



US009986325B2

(12) **United States Patent**
Koss et al.

(10) **Patent No.:** **US 9,986,325 B2**
(45) **Date of Patent:** ***May 29, 2018**

(54) **SYSTEM WITH WIRELESS EARPHONES**

(71) Applicant: **Koss Corporation**, Milwaukee, WI (US)

(72) Inventors: **Michael J. Koss**, Milwaukee, WI (US);
Michael J. Pelland, Princeton, WI (US)

(73) Assignee: **KOSS CORPORATION**, Milwaukee, WI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days. days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/650,362**

(22) Filed: **Jul. 14, 2017**

(65) **Prior Publication Data**

US 2017/0318378 A1 Nov. 2, 2017

Related U.S. Application Data

(63) Continuation of application No. 15/293,785, filed on Oct. 14, 2016, now Pat. No. 9,729,959, which is a (Continued)

(51) **Int. Cl.**

H04R 1/10 (2006.01)
H04M 1/02 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **H04R 1/1041** (2013.01); **H03G 3/02** (2013.01); **H03K 17/9622** (2013.01); (Continued)

(58) **Field of Classification Search**

CPC H04R 2460/13; H04W 52/0229 (Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,784,685 A 7/1998 Stanford et al.
6,389,463 B2 5/2002 Bolas
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2004-320597 11/2004
WO WO 2006/047724 A2 5/2006
(Continued)

OTHER PUBLICATIONS

Supplementary European Search Report for European Application No. 09731146.8 dated Jun. 10, 2011, 7 pages.

(Continued)

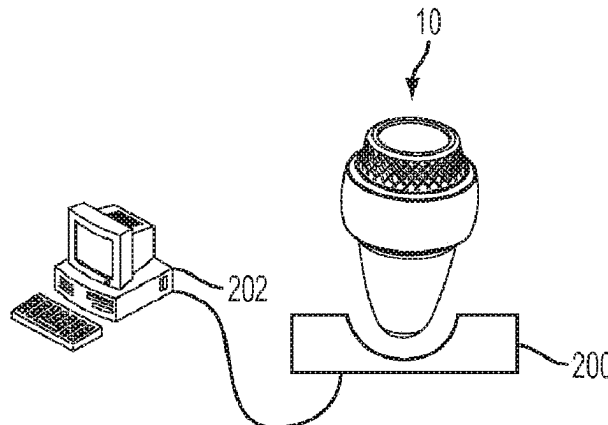
Primary Examiner — Kiet Doan

(74) *Attorney, Agent, or Firm* — K&L Gates LLP

(57) **ABSTRACT**

Apparatus comprises adapter and speaker system. Adapter is configured to plug into port of personal digital audio player. Speaker system is in communication with adapter, and comprises multiple acoustic transducers, programmable processor circuit, and wireless communication circuit. In first operational mode, processor circuit receives, via adapter, and processes digital audio content from personal digital audio player into which adapter is plugged, and the multiple acoustic transducers output the received audio content from the personal digital audio player. In second operational mode, wireless communication circuit receives digital audio content from a remote digital audio source over a wireless network, processor circuit processes the digital audio content received from remote digital audio source, and the multiple acoustic transducers output the audio content received from the remote digital audio source.

3 Claims, 16 Drawing Sheets



DocuPrint 1002

Related U.S. Application Data

continuation of application No. 15/082,040, filed on Mar. 28, 2016, now Pat. No. 9,497,535, which is a continuation of application No. 14/695,696, filed on Apr. 24, 2015, now Pat. No. 9,438,987, which is a continuation of application No. 13/609,409, filed on Sep. 11, 2012, now Pat. No. 9,049,502, which is a continuation of application No. 13/459,291, filed on Apr. 30, 2012, now Pat. No. 8,571,544, which is a continuation of application No. 12/936,488, filed as application No. PCT/US2009/039754 on Apr. 7, 2009, now Pat. No. 8,190,203.

(60) Provisional application No. 61/123,265, filed on Apr. 7, 2008.

