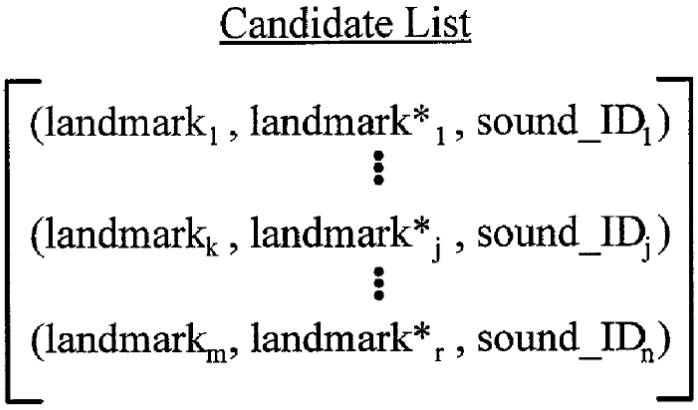


FIG. 9B

EX1006, FIG. 9B.

After the candidate list is compiled, it is processed by segmenting according to sound_ID using any one of a large number of algorithms. EX1006, ¶82. "The result of this process is a list of candidate sound_IDs, each of which has a scatter list of pairs of sample and file landmark timepoints" as shown in FIG. 9C.

EX1006, ¶83; EX1007, 1; EX1003, ¶199.

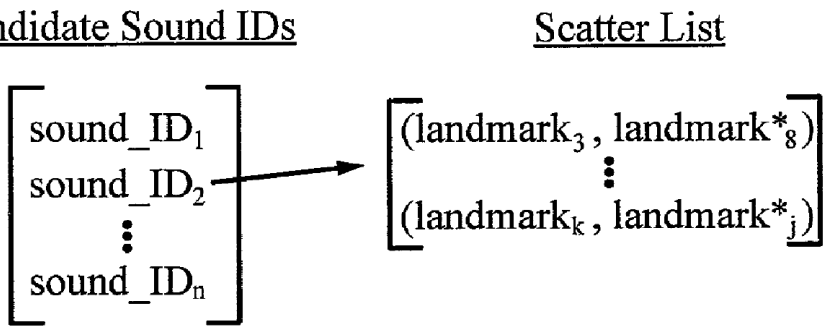


FIG. 9C

EX1006, FIG. 9C.

The scatter list for each candidate sound_ID is then analyzed to determine whether a given sound_ID has a linear correspondence in the form of: $landmark*_n = m*landmark_n + offset$, where m is the slope, landmark is the timepoint within the sample, $landmark*_n$ is the corresponding timepoint within the sound recording indexed by sound_ID, and offset is the time offset into the sound recording corresponding to the beginning of the sound sample. EX1006, ¶¶82-85. "Landmark pairs that can be fit with the above equation for particular values of m and offset are said to be linearly related," which "identifies the correct sound file with high probability." EX1006, ¶85; EX1007, 1; EX1003, ¶200.

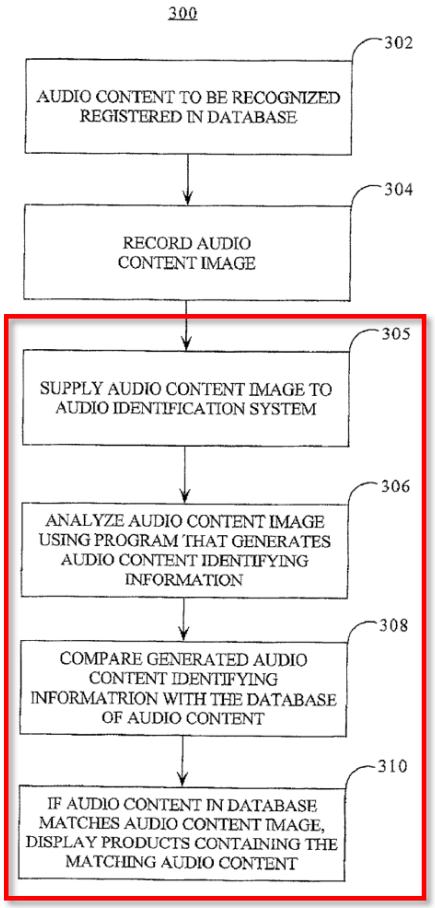
A POSA would have thus understood that the scatter list is a mathematical representation of the candidate list (raw play stream). *See* EX1001, 8:44-49 (describing the mathematical representation without detail); EX1003, ¶201.

IX. GROUND 3: CLAIMS 1-13 ARE OBVIOUS OVER PITMAN, SCHREMPP, AND WELLS.

A. A POSA would have combined Pitman with Schrempp and Wells.

Pitman is directed to a method for "determin[ing] whether audio identifying information generated for an audio content image matches audio identifying information in an audio content database." EX1013, Abstract. In particular, Pitman discloses a content identifier module 218 that receives an audio content sample (e.g., a segment of a song, 305) and analyzes it to generate a set of keys (a signature/fingerprint, 306) that are then compared to the keys stored in the key database 216 (308), and, if a match is found, identification of the matching audio content (e.g., the artist and title) can be displayed to a user (310). EX1013, ¶¶[0030]-[0036], FIGs. 2A, 3; EX1003, ¶¶202-204.

FIG. 3

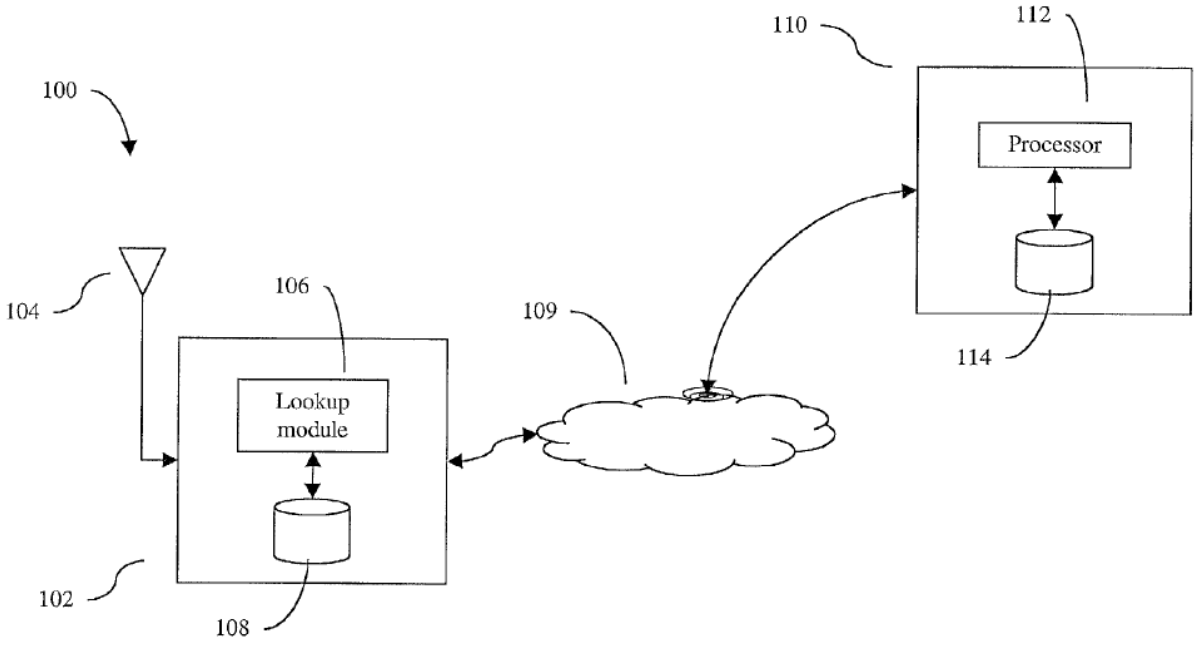


EX1013, FIG. 3 (annotated).

