Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CONT_14148749
	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Steven	Wayne	Goldstein	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Delray Beach	State/Province	FL	Country of Residence i	US

Mailing Address of Inventor:

Address 1	16390 Maddalena Place		
Address 2			
City	Delray Beach	**State/Province**	FL
Postal Code	33446	**Country** i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	150139		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD		
Attorney Docket Number	CONT_14148749	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	**Suggested Figure for Publication (if any)**	4

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IPR2024-01303
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	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	150139		

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix	Remove
Registration Number					
Prefix	**Given Name**	Middle Name	**Family Name**	Suffix	Remove
Registration Number					

Additional Representative Information blocks may be generated within this form by selecting the **Add** button.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CONT_14148749
	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	14148749	2014-01-07

Prior Application Status	Abandoned		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14148749	Continuation of	11774965	2007-07-09

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
11774965	Claims benefit of provisional	60806769	2006-07-08

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country	Filing Date (YYYY-MM-DD)	Access Code (if applicable)
	US		

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Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

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	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

☒ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CONT_14148749
	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CONT_14148749
	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
◉ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:	
If the Applicant is an Organization check here.	☒
Organization Name	Staton Techiya LLC

Mailing Address Information For Applicant:

Address 1	16193 bridlewood circle		
Address 2			
City	Delray Beach	**State/Province**	FL
Country[i]	US	Postal Code	33445
Phone Number		Fax Number	
Email Address	Daniel@techiya.co		

Additional Applicant Data may be generated within this form by selecting the Add button.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CONT_14148749
	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	Staton Techiya LLC

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	16193 bridlewood circle		
Address 2			
City	Delray Beach	**State/Province**	FL
Country i	US	Postal Code	33445
Phone Number		Fax Number	
Email Address	Daniel@techiya.co		

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

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	Application Number	
Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e. g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/John P. Keady/			Date (YYYY-MM-DD)	
First Name	John	Last Name	Keady	Registration Number	56389

Additional Signature may be generated within this form by selecting the Add button.

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____

  filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: STEVEN WAYNE GOLDSTEIN Date (Optional) : _____

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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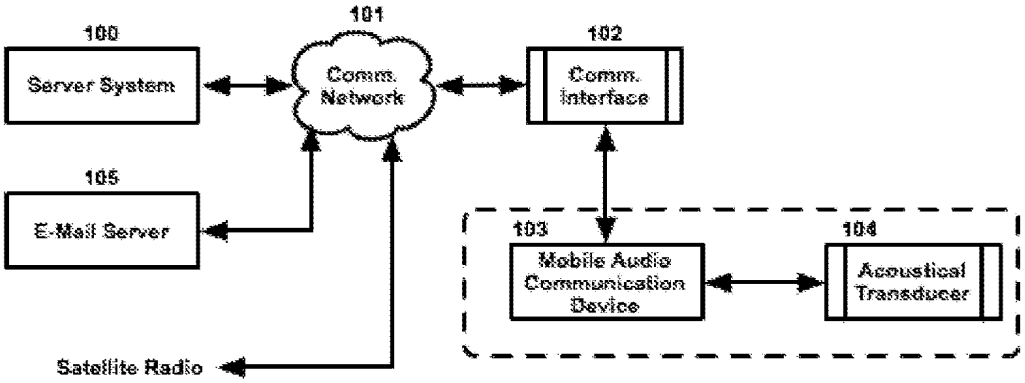

100
Server System
101
Comm. Network
102
Comm. Interface
105
E-Mail Server
103
Mobile Audio Communication Device
104
Acoustical Transducer
Satellite Radio

Fig. 1

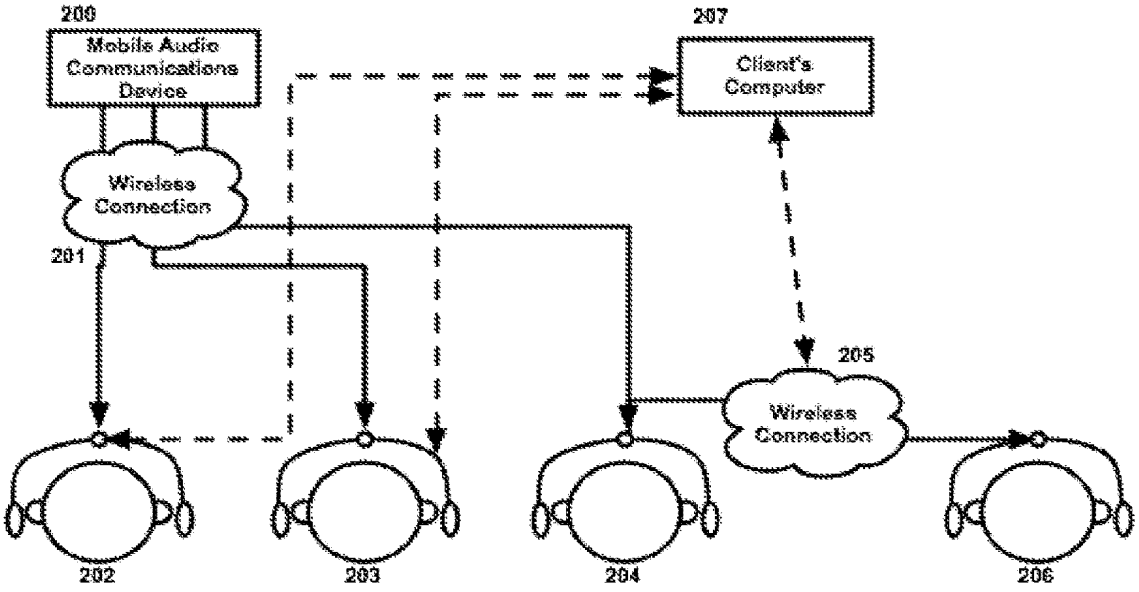

200
Mobile Audio Communications Device
207
Client's Computer
Wireless Connection
201
205
Wireless Connection
202
203
204
206