(51) **Int. Cl.**

H04R 3/00 (2006.01)
H04R 5/033 (2006.01)
H04R 5/04 (2006.01)
H04W 48/20 (2009.01)
H03G 3/02 (2006.01)
H03K 17/96 (2006.01)
H04R 1/02 (2006.01)
H04H 20/95 (2008.01)
H04L 29/12 (2006.01)
H04R 25/00 (2006.01)
H04W 84/18 (2009.01)
H04W 84/12 (2009.01)

(52) **U.S. Cl.**

CPC **H04H 20/95** (2013.01); **H04L 61/6068** (2013.01); **H04M 1/0254** (2013.01); **H04R 1/02** (2013.01); **H04R 1/1091** (2013.01); **H04R 3/00** (2013.01); **H04R 5/033** (2013.01); **H04R 5/04** (2013.01); **H04W 4/80** (2018.02); **H04W 48/20** (2013.01); **H03K 2217/960785** (2013.01); **H04R 25/554** (2013.01); **H04R 2201/103** (2013.01); **H04R 2201/107** (2013.01); **H04R 2225/55** (2013.01); **H04R 2420/07** (2013.01); **H04W 84/12** (2013.01); **H04W 84/18** (2013.01)

(58) **Field of Classification Search**

USPC 381/74, 381, 323, 111, 379, 71.6, 71.1, 381/309, 314; 455/456.1, 456.3, 552.1, 455/73, 569.1, 66.1, 575.2

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,671,494 B1 12/2003 James
 6,674,864 B1 1/2004 Kitamura
 6,792,091 B2 9/2004 Lemchen et al.
 6,937,712 B2 8/2005 Lemchen et al.
 7,003,515 B1 2/2006 Glaser
 7,027,311 B2 4/2006 Vanderelli
 7,095,455 B2 8/2006 Jordan
 7,099,370 B2 8/2006 Takahashi
 7,120,388 B2 10/2006 Hall
 7,139,585 B2 11/2006 Hachimura et al.
 7,266,390 B2 9/2007 Mathews
 7,337,027 B2 2/2008 Nishiguchi et al.
 7,467,021 B2 12/2008 Yuen
 7,512,414 B2 3/2009 Jannard et al.
 7,599,679 B2 10/2009 Awiszus

7,650,168 B2 1/2010 Bailey
 7,680,490 B2 3/2010 Bloebaum et al.
 7,697,899 B2 4/2010 Rofougaran
 7,734,055 B2 6/2010 Chiloyan
 7,764,775 B2 7/2010 Tarkoff et al.
 7,805,210 B2 9/2010 Cucos
 7,861,312 B2 12/2010 Lee et al.
 7,962,482 B2 6/2011 Handman
 8,023,663 B2 9/2011 Goldberg
 8,027,638 B2 9/2011 Sanguino
 8,073,137 B2 12/2011 Weinans et al.
 8,102,836 B2 1/2012 Jerlhagen
 8,190,203 B2 5/2012 Pelland et al.
 8,295,516 B2 10/2012 Kondo et al.
 8,335,312 B2 12/2012 Gerhardt et al.
 8,401,202 B2 3/2013 Brooking
 8,478,880 B2 7/2013 Finkelstein et al.
 8,483,755 B2 7/2013 Kumar
 8,553,865 B2 10/2013 Menard et al.
 8,571,544 B2 10/2013 Pelland et al.
 8,655,420 B1 2/2014 Pelland et al.
 8,792,945 B2 7/2014 Russell et al.
 9,049,502 B2 6/2015 Pelland et al.
 2004/0107271 A1 6/2004 Ahn et al.
 2005/0064853 A1 3/2005 Radpour
 2005/0198233 A1 9/2005 Manchester
 2006/0206487 A1 9/2006 Harada
 2006/0212442 A1 9/2006 Conrad
 2006/0212444 A1 9/2006 Handman et al.
 2006/0268830 A1 11/2006 Evans
 2007/0008984 A1 1/2007 Phillips
 2007/0037615 A1 2/2007 Glezerman
 2007/0049198 A1 3/2007 Walsh et al.
 2007/0053543 A1 3/2007 Lee
 2007/0165875 A1 7/2007 Rezvani
 2007/0253603 A1 11/2007 Kimura et al.
 2007/0297618 A1 12/2007 Nurmi et al.
 2008/0019557 A1 1/2008 Bevirt et al.
 2008/0031470 A1 2/2008 Angelhag
 2008/0062939 A1 3/2008 Van Horn
 2008/0076489 A1 3/2008 Rosener et al.
 2008/0242312 A1* 10/2008 Paulson G01S 19/25
 455/456.1
 2008/0298606 A1 12/2008 Johnson et al.
 2009/0116678 A1 5/2009 Bevirt et al.
 2009/0248178 A1* 10/2009 Paulson G01C 21/26
 700/66
 2010/0290642 A1 11/2010 Haseagawa
 2013/0039510 A1 2/2013 Pelland et al.
 2013/0099507 A1* 4/2013 Moriya F02N 15/067
 290/38 E
 2015/0237439 A1 8/2015 Koss et al.