As such, Pitman describes identifying a song and displaying the content identification results to a user but is silent on the format of that information. A POSA, however, would have known that this information could have been presented in any number of formats and would have looked to prior art, such as Schrempp, which discloses as much. EX1003, ¶¶205-206.

Like Pitman, Schrempp is directed to capturing audio and identifying the audio (e.g., song titles) by matching the audio to a database. EX1014, ¶¶[0007]-

[0008]. Schrempp also explains that lists of streamed media content were well known and document digital media, audio works, or video works performed/transmitted at a particular time over a particular medium (e.g., broadcast or internet stream). EX1014, ¶¶[0004]-[0005]. Schrempp, in particular, discloses a playlist generation system 100 that can identify content (e.g., content in a broadcast signal) by comparing it to a database 108 of known reference signatures and keeping a record of all matches made during a predetermined period of time (e.g., a record of song titles detected during a 24-hour period). EX1014, ¶¶[0006]-[0008], FIG. 1. Playlist server 110 can also receive the titles of the identified songs and generate a playlist. EX1014, ¶[0009]; EX1003, ¶¶207-208.



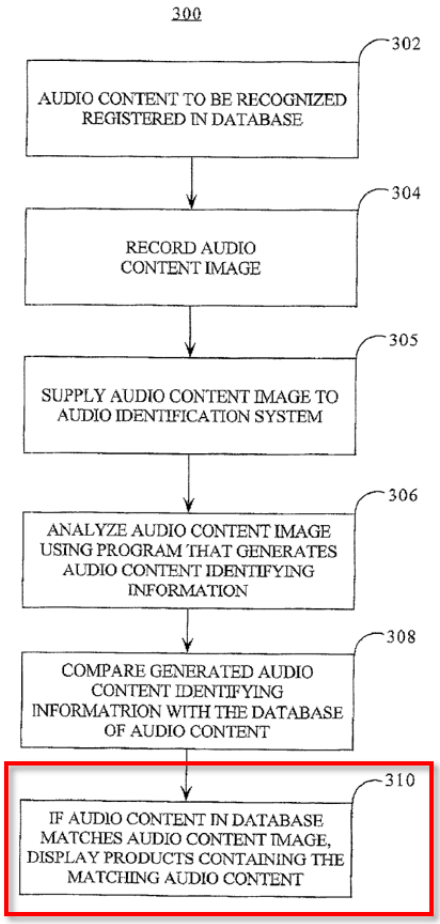
EX1014, FIG. 1.

Based on the teachings of Schrempp, it would have been obvious to a POSA to arrange the identified songs in Pitman in a play stream of content identification results corresponding to a sequence of data samples. *See* EX1001, 10:34-56 (broadly describing "play stream"). Modifying Pitman to incorporate Schrempp's teaching would have required minor modifications (e.g., modifying Pitman's software). A POSA would have been further motivated to combine Pitman and Schrempp because both are in the same field of content identification. And a POSA would have combined the teachings of Pitman and Schrempp by known methods, and the result of the combination would have been predictable to a POSA (e.g., generating a play stream of the identified content). The proposed combination would have involved nothing more than incorporating a well-known concept (e.g., play streams) into a well-known system (e.g., Pitman). EX1003, ¶¶209-210.

Pitman also explains "[i]f the listener enjoys the song" they may desire "to purchase a recording of the song or a product containing the song (e. g., an album or video)." EX1013, ¶[0005]. Pitman thus not only identifies a song, the system can also identify one or more products (e.g., an album) relating to the identified audio content. EX1013, ¶¶[0030]-[0031], [0035]. "For example, if the audio content image is a portion of a song, the list displayed to the listener could include products such as a cassette single of the song, an album containing the song, a

music video for the song, a concert video including a live performance of the song, a movie in which the song appears, and a movie soundtrack including the song." *Id.*, *see also id.*, ¶[0071]; EX1003, ¶211.

FIG. 3



EX1013, FIG. 3 (annotated).

A POSA would have thus understood that Pitman teaches identifying a channel. *See* EX1001, 8:50-56 (describing "channel" as an album). Pitman, however, does not explicitly disclose using a sequential order of at least two different obtained content identifiers in the play stream to identify an album

("channel") corresponding to the data samples, but this would have been obvious in view of Wells. EX1003, ¶212.

Wells, like Pitman, discloses receiving a stream of music (1601), sampling the stream of music (e.g., 3 seconds) and extracting fingerprints for each sample (1602), searching a database for matching fingerprints (1603), and, if one or more fingerprints match (1604), applying additional criteria to identify the stream. EX1015, ¶¶[0259]-[0264], FIG. 12. In particular, Wells teaches that the song is identified (1607) only if P (e.g., 10) "consecutive candidate fingerprints match with the same song in the DB" to reduce the possibility of a mismatch. EX1015, ¶[0264]; EX1003, ¶213.

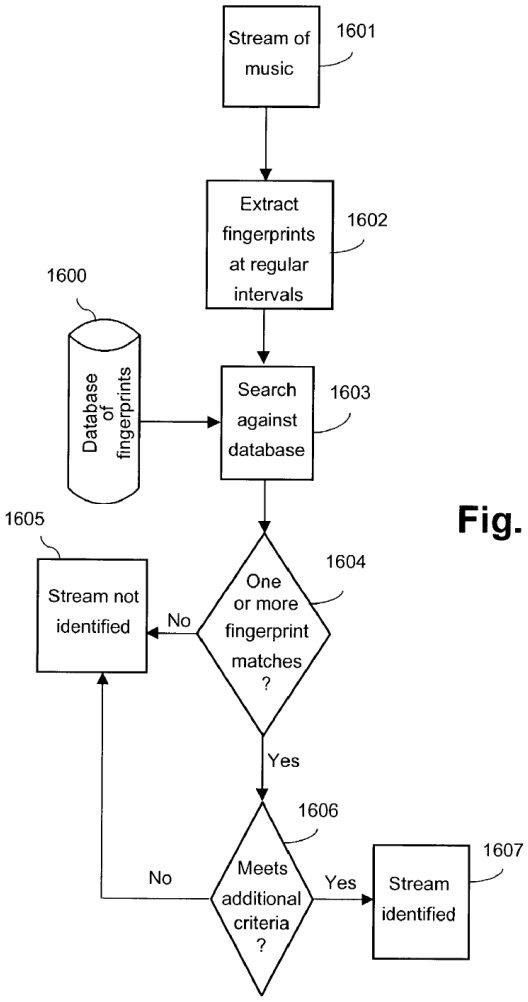


Fig. 12

EX1015, FIG. 12.

That is, Wells teaches the use of multiple consecutive content identifiers to identify a match. EX1003, ¶214.

Based on the teachings of Wells, a POSA would have been motivated to modify Pitman-Schrempp to incorporate Wells' teaching of identifying a song when multiple sequential song segments correspond to the same song and also identifying an album or movie when multiple sequential songs match the album or movie. Doing so would have reduced the possibility of an incorrect song

identification, and by extension an incorrect album (or movie in which the songs appears), as taught by Wells. Modifying Pitman-Schrempp to incorporate Wells' teaching would have required minor modifications (e.g., modifying Pitman's software). EX1003, ¶215.

A POSA would have been further motivated to combine Pitman/Schrempp and Wells because both are in the same field of content identification. And a POSA would have combined the teaching of Pitman-Schrempp and Wells by known methods, and the result of the combination would have been predictable to a POSA (e.g., identifying songs and a corresponding album or movie in which the songs appear when multiple songs correspond to the same album or movie). The proposed combination would have involved nothing more than incorporating a well-known concept (e.g., content identification) into a well-known system (e.g., Pitman). EX1003, ¶216.

B. Claim 1

1. [1.P]

Pitman discloses this preamble to the extent it is limiting. EX1003, ¶217.