Fig. 2

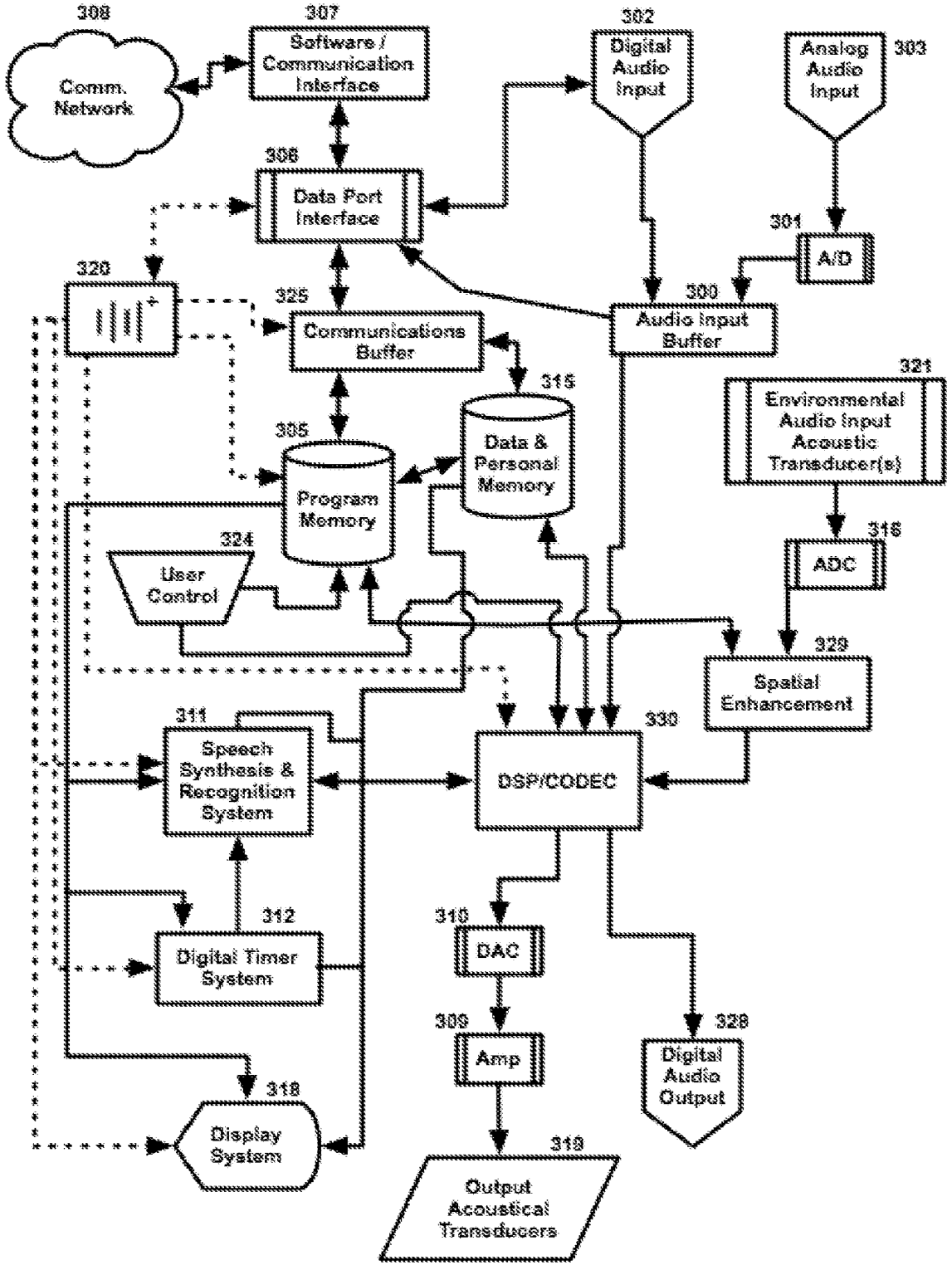

308
Comm. Network
307
Software / Communication Interface
302
Digital Audio Input
303
Analog Audio Input
306
Data Port Interface
301
A/D
320
325
Communications Buffer
300
Audio Input Buffer
321
Environmental Audio Input Acoustic Transducer(s)
315
Data & Personal Memory
305
Program Memory
324
User Control
316
ADC
329
Spatial Enhancement
311
Speech Synthesis & Recognition System
330
DSP/CODEC
312
Digital Timer System
310
DAC
309
Amp
328
Digital Audio Output
318
Display System
319
Output Acoustical Transducers