FOREIGN PATENT DOCUMENTS

WO WO 2007/136620 A2 11/2007
 WO WO 2007/139578 A1 12/2007
 WO WO 2008/033478 A1 3/2008
 WO WO 2008/054985 A2 5/2008
 WO WO 2009/086555 A1 7/2009

OTHER PUBLICATIONS

International Search Report for International Application No. PCT/US09/39754 dated Jun. 11, 2009, 2 pages.
 International Preliminary Examination Report for International Application No. PCT/US09/39754 dated Oct. 28, 2010, 8 pages.
 Written Opinion of the International Searching Authority for International Application No. PCT/US09/39754 dated Jun. 11, 2009, 5 pages.
 IT Review, "LTB 802.11 WiFi Headphones", <http://itreview.belproject.com/item/1536> accessed on Mar. 13, 2008 (4 pages).

* cited by examiner

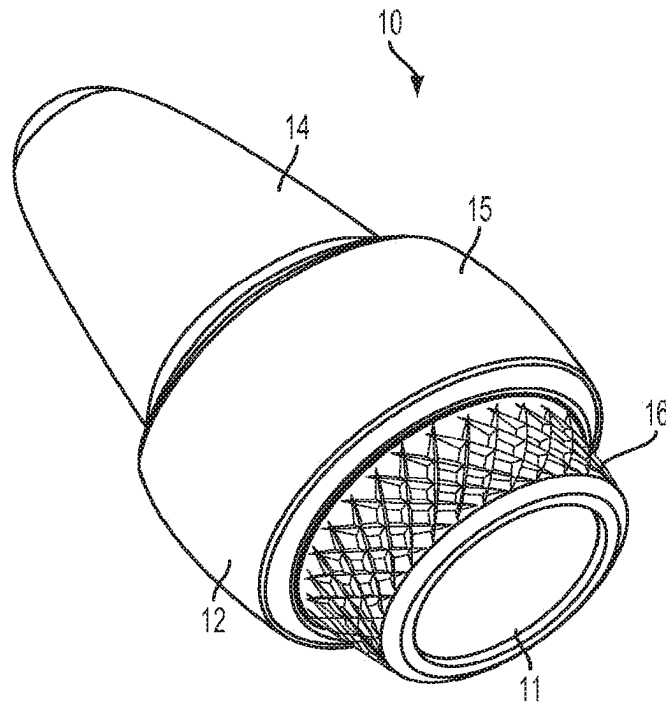


FIG. 1A

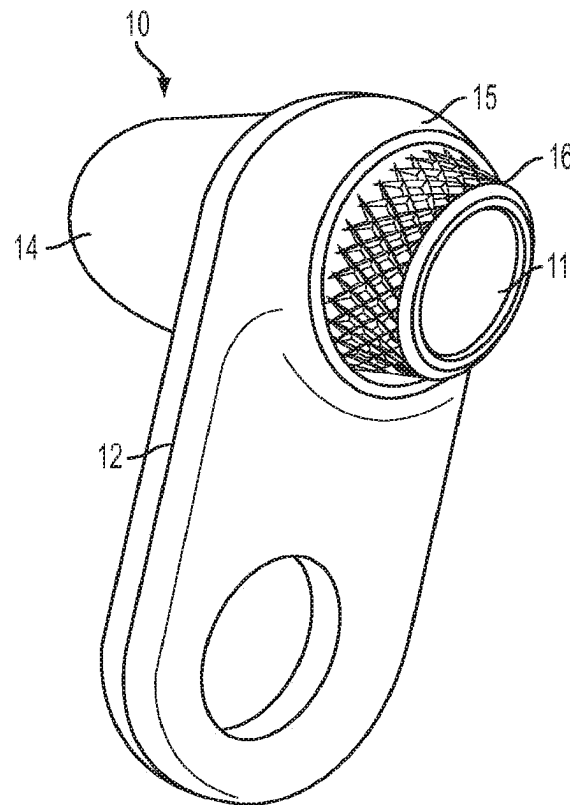


FIG. 1B

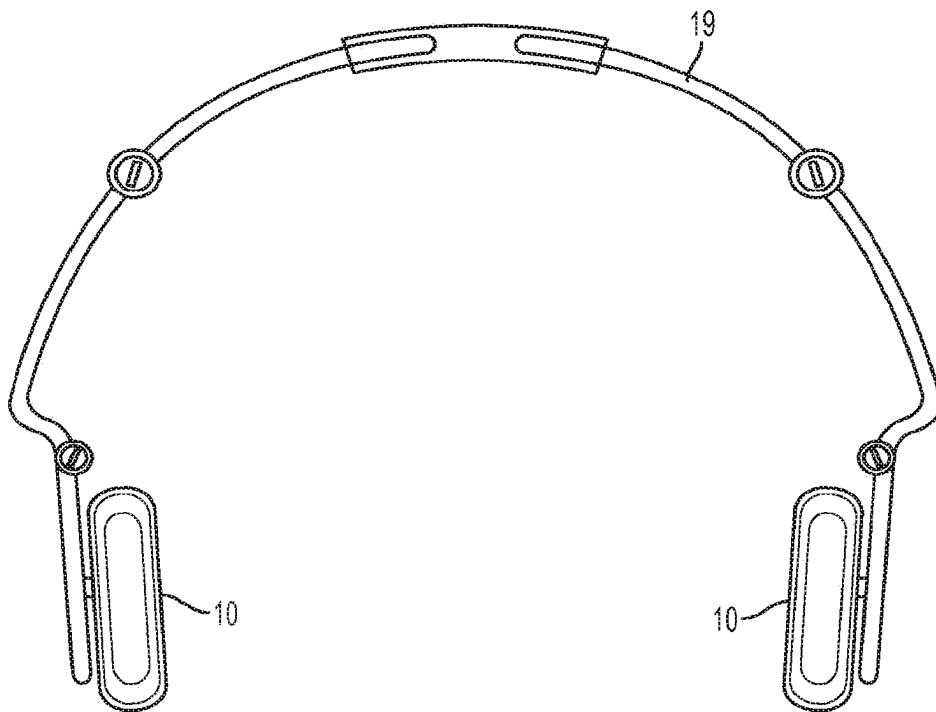


FIG. 1C

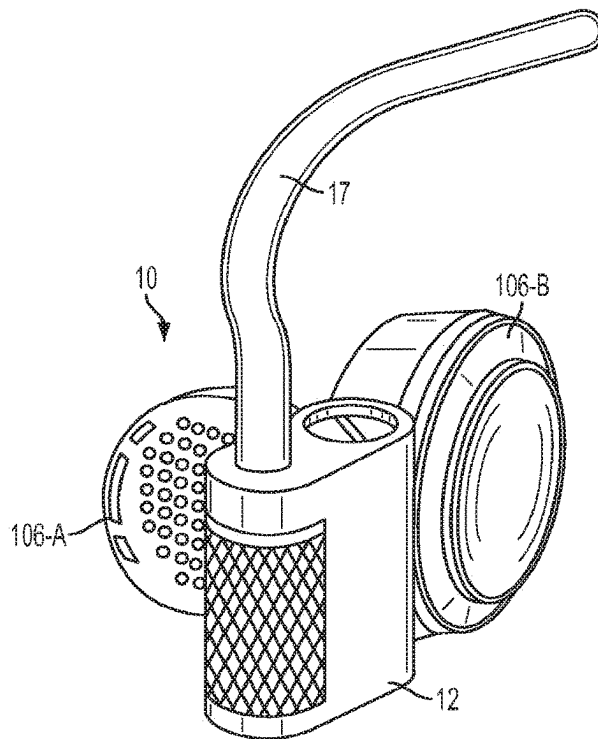


FIG. 1D

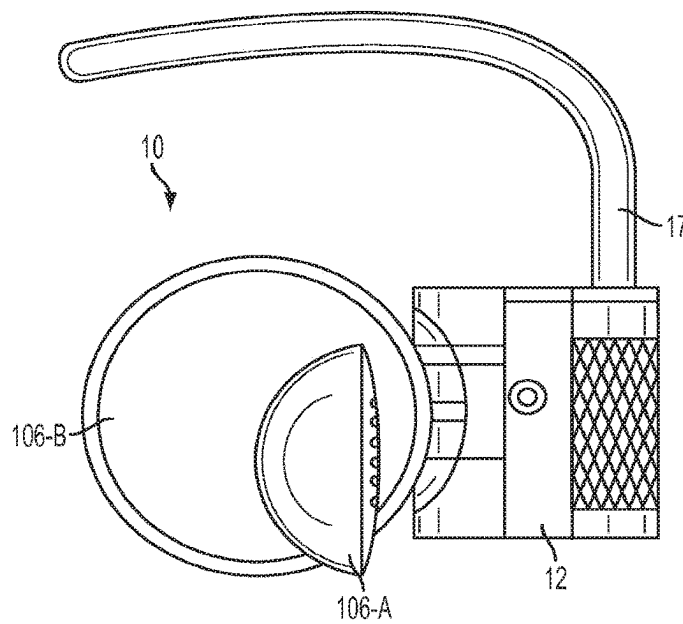


FIG. 1E

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.