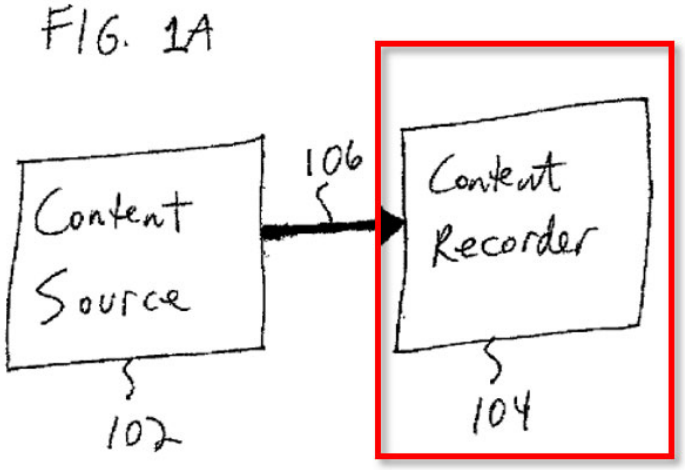
Pitman is directed to a method for "determining whether audio identifying information generated for an audio content image matches audio identifying information in an audio content database." EX1013, Abstract. In particular, a "method for allowing a listener to automatically identify audio content so that a

product containing the audio content can be purchased." EX1013, ¶[0006], *see also id.*, ¶¶[0003], [0071], claims 1-15; EX1003, ¶¶218-219.

2. [1.1]

Pitman in combination with Schrempp renders obvious this element. EX1003, ¶220.

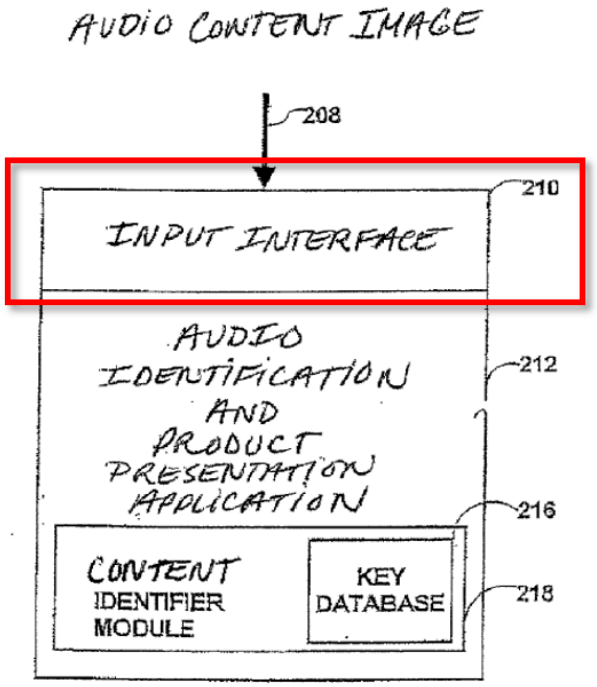
Pitman's system first captures data samples comprising representations of audio data captured as a media monitoring device (104/210). Figure 1A illustrates content source 102 (e.g., "any source that supplies audio content" such as a radio station) and content recorder 104 (e.g., any device that can receive and record an image of the audio content from the content source 102). EX1013, ¶¶[0020]-[0021], [0023]; EX1003, ¶221.



EX1013, FIG. 1A (annotated).

Figure 2A illustrates the system, which includes an input interface 210 for receiving content (e.g., an analog signal that is modulated by the audio content, a

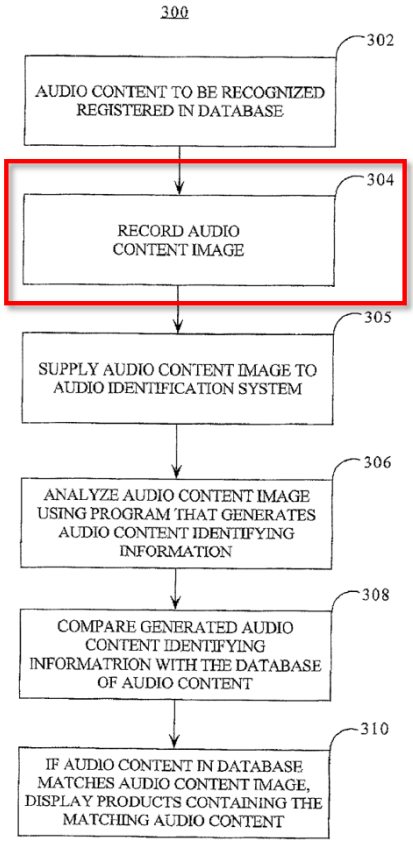
digital datastream, or a computer file). EX1013, ¶[0025]; EX1003, ¶222.



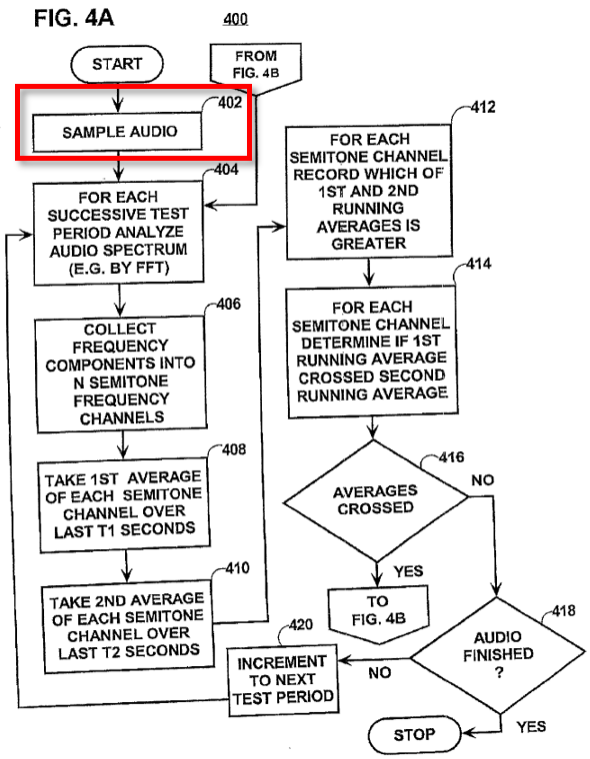
EX1013, FIG. 2A (annotated).

When a listener hears audio content, "an image of at least a portion of the audio content" is recorded (304)/sampled (402). EX1013, ¶¶[0032], [0037], FIGs. 3-4A. That audio content may correspond to a segment of a song. EX1013, ¶¶[0026]-[0027]; EX1003, ¶223.

FIG. 3



EX1013, FIG. 3 (annotated).

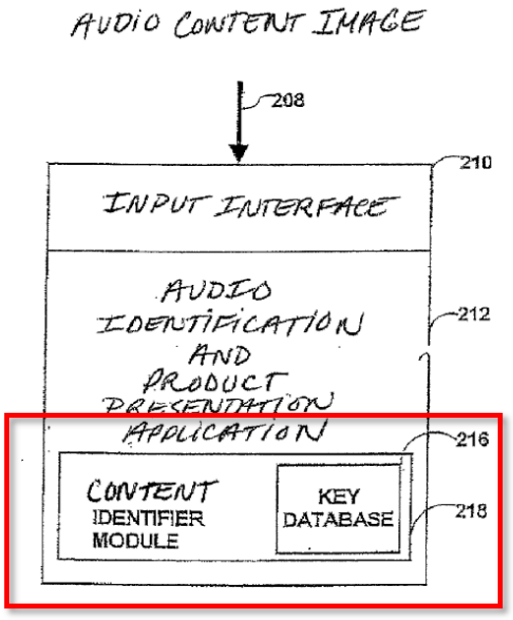


EX1013, FIG. 4A (annotated).

Pitman also discloses using one or more computers to generate content identification results corresponding to a sequence of data samples (e.g., segments of songs). EX1013, ¶¶[0069], [0074]-[0075]; EX1003, ¶224.