Fig. 3

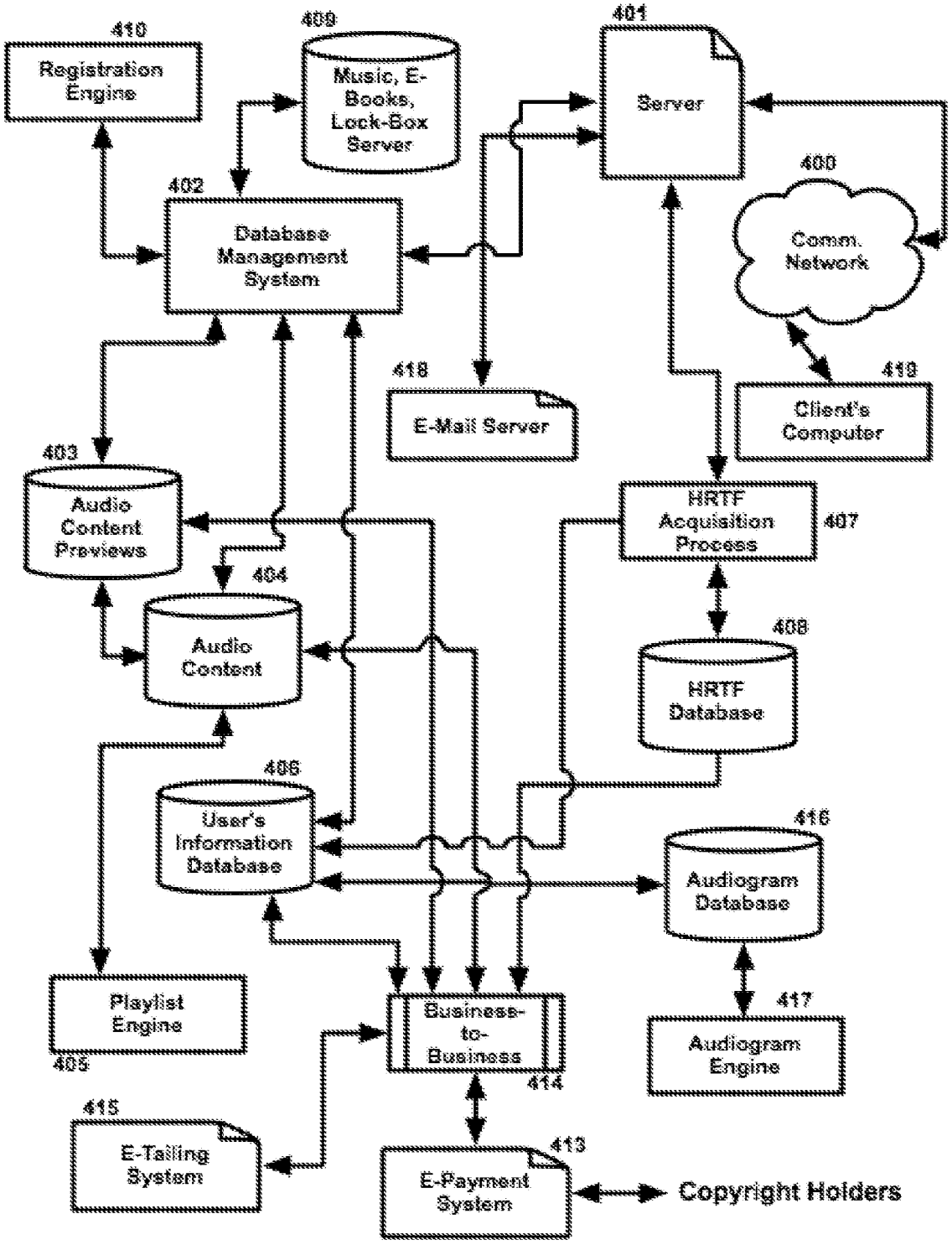

410
Registration Engine
409
Music, E-Books, Lock-Box Server
401
Server
402
Database Management System
400
Comm. Network
418
E-Mail Server
419
Client's Computer
403
Audio Content Previews
HRTF Acquisition Process
407
404
Audio Content
408
HRTF Database
406
User's Information Database
416
Audiogram Database
Playlist Engine
405
Business-to-Business
414
417
Audiogram Engine
415
E-Tailing System
413
E-Payment System
Copyright Holders