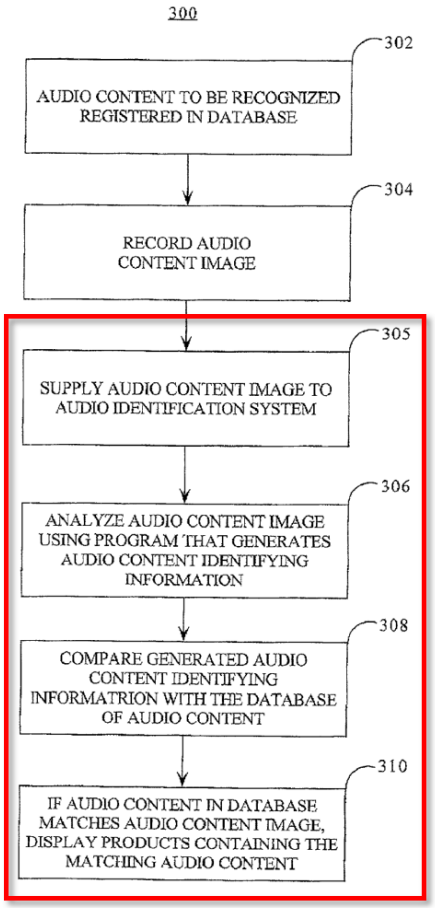
In Figure 3, content identifier module 218 receives the audio content sample (e.g., a segment of a song, 305) and analyzes it to generate a set of keys (a signature/fingerprint, 306) that is then compared to the keys stored in the key database 216 (308), and, if a match is found, identification of the matching audio content (e.g., the artist and title) can be displayed to a user (31). EX1013, ¶¶[0030]-[0036], FIGs. 2A, 3. In the database, there is a set of keys for each song

and a section of a song will have a corresponding subset of keys. EX1013, ¶[0026]; EX1003, ¶225.



EX1013, FIG. 2A (annotated).

FIG. 3

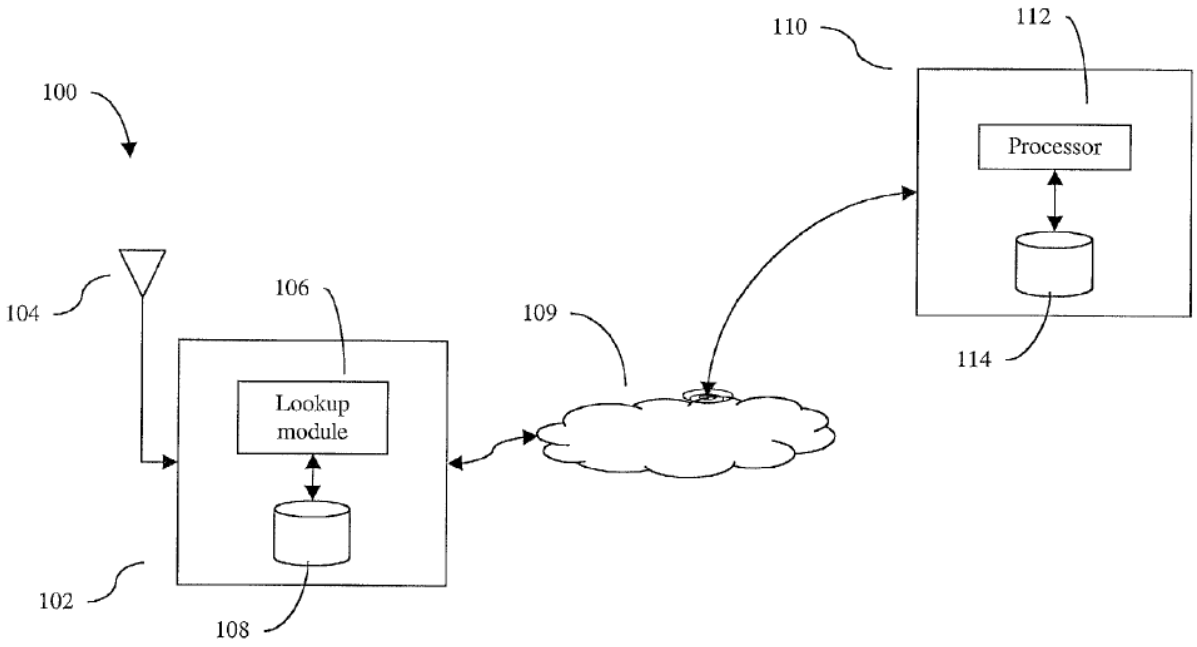


EX1013, FIG. 3 (annotated).

Pitman illustrates its process for identifying audio in Figures 4A-6 and 8. EX1013, ¶¶[0037]-[0059], [0063]-[0070], FIGs. 4A-6, 8. That is, Pitman discloses using one or more computer to generate content identification results (song titles) corresponding to a sequence of data samples (audio samples) by searching a database of known content. EX1003, ¶226.

While Pitman describes identifying a song (content identification result) and displaying the content identification results to a user, Pitman is silent on the format

of that information. However, Schrempp explains that lists of streamed media content were well known and document digital media, audio works, or video works performed at a particular time over a particular medium (e.g., broadcast or internet stream). EX1014, ¶¶[0004]-[0005]. Schrempp, in particular, discloses a playlist generation system 100 that can identify content (e.g., content in a broadcast signal) by comparing it to a database 108 of known reference signatures and keep a record of all matches made during a predetermined period of time (e.g., a record of song titles detected during a 24-hour period). EX1014, ¶¶[0006]-[0008], FIG. 1. Playlist server 110 can also receive the titles of the identified songs and generate a playlist. EX1014, ¶[0009]; EX1003, ¶227.



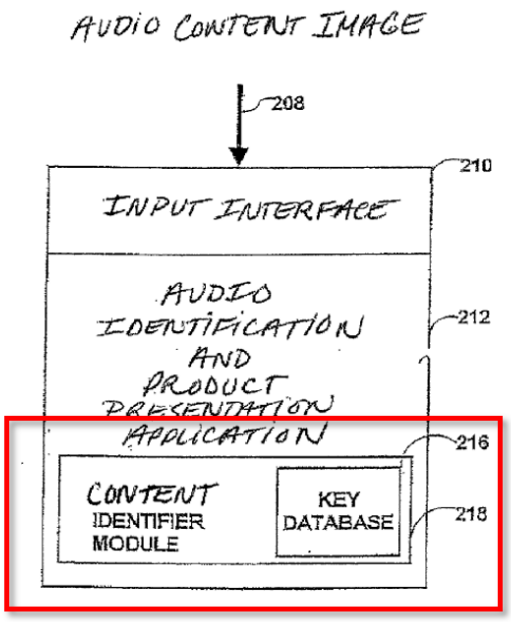
EX1014, FIG. 1.

It would have been obvious to a POSA to arrange the identified songs in Pitman in a play stream of content identification results corresponding to a sequence of data samples in light of Schrempp. *See supra* Section IX.A; EX1003, ¶228.

3. [1.2]

Pitman in combination with Schrempp renders obvious this element. EX1003, ¶229.

As explained above, Pitman's processes can identify a song (or segments of a song) by analyzing each segment to generate a set of keys (a signature, 306), comparing the generated keys to the keys stored in the key database 216 (308), and, if a match is found, identification of the matching audio content (e.g., the artist and title) can be displayed to a user (31). EX1013, ¶¶[0030]-[0036], FIGs. 2A, 3; EX1003, ¶230.



EX1013, FIG. 2A (annotated).

4. [1.3]

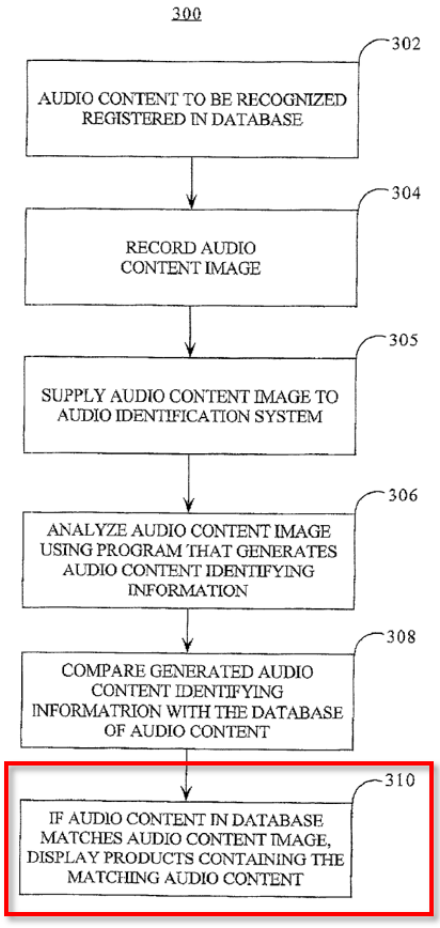
Pitman in combination with Schrempp and Wells renders obvious this element. EX1003, ¶231.

As explained above, Pitman identifies a song (or segments of a song) by analyzing each segment to generate a set of keys (a signature/fingerprint, 306), compares the generated signature/fingerprint to database 216 (308), and, if a match is found, identification of the matching audio content (e.g., the artist and title) can be displayed to a user (31). EX1013, ¶¶[0030]-[0036], FIGs. 2A, 3; EX1003, ¶232.

Pitman also explains "[i]f the listener enjoys the song" they may desire "to purchase a recording of the song or a product containing the song (e. g., an album or video)." EX1013, ¶[0005]. Pitman thus not only identifies a song, the system

identifies one or more products relating to the identified audio content. EX1013, ¶¶[0030]-[0031], [0035]. "For example, if the audio content image is a portion of a song, the list displayed to the listener could include products such as a cassette single of the song, an album containing the song, a music video for the song, a concert video including a live performance of the song, a movie in which the song appears, and a movie soundtrack including the song." *Id.*, *see also id.*, ¶[0071]; EX1003, ¶233.

FIG. 3



EX1013, FIG. 3 (annotated).

A POSA would have thus understood that Pitman teaches identifying a channel (e.g., an album containing the song) corresponding to the data samples (segments of audio). However, while Pitman does not explicitly disclose using a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples, Wells does. EX1003, ¶234.

Wells, like Pitman, discloses receiving a stream of music (1601), sampling the stream of music (e.g., 3 seconds) and extracting fingerprints for each sample (1602), searching a database for matching fingerprints (1603), and, if one or more fingerprints match (1604), applying additional criteria to identify the stream. EX1015, ¶¶[0259]-[0264], FIG. 12. In particular, Wells teaches that the stream is identified (1607) only if P (e.g., 10) "consecutive candidate fingerprints match with the same song in the DB" to reduce the possibility of a mismatch. EX1015, ¶[0264]. That is, Wells teaches the use of multiple consecutive content identifiers to identify a match. EX1003, ¶235.

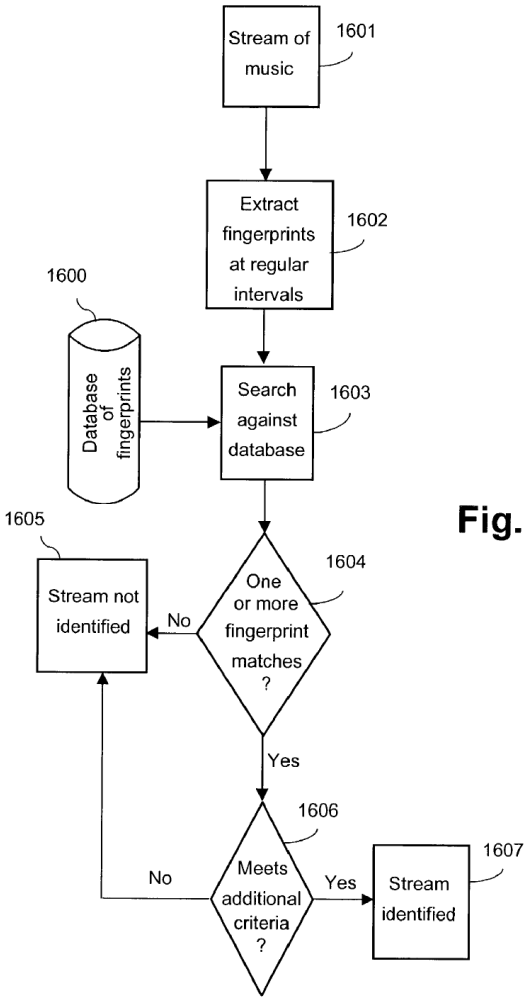


Fig. 12

EX1015, FIG. 12.

In addition to identifying segments of songs, Pitman "provides a means for identifying a song." EX1013, ¶26. And Pitman teaches that not just a single song but all songs on an album or in a movie may be registered in the audio content database for presentation to a user for sale. EX1013, ¶¶30-31. As noted above, Schrempp teaches keeping a record of all matches made during a predetermined period of time (e.g., a record of song titles detected during a 24-hour period). EX1014, ¶¶[0006]-[0008], FIG. 1. Moreover, Wells teaches identifying a source by

looking at content matches over time. EX1015, ¶¶[0259]-[0264]; EX1003, ¶236.

It would have thus been obvious to a POSA to use the identification of two (or more) sequential songs from the stored record of song titles to determine whether those songs correspond to a particular album or movie in the Pitman-Schrempp-Wells combination. Otherwise, if a song appears on multiple albums and in multiple movies, the system would not be able to identify the album that the user is actually listening to but instead could only provide every possible album or movie to the user for purchase; potentially frustrating the user and leading them to not purchase a product. EX1003, ¶237.

5. [1.4]

Pitman in combination with Schrempp and Wells renders obvious this element. EX1003, ¶238.

As noted above, it would have been obvious to identify the songs and corresponding album or movie in which the songs appears when sequential songs correspond to the same album or movie in Pitman, in view of Wells. Doing so would have reduced the possibility of an incorrect song identification. *See supra* Section IX.B.4; EX1003, ¶239.

C. Claims 6 and 10

1. [6.P], [10.P]

Pitman discloses this preamble to the extent it is limiting for the reasons set forth above for element [1.P]. In particular, "[t]he present invention can be realized

in hardware, software, or a combination of hardware and software. Any kind of computer system—or other apparatus adapted for carrying out the methods described herein—is suited." EX1013, ¶¶[0074]-[0075]; EX1003, ¶¶240-242.

2. [6.1], [10.1]

Pitman in combination with Schrempp renders obvious this element for at least the reasons set forth above for element [1.1]. EX1003, ¶243.

3. [6.2], [10.2]

Pitman in combination with Schrempp renders obvious this element for at least the reasons set forth above for element [1.2]. EX1003, ¶244.

4. [6.3], [10.3]

Pitman in combination with Schrempp and Wells renders obvious this element for at least the reasons set forth above for element [1.3]. EX1003, ¶245.