Fig. 4

FIG. 5A

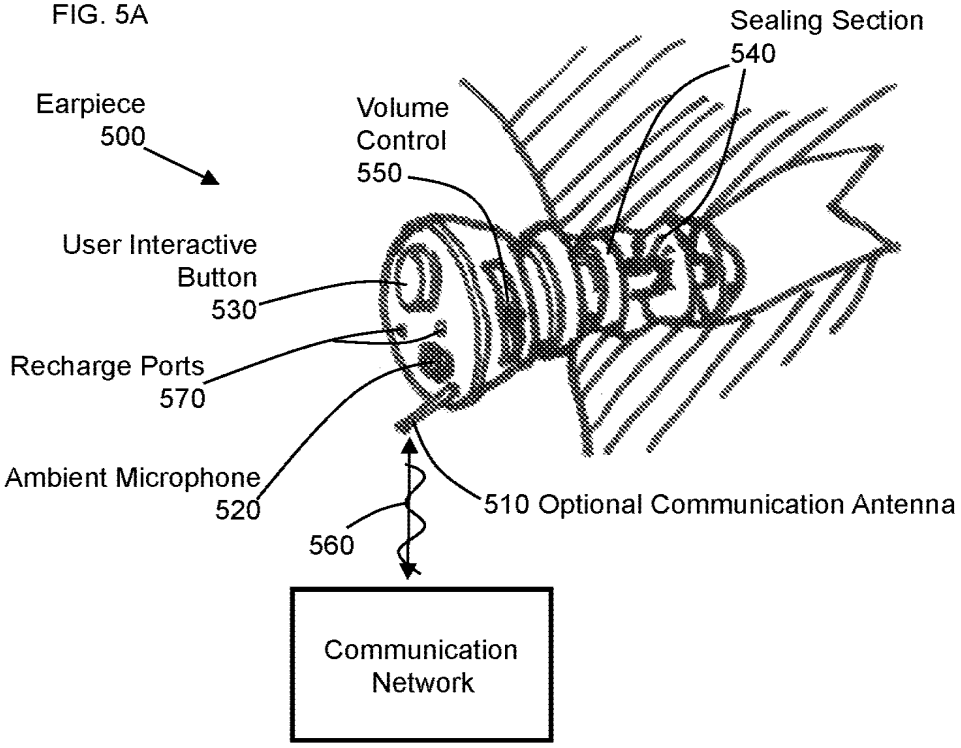

Earpiece
500
Volume
Control
550
Sealing Section
540
User Interactive
Button
530
Recharge Ports
570
Ambient Microphone
520
560
510 Optional Communication Antenna
Communication
Network

FIG. 5B

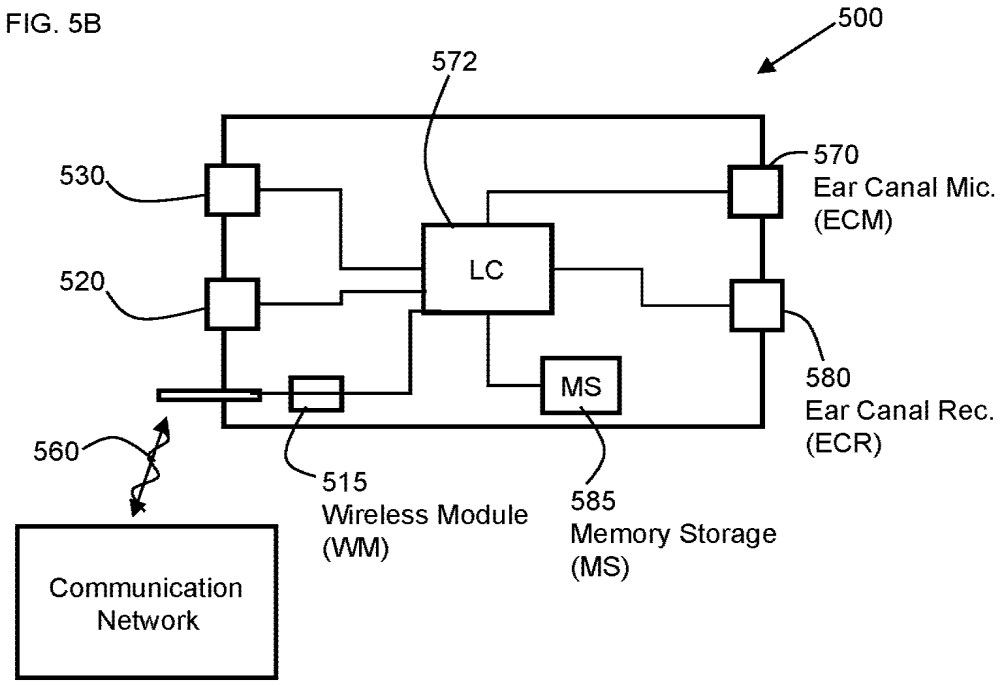
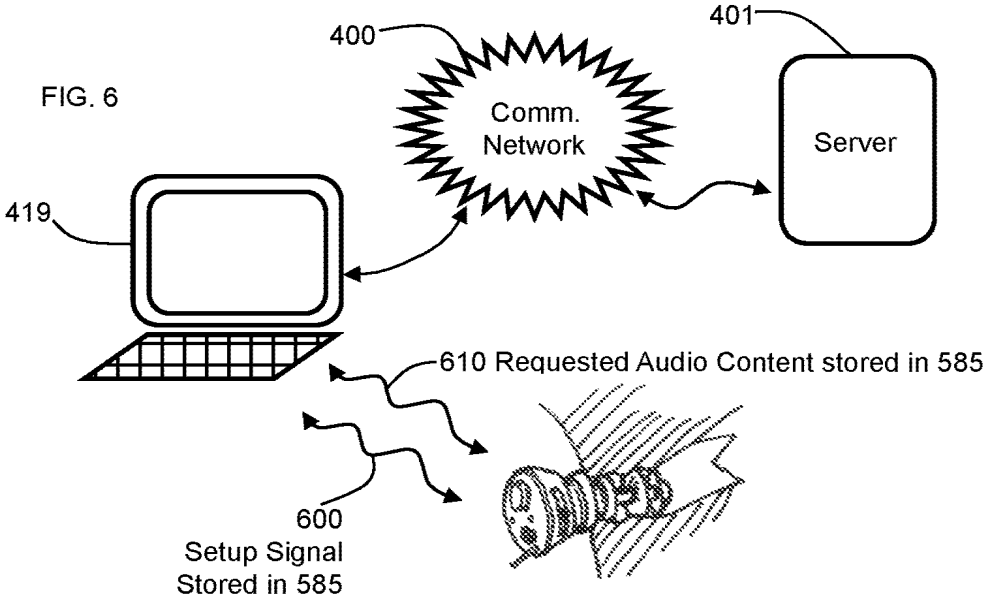

500
572
530
570
Ear Canal Mic.
(ECM)
520
LC
MS
580
Ear Canal Rec.
(ECR)
560
515
Wireless Module
(WM)
585
Memory Storage
(MS)
Communication
Network

FIG. 6


400
401
Comm. Network
Server
419
610 Requested Audio Content stored in 585
600
Setup Signal
Stored in 585

ABSTRACT

A system includes a first microphone that captures audio, a communication module communicatively coupled to the first microphone, a logic circuit communicatively coupled to the first microphone and communication module, a speaker operatively coupled to the logic circuit, and an interaction element. The interaction element and logic circuit are configured to initiate control of audio content for output from the speaker in response to at least one voice command detected in captured audio. Other embodiments are disclosed.