5. [6.4], [10.4]

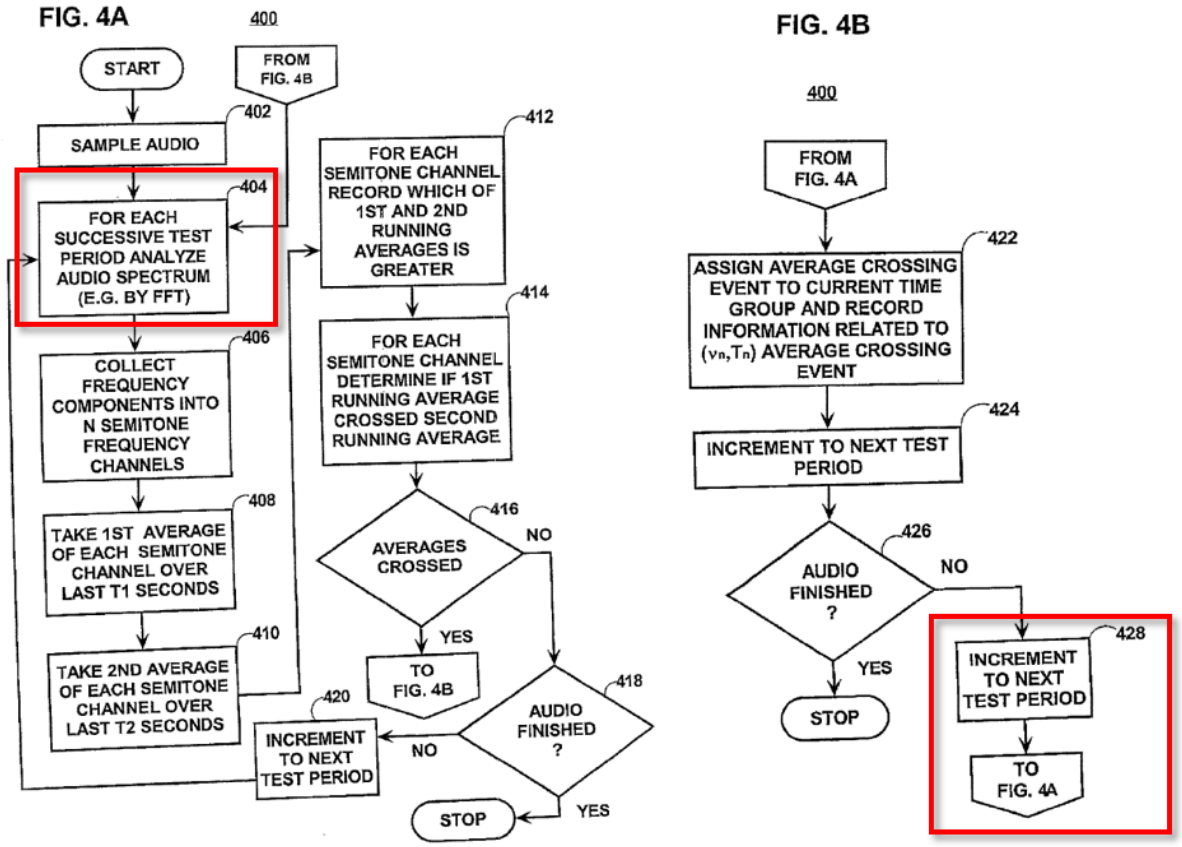
Pitman in combination with Schrempp and Wells renders obvious this element for at least the reasons set forth above for element [1.4]. EX1003, ¶246.

D. Claims 2, 7, and 11

Pitman-Schrempp-Wells discloses this element. EX1003, ¶247.

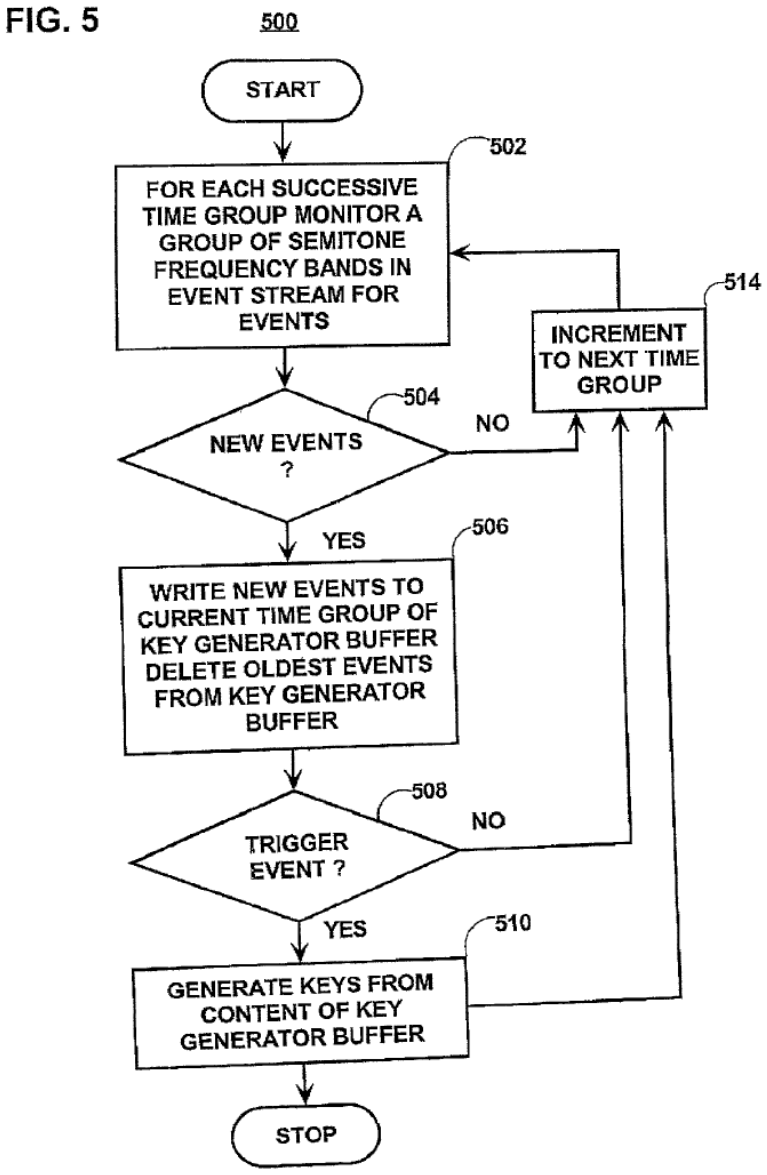
Pitman discloses a multistep process for identifying the sampled content. For each test period (e.g., 1/43 to 1/10.75 of a second), Pitman analyzes the content to generate "event information" (e.g., a time group for the event, a test period for the event, a semitone frequency band of the event, and a value of a fast average

(average over T 1) at a time of crossing) (404-428). EX1013, ¶¶[0038]-[0049], FIGs. 4A-4B. The events are then grouped into "time groups," which are ¼ to 2 seconds and the event information is then stored in memory in the form of an event stream. EX1013, ¶¶[0048], [0050]; EX1003, ¶248.



EX1013, FIGs. 4A-4B (annotated).

Next, Pitman analyses each time group of events spanning ¼ to 2 seconds and, depending on the analysis, generates keys for that time group of events. EX1013, ¶¶[0051]-[0054], FIG. 5; EX1003, ¶249.

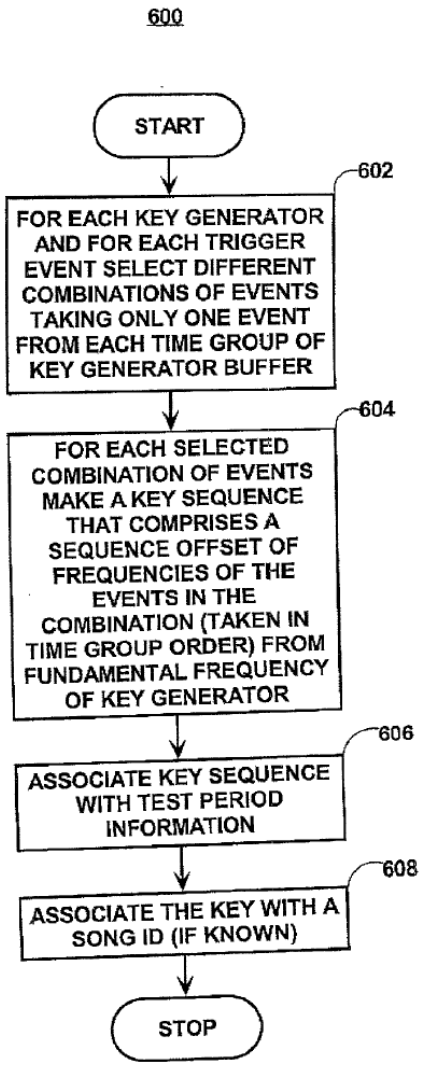


EX1013, FIG. 5.

Pitman Figure 6 illustrates generating the keys, which corresponds to step 510 in Figure 5. EX1013, ¶¶[0055]-[0058]. In particular, Pitman generates a key having a key sequence (a sequence of numerical values of frequency offsets relative to the main key generator frequency) for each event that corresponds to a trigger event and then associates that key sequence with "test period information,"

which is a sequence number for the test period of the trigger event, where the sequence number for the first test period for each song is designated by the number one. EX1013, ¶[0057]. In other words, the key includes a key sequence and an offset indicating when the trigger event occurs ("test period information"). The keys for all of the test periods form a set of keys (a unique signature for the recorded audio). EX1013, ¶¶[0033], [0064]. While Figure 6 illustrates a step of associating the key with a song (608), that step is only performed when generating the database of known content. EX1013, ¶[0058]; EX1003, ¶¶250-251.

FIG. 6



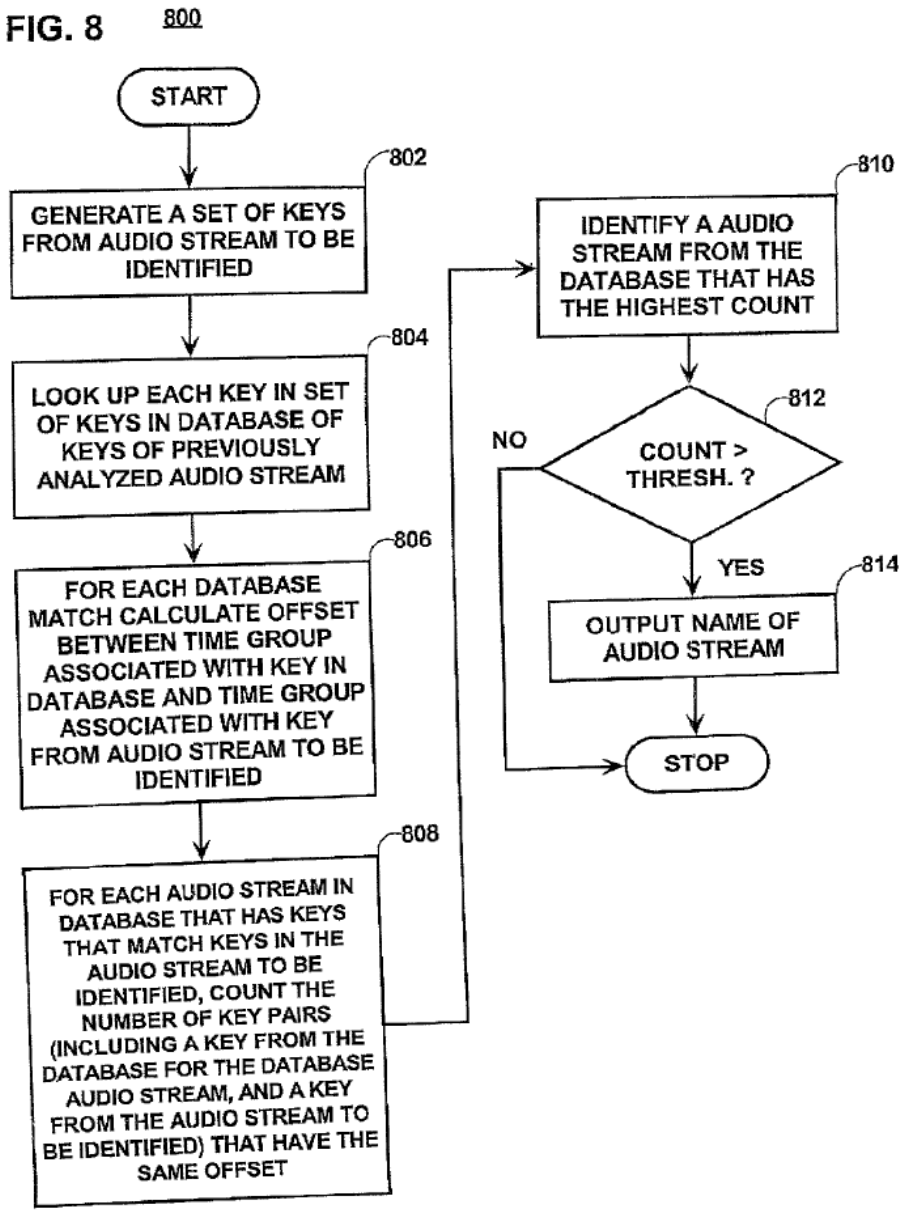
EX1013, FIG. 6.

Pitman Figure 8 illustrates "a song identification process that uses the keys generated in the processes of FIGS. 5 and 6" using a song database. EX1013, ¶[0063]. The song database is a keytable and each includes a key sequence in the first column, a time group value in the second column, and a song ID (e.g., title) in the third column:

key sequence	**time group value**	**song ID (e.g., title)**

EX1013, ¶¶[0027], [0058], [0063]; EX1003, ¶252.

Pitman compares each key in the set of keys (the signature for the song) to the song database by comparing the key sequence of the key to key sequences stored in the song database (806). EX1013, ¶[0064], FIG. 8; EX1003, ¶¶253-254.



EX1013, FIG. 8.

A POSA would have thus understood that the data set of unprocessed audio samples in Pitman is converted to a format (e.g., keys) usable for searching channel data to identify a channel (e.g., album) to associate with content of the raw play stream. EX1003, ¶255.

E. Claims 3, 8, and 12

Pitman-Schrempp-Wells discloses this element. EX1003, ¶256.

As explained above, the data set of unprocessed audio samples in Pitman-Schrempp-Wells is converted to a set of keys where each key includes a key sequence and associated test period ("play list"), which is used to identify the audio. *See supra* Section IX.D; *see also* EX1013, ¶¶[0026], [0030], [0033], [0057]-[0058], [0064]; EX1003, ¶257.

F. Claim 4

Pitman-Schrempp-Wells discloses this element. EX1003, ¶258.

As explained above, the data set of unprocessed audio samples in Pitman-Schrempp-Wells is converted to a key sequence, which includes a sequence of numerical values of frequency offsets (relative to the main key generator frequency) for the sequence of events from each combination. *See supra* Section IX.D; *see also* EX1013, ¶[0057]. A POSA would have thus understood that Pitman converts the raw play stream to a mathematical representation of the raw play stream. EX1003, ¶259.

G. Claims 5, 9, and 13

Pitman-Schrempp-Wells discloses this element. EX1003, ¶260.

The "content source 102 can be any source that supplies audio content, either alone or as part of a multimedia presentation." EX1013, ¶[0021]. "For example, content source 102 is an FM radio station, content recorder 104 is a

stereo having an FM receiver and a cassette deck, content player 112 is a portable cassette player, and AIC 120 is a computer-powered kiosk at a record store." EX1013, ¶[0023]. Alternatively, content source 102 is a recorded video playback device (e. g., VCR or DVD player), a personal computer is both the content recorder 104 and content player 112, and a remote web server is the AIC 120. EX1013, ¶[0024]. A POSA would have thus understood that Pitman teaches searching channel information that includes a plurality of channel types including at least a broadcast media channel type (e.g., FM radio station) and a non-broadcast playable media channel type (e.g., DVD player). EX1003, ¶¶261-262.

X. PETITIONER IS UNAWARE OF ANY SECONDARY CONSIDERATIONS OF NON-OBVIOUSNESS

Petitioner is unaware of any alleged evidence of secondary considerations, or that PO has made any non-conclusory assertions of any secondary considerations of non-obviousness.