CLAIMS

We claim:

1.(Original) An earpiece, comprising:

a sealing section;

an ambient microphone;

a speaker;

an interaction element;

a location unit;

a memory that stores instructions; and

a logic circuit that executes the instructions to perform operations, the operations comprising:

detecting the manual activation of the interaction element; and

switching the mode of the earpiece to voice command mode when manual activation of the interaction element is detected.

2.(Original) An earpiece according to claim 1, further including the operations of:

detecting a user's voice; and

extracting an audio signal of the user's voice.

3.(Original) An earpiece according to claim 2, further including the operations of:

analyzing the audio signal to determine a voice command; and

initiating a response in response to the voice command.

4.(Original) An earpiece according to claim 3, where the voice command is to create an audio content wish list.

5.(Original) An earpiece according to claim 3, where the voice command is perform at least one of the following actions with respect to an audio content list stored in the memory, purchase a song in the audio content list, delete a song from the audio content list, skip to the

next song in the audio content list, add a song to the audio content list, and delete the audio content list.

6.(Original) An earpiece according to claim 3, where the voice command is to search the internet.

7.(Original) An earpiece according to claim 6, where the internet search results are received via a text to speech analyzer resulting in an audio result and the user receives the audio result.

8.(Original) An earpiece according to claim 3, where the voice command is to play audio from the internet.

9.(Original) An earpiece according to claim 8, where a second voice command is to scan audio from the internet.

10.(Original) An earpiece according to claim 3, where the voice command is to play audio from a radio station.

11.(Original) An earpiece according to claim 3, where the voice command is to search for a particular stock value.

12.(Original) An earpiece according to claim 3, where the voice command is to link to a user's investment account.

13.(Original) An earpiece according to claim 12, where a second voice command is to search for a particular stock value.

14.(Original) An earpiece according to claim 13, where a third voice command is to buy the particular stock.

15.(Original) An earpiece according to claim 13, where a third voice command is to sell the particular stock.

16.(Original) The earpiece according to claim 3 including an ear canal microphone.

17.(Original) An earpiece according to claim 16, further including the operations of:
measuring the sound pressure level using the ear canal microphone.

18.(Original) An earpiece according to claim 16, further including the operations of:
calculating the sound pressure level dosage of a user using the measured sound pressure level.

CONT 14148749

PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of and claims the priority benefit of U.S. Pat. App. No. 14/148,749, filed 7 Jan. 2014, which claims the priority benefit of U.S. Provisional Application No. 60/806,769, under 35 U.S.C. § 119(e), filed 8 July 2006, and U.S. Non-Provisional Application No. 11/774,965 filed 9 July 2007, all of which are incorporated herein by reference in their entireties.

FIELD

[0002] The claimed embodiments relate in general to methods and devices for the storage and recall of audio content via an earpiece, and in particular, though not exclusively, for the storage and playing of music or verbal content on a system that is built into a headphone.

BACKGROUND

[0003] Present audio content playing devices are separated from the headphone system that normally contains the speakers (also referred to as receivers). The reason for this has typically been that audio content has been stored on disks that require a separate playing system. However, even with the advent of storing audio content on non-disk RAM (Random Access Memory) storage systems, the audio content player has been separated from the earpiece system (e.g., plug in headphones or earbuds). Combining the capacity for audio download and playing in an earpiece system is not obvious over related art since

the user interaction system (e.g., play button, keyboard system) does not readily appear compatible with the size of an earpiece device and the difficulty of user interaction.

[0004] Additionally, no system currently exists for registration and download of audio content into an earpiece.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Examples of the claimed embodiments will become apparent from the following detailed description, taken in conjunction with the drawings in which:

[0006] Figure 1 illustrates the connection between an earpiece device (103 and 104) and a communication network;

[0007] Figure 2 illustrates at least one exemplary embodiment where earpiece devices share information with other earpiece devices within range (e.g., GPS location and identity);

[0008] Figure 3 illustrates an example of various elements that can be part of an earpiece device in accordance with at least one exemplary embodiment;

[0009] Figure 4 illustrates an example of a communication system in accordance with at least one exemplary embodiment that a user can use to register via his/her computer;

[0010] Figure 5A illustrates an earpiece that can store and download audio content in accordance with at least one exemplary embodiment;

[0011] Figure 58 illustrates a block diagram of the earpiece of Figure 5A; and

[0012] Figure 6 illustrates a user interface for setting the parameters of the Personal Audio Assistant.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0013] The following description of exemplary embodiment(s) is merely illustrative in nature and is in no way intended to limit the claimed embodiments, its application, or uses.

[0014] Processes, methods, materials and devices known by one of ordinary skill in the relevant arts can not be discussed in detail but are intended to be part of the enabling discussion where appropriate for example the generation and use of transfer functions.