XI. DISCRETIONARY DENIAL IS NOT APPROPRIATE.

A. *Fintiv* does not support discretionary denial.

Fintiv does not support discretionary denial. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, at 6 (P.T.A.B. Mar. 20, 2020) (precedential) ("*Fintiv*"). If the Board institutes trial, Roku will not pursue, in a parallel district court proceeding, the same grounds as in the petition or any grounds that could have reasonably been raised in the IPR. *See Sotera Wireless, Inc. v. Masimo Corp.*,

IPR2020-01019, Paper 12, at 18-19 (P.T.A.B. Dec. 1, 2020) (precedential as to § II.A). Under the Interim Procedure, "the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a [*Sotera*] stipulation," as Roku presents here. EX1016, 3, 7.

B. Denial under §325(d) is not appropriate.

Denial under §325(d) and *Advanced Bionics* is not appropriate. Under *Advanced Bionics* part one, Herley682, Seet, Pitman, Schrempp, and Wells were not before the Examiner during prosecution. *See* EX1001, (56). Wang777 and Wang060 were cited individually during examination but the Examiner did not rely on a combination of the teachings of Wang777 and Wang060, and did not cite many of the portions of Wang777 and Wang060 that are relied upon in this IPR.

Thus, the Examiner during original prosecution did not consider the combinations or arguments presented in the Petition and *Advanced Bionics* part one is not met.

Even if part one were met (which it is not), *Advanced Bionics* part two requires a consideration of whether the Office erred. Here, the Examiner clearly erred by not considering or applying Herley682, Seet, Pitman, Schrempp, or Wells in rejecting the claims. *See* Section V.B.

XII. CERTIFICATION THAT THE PATENT MAY BE CONTESTED VIA *INTER PARTES* REVIEW BY THE PETITIONER AND STANDING (37 C.F.R. § 42.104(A))

Petitioner certifies that the '622 patent is available for IPR and Petitioner is not barred or estopped from requesting IPR of any '622 patent claim.

XIII. MANDATORY NOTICES (37 C.F.R. § 42.8(A)(1))

Real Party-in-Interest (37 C.F.R. § 42.8(b)(1)): The real party-in-interest is Petitioner Roku, Inc. r

Related Matters (37 C.F.R. § 42.8(b)(2)): The '622 patent is currently at issue in the following matters:

Proceeding	Filed	Status
Anonymous Media Research Holdings LLC v. Samsung Electronics Co., Ltd., 2-23-cv-00439 (EDTX)	September 22, 2023	Pending
Anonymous Media Research Holdings LLC v. Roku, Inc., 1-23-cv-01143 (WDTX)	September 22, 2023	Pending

Lead and Back-up Counsel (37 C.F.R. § 42.8(b)(3)) for Petitioner are

Lead Counsel	Back-Up Counsel
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Service Information (37 C.F.R. § 42.8(b)(4)): Please direct all correspondence regarding this Petition to counsel at the above addresses and PTAB@sternekessler.com. Petitioner consents to service by email at the addresses above.

Procedural Statements: This Petition is filed in accordance with 37 C.F.R. § 42.106(a). Concurrently filed herewith are a Power of Attorney and Exhibit List under 37 C.F.R. §§ 42.10(b) and 42.63(e), respectively. The required fee is paid through Deposit Acct. No. 19-0036 (Customer ID No. 45324). The Office is authorized to charge any fee deficiency, or credit any overpayment, to Deposit Acct. No. 19-0036 (Customer ID No. 45324).

XIV. CONCLUSION

The challenged claims are unpatentable as obvious and IPR is warranted.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX PLLC

/ Lestin Kenton /

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CERTIFICATE OF WORD COUNT (37 C.F.R. § 42.24(d))

1. This Petition for *Inter Partes* Review complies with the type-volume limitation of 14,000 words, comprising 13,977 words, excluding the parts exempted by 37 C.F.R. § 42.24(a)(1).

2. This Petition for *Inter Partes* Review complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman font.

Respectfully submitted,

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/ Lestin Kenton /

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CERTIFICATE OF SERVICE (37 C.F.R. §§ 42.6(e)), 42.105(a))

I certify that the above-captioned **PETITION FOR *INTER PARTES* REVIEW FOR U.S. PATENT NO. 8,756,622** and associated Exhibits 1001-1023 were served in their entireties upon the Patent Owner on July 17, 2024, via FedEx® Express at the following addresses:

MASCHOFF BRENNAN GILMORE ISRAELSEN & MAURIEL LLP
1389 Center Drive, Suite 300
Park City, UT 84098
Patent Owner's Correspondence Address of Record for U.S. Patent No. 8,756,622

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX PLLC

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CLAIM APPENDIX

Limitation	Claim
[1P]	A media measurement method comprising:
[1.1]	using one or more computers to generate a play stream of content identification results corresponding to a sequence of data samples, the data samples comprising representations of audio data captured at a media monitoring device,
[1.2]	wherein content identifiers of the play stream's content identification results are obtained by using corresponding data samples to search a computerized database of known content; and
[1.3]	in response to obtaining the content identifiers, using one or more computers to utilize a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples,
[1.4]	the at least two different obtained content identifiers identifying different media content items.
[2]	The method of claim 1 further comprising: converting a raw play stream to a format usable for searching channel data to identify a channel to associate with content of the raw play stream.
[3]	The method of claim 2 wherein the raw play stream is converted to a play list.
[4]	The method of claim 2 wherein the raw play stream is converted to a mathematical representation of the raw play stream.
[5]	The method of claim 1 wherein using one or more computers to utilize a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples comprises searching channel information that includes a plurality of channel types including at least a broadcast media channel type and a non-broadcast playable media channel type.
[6P]	A computer program product in a non-transitory computer readable medium comprising instructions executable by one or more processors of one or more computers, the instructions comprising instructions for:
[6.1]	generating a play stream of content identification results corresponding to a sequence of data samples, the data samples

	comprising representations of audio data captured at a media monitoring device,
[6.2]	wherein content identifiers of the play stream's content identification results are obtained by using corresponding data samples to search a computerized database of known content; and
[6.3]	in response to obtaining the content identifiers, utilizing a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples,
[6.4]	the at least two different obtained content identifiers identifying different media content items.
[7]	The computer program product of claim 6 wherein the instructions include instructions for converting a raw play stream to a format usable for searching channel data to identify a channel to associate with content of the raw play stream.
[8]	The computer program product of claim 7 wherein the instructions include instructions for converting the raw play stream to a play list.
[9]	The computer program product of claim 6 wherein utilizing an order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples comprises searching channel information that includes a plurality of channel types including at least a broadcast media channel type and a non-broadcast playable media channel type.
[10P]	A computer system comprising one or more computers configured by computer code stored in the one or more computers, the computer code comprising instruction executable by one or more processors of the one or more computers, the instructions comprising instructions for:
[10.1]	generating a play stream of content identification results corresponding to a sequence of data samples, the data samples comprising representations of audio data captured at a media monitoring device,
[10.2]	wherein content identifiers of the play stream's content identification results are obtained by using corresponding data samples to search a computerized database of known content; and

[10.3]	in response to obtaining the content identifiers, utilizing a sequential order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples,
[10.4]	the at least two different obtained content identifiers identifying different media content items.
[11]	The computer system of claim 10 wherein the instructions include instructions for converting a raw play stream to a format usable for searching channel data to identify a channel to associate with content of the raw play stream.
[12]	The computer system of claim 11 wherein the instructions include instructions for converting the raw play stream to a play list.
[13]	The computer system of claim 10 wherein utilizing an order of at least two different obtained content identifiers in the play stream to identify a channel corresponding to the data samples comprises searching channel information that includes a plurality of channel types including at least a broadcast media channel type and a non-broadcast playable media channel type.