[0015] Notice that similar reference numerals and letters refer to similar items in the following figures, and thus once an item is defined in one figure, it can not be discussed for following figures.

[0016] Note that herein when referring to correcting or corrections of an error (e.g., noise), a reduction of the error and/or a correction of the error is intended.

SUMMARY OF EXEMPLARY EMBODIMENTS

[0017] At least one exemplary embodiment is directed to a system for Personalized Services delivered to a Personal Audio Assistant incorporated within an earpiece (e.g., earbuds, headphones). Personalized Services include content such as music files (for preview or purchase) related to a user's preferences, reminders from personal scheduling software, delivery and text-to-speech, speech-to-text processing of email, marketing messages, delivery and

text-to-speech of stock market information, medication reminders, foreign language instruction, academic instruction, time and date information, speech-to-speech delivery, instructions from a GPS system and others. A Personal Audio Assistant can be an audio playback platform for providing the user with Personalized Services.

[0018] At least one exemplary embodiment is directed to a Personal Audio Assistant system that is included as part of an earpiece (e.g., Headphone system). The Personal Audio Assistant is capable of digital audio playback, mitigating the need to carry a personal music player. Furthermore, a subscription-based service provides audio content to the user through the Personal Audio Assistant. The type of audio content, which is automatically provided to the user, is based on the user's preferences, which are obtained through a registration process.

[0019] The audio content, which is seamlessly downloaded to the Personal Audio Assistant in the background, is managed from a Server system and is only available on the Personal Audio Assistant for a predetermined period of time or for a fixed number of playback counts. However, the user can purchase any music file or electronic book directly from the Personal Audio Assistant with a simple one-click control interface, storing the purchased audio content on the Personal Audio Assistant as well as storing the content permanently in a user storage lock-box location on the Server system.

[0020] The system provides for audio content to be new and "fresh" each time the user auditions the content. As such, the content is typically auditioned in a

first-in : first-out scenario. In one such example, the user has turned on the Personal Audio Assistant at 8:00am and by 10:00 am has auditioned 2 hours of content that were created for the user as a manifestation of the user's choices of their preferences of genre, artist, their demographics, day of the week, time of day and purchase history. The system also provides for the elimination of a particular song or playlist *in situ.*

[0021] As the user's Listening History Envelope is updated based on experience, subsequent downloads will only contain content incorporating these revised preferences. The Personal Audio Assistant provides for ample memory, thus permitting hours of uninterrupted playback without the need to download additional content from the server. When in need, the Personal Audio Assistant automatically interrogates various communication platforms as it searches for connections. Once a connection is made, the Listener History Envelope file is uploaded to the server, and a new set of personalized playlist content is downloaded to the Personal Audio Assistant. Accordingly, as the Personal Audio Assistant content is auditioned and thus depleted, the communications system provides for constant replenishment.

[0022] In another embodiment, the Personal Audio Assistant also provides for a new set of business solutions to be offered to the music industry. As the personalized audio content is only available for audition for a limited period of time, and can not be sent to the user again from for weeks to months, the user's purchasing behavior can be demonstrated as spontaneous. The basic model of "Try before you buy" is the expected outcome. In another iteration, the distributor

of the music can choose to offer discounts, which can be time-sensitive or quantity-sensitive in nature, in effect promoting greater purchase activity from the user.

[0023] In another iteration, while in audition a user can wish to place the desired content in a hold status. The hold status forms the basis of a "wish list," thus allowing the user to hold for future consideration audio content while it is being auditioned. This content resides in the memory of the Personal Audio Assistant for a defined period, and is automatically erased, or the user can do so manually. The selected content will also appear on the user's computer via a **URL** address; here it resides on the server ready for audition or purchase and download.

[0024] The system is designed to operate as simply as possible. Using a single button, which has multiple contacts, the interface allows the user to purchase, delete, skip to next, and add to a wish list and even control a listening level.

[0025] In another iteration, the user can download their own music to the Personal Audio Assistant for audition. The Personal Audio Assistant system is capable of text-to-speech processing and can interface with personal scheduling software to provide auditory schedule reminders for the user. Auditory reminders relating to the user's medication schedule are also generated by the system.

[0026] At least one exemplary embodiment includes input Acoustic Transducers (microphones) for capturing user's speech as well as Environmental Audio. In further embodiments, stereo input Acoustic Transducers capture

Environmental Audio, and, mixing it with the audio signal path, present the ambient sound field to the user, mitigating the need to remove the Headphone apparatus for normal conversation.

[0027] Additional exemplary embodiments are directed to various scenarios for the delivery and consumption of audio content. The Personal Audio Assistant can store and play back audio content in compressed digital audio formats. In one embodiment, the storage memory of the Personal Audio Assistant is completely closed to the end-user and controlled from the Server. This allows for audio content to be distributed on a temporary basis, as part of a subscription service. In another iteration of the present embodiments, the storage memory of the Personal Audio Assistant is not completely closed to the end-user, allowing the user to transfer audio content to the Personal Audio Assistant from any capable device such as a Personal Computer or a Personal Music Player.

[0028] In at least one exemplary embodiment the Personal Audio Assistant automatically scans for other Bluetooth®-enabled audio playback systems and notifies the user that additional devices are available. These additional devices can include a Bluetooth® video system, television system, personal video player, video camera, cell phone, another Personal Audio Assistant and others.

[0029] In another iteration, the Personal Audio Assistant can be directly connected to a Terrestrial Radio receiver, or have such a receiver built in to the system.

[0030] In another exemplary embodiment, a technique known as Sonification can be used to convey statistical or other numerical information to

a headphone. For example, the user would be able to receive information about the growth or decline of a particular stock, groups of stocks or even sectors of the markets though the Personal Audio Assistant. Many different components can be altered to change the user's perception of the sound, and in turn, their perception of the underlying information being portrayed. An increase or decrease in some level of share price or trading levels can be presented to the user. A stock market price can be portrayed by an increase in the frequency of a sine tone as the stock price rose, and a decline in frequency as it fell. To allow the user to determine that more than one stock was being portrayed, different timbres and spatial locations might be used for the different stocks, or they can be played to the user from different points in space, for example, through different sides of their headphones. The user can act upon this auditory information and use the controls built-in to the headphone to either purchase or sell a particular stock position.

[0031] Furthermore, specific sonification techniques and preferences can be presented to the user as "themes" from which the user can select. For example, one theme might auralize the current trading price of one stock with an ambient sine tone in the left ear, the price of another stock in the right ear, their respective trade volumes as perceived elevation using personalized head-related transfer function binauralization, and the current global index or other market indicator as the combined perceptual loudness of both tones. Such a scheme affords ambient auditory display in this example of five dimensions of financial data without compromising the user's ability to converse or work on other tasks. In

another embodiment, the system affords users the ability to customize themes to their liking and to rapidly switch among them using simple speech commands. Additionally, the user can search the web from voice commands and receive results via a text to speech synthesizer.

[0032] In yet another exemplary embodiment the Personal Audio Assistant (PAA) functions as a dictation device for medical professionals for dictating clinical information to a patient's medical record, or write prescriptions for medication or devices. Conversely, the PAA can function as text-to-speech allowing the clinician to audition information from a medical record, rather than reading. The PAA can save considerable time preparing clinician interaction with a patient.

[0033] In another iteration, the Personal Audio Assistant can function as a tool to locate other users of Personal Audio Assistant who share common interests, or who are searching for particular attributes of other users. Whereas the first user has stored specific personal information in the Public Data memory of the Personal Audio Assistant, an example of which might be related to schools attended, marital status, profession etc, or the first user can be in search of another user with these attributes and whereas a second user of a Personal Audio Assistant comes within communication range of the first user, the individual Personal Audio Assistants communicate with each other, access the personal information stored in each of their respective Public Data memories to ascertain if these users have common interests. If a match occurs, each unit can contain both audible and visual indicators announcing that a match has been

made and thus each user can start dialog either physically or electronically via the environmental microphones.

EXAMPLES OF TERMINOLOGY

[0034] Note that the following non-limiting examples of terminology are solely intended to aid in understanding various exemplary embodiments and are not intended to be restrictive of the meaning of terms nor all inclusive.

[0035] **Acoustic Isolation Cushion:** An "Acoustic Isolation Cushion" shall be defined as a circum-aural or intra-aural device that provides acoustic isolation from Environmental Noise. Acoustic Isolation Cushions can be included as part of a Headphones system, allowing the output of the acoustical transducers to reach the ear unimpeded, but still providing acoustic isolation from Environmental Noise.

[0036] **Acoustic Transducer:** An "Acoustic Transducer" shall be defined as a device that converts sound pressure level variations into electronic voltages or vice versa. Acoustic Transducers include microphones, loudspeakers, Headphones, and other devices.

[0037] **Audio Playback:** "Audio Playback" shall be defined as the auditory stimuli generated when Playback Hardware reproduces audio content (music, speech, etc) for a listener or a group of listeners listening to Headphones.

[0038] **Audition:** "Audition" shall be defined as the process of detecting sound stimulus using the human auditory system. This includes the physical, psychophysical, psychoacoustic, and cognitive processes associated with the perception of acoustic stimuli.

[0039] **Client:** A "Client" shall be defined as a system that communicates with a Server, usually over a communications network, and directly interfaces with a user. Examples of Client systems include personal computers and mobile phones.

[0040] **Communications Port:** A Communication Port shall be defined as an interface port supporting bidirectional transmission protocols (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, COMA, or others) via a communications network (e.g., the Internet, cellular networks).

[0041] **Control Data:** "Control Data" shall be defined as information that dictates the operating parameters for a system or a set of systems.

[0042] **Earcon:** An Earcon shall be defined as a Personalized Audio signal that informs the User of a pending event typically inserted in advance of the upcoming audio content.

[0043] **Ear Mold Style:** "Ear Mold Style" shall be defined as a description of the form factor for an intra-aural device (e.g., hearing aids). Ear Mold Styles include completely in the canal (CIC), in the canal (ITC), in the ear (ITE), and behind the ear (BTE).

[0044] **Environmental Audio:** "Environmental Audio" shall be defined as auditory stimuli of interest to the user in the environment where the user is present. Environmental Audio includes speech and music in the environment.

[0045] **Environmental Noise:** "Environmental Noise" shall be defined as the auditory stimuli inherent to a particular environment where the user is present and which the user does not wish to audition. The drone of highway traffic is a

common example of Environmental Noise. Note that Environmental Noise and Audio Playback are two distinct types of auditory stimuli. Environmental Noise does not typically include Music or other audio content.

[0046] E-Tailing System: An "E-tailing System" shall be defined as a web-based solution through which a user can search, preview and acquire some available product or service. Short for "electronic retailing," E-tailing is the offering of retail goods or services on the Internet. Used in Internet discussions as early as 1995, the term E-tailing seems an almost inevitable addition to e-mail, e-business, and e-commerce. E-tailing is synonymous with business-to-consumer (B2C) transactions. Accordingly, the user can be required to register by submitting personal information, and the user can be required to provide payment in the form of Currency or other consideration in exchange for the product or service. Optionally, a sponsor can bear the cost of compensating the E-tailer, while the user would receive the product or service.

[0047] Generic HRTF: A "Generic **HRTF"** shall be defined as a set of **HRTF** data that is intended for use by any Member. A Generic **HRTF** can provide a generalized model of the parts of the human anatomy relevant to audition and localization, or simply a model of the anatomy of an individual other than the Member. The application of Generic **HRTF** data to Audio Content provides the least convincing Spatial Image for the Member, relative to Semi-Personalized and Personalized **HRTF** data. Generic **HRTF** data is generally retrieved from publicly available databases such as the CIPIC **HRTF** database.

[0048] Headphones: "Headphones" (also known as earphones, earbuds, stereophones, headsets, Canalphones, or the slang term "cans") are a pair of transducers that receive an electrical signal from a media player, communication receivers and transceivers, and use speakers placed in close proximity to the ears (hence the name earphone) to convert the signal into audible sound waves. Headphones are intended as personal listening devices that are placed either circum-aural or intra-aural according to one of the Ear Mold Styles, as well as other devices that meet the above definition such as advanced eyewear that includes Acoustical Transducers (i.e. Dataview). Headphones can also include stereo input Acoustic Transducers (microphones) included as part of the Ear Mold Style form factor.

[0049] HRTF: "HRTF" is an acronym for head-related transfer function- a set of data that describes the acoustical reflection characteristics of an individual's anatomy relevant to audition. Although in practice they are distinct (but directly related), this definition of HRTF encompasses the head-related impulse response (HRIR) or any other set of data that describes some aspects of an individual's anatomy relevant to audition.

[0050] Informed Consent: "Informed Consent" shall be defined as a legal condition whereby a person can provide formal consent based upon an appreciation and understanding of the facts and implications associated with a specific action. For minors or individuals without complete possession of their faculties, Informed Consent includes the formal consent of a parent or guardian.

[0051] Listening History Envelope: "Listening History Envelope" shall be defined as a record of a user's listening habits over time. The envelope includes system data, time system was turned off, time the system is presenting content, when the system doesn't audition, system transducers, when the user auditions content, time stamp of content being auditioned, content which is: skipped, deleted, played multiple times, saved in the Wish List, and time between listening sessions.

[0052] Music: "Music" shall be defined as a form of expression in the medium of time using the structures of tones and silence to create complex forms in time through construction of patterns and combinations of natural stimuli, principally sound. Music can also be referred to as audio media or audio content.

[0053] Playback Hardware: Any device used to play previously recorded or live streaming audio. Playback Hardware includes Headphones, loudspeakers, personal music players, mobile phones, and other devices.

[0054] Personal Audio Assistant: A "Personal Audio Assistant" shall be defined as a portable system capable of interfacing with a communications network, directly or through an intermediate, to transmit and receive audio signals and other data.

[0055] Personal Computer: "Personal Computer" shall be defined as any piece of hardware that is an open system capable of compiling, linking, and executing a programming language (such as C/C++, Java™, etc.).

[0056] Personal Music Player: "Personal Music Player" shall be defined as any portable device that implements perceptual audio decoder technology but is

a closed system in that users are not generally allowed or able to write software for the device.

[0057] Personalized HRTF: A "Personalized **HRTF"** shall be defined as a set of **HRTF** data that is measured for a specific Member and unique to that Member. The application of Personalized **HRTF** data to Audio Content creates, by far, the most convincing Spatial Image for the the Member (Begault et. al. 2001, D. Zotkin, R. Duraiswami, and L. Davis 2002).

[0058] Personalized Services: "Personalized Services" shall be defined as services customized to better meet the needs of an individual. Personalized Services include media content (for preview or purchase) related to a user's preferences, reminders from personal scheduling software, delivery and text-to-speech processing of email, marketing messages, delivery and text-to-speech of stock market information, medication reminders, foreign language instruction [real-time foreign language translation], academic instruction, time and date information, and others.

[0059] Public Data: "Public Data" shall be defined as data which contains specific and personal information about the registered user of the Personal Audio Assistant. The registered user chooses which portions of their complete Registration Process data they wish to include in this subset. This data becomes distributed to other users who have compliant devices thus allowing other users to know specific details of the registered user.

[0060] Registration Process: "Registration Process" includes the acquisition of the user's preference via a web page. Typically, the process would include the

items to be captured: Age, demographics, email, gender, Relative Audiogram, Personal Preferences, banking information, credit card information, wake-up and sleep times, music preferences by genre, artist, preferences for writers and authors, desire to receive advertising, turn-on listening level, equalization, email preferences, parental control setup as well as other user-controlled settings.

[0061] Relative Audiogram: A "Relative Audiogram" shall be defined as a measured set of data describing a specific individual's hearing threshold level as a function of frequency. A Relative Audiogram is only an approximate Audiogram, leaving more complete Audiogram analysis to qualified audiologists.

[0062] Semi-Personalized HRTF: A "Semi-Personalized **HRTF"** shall be defined as a set of **HRTF** data that is selected from a database of known **HRTF** data as the "best-fit" for a specific user. Semi-Personalized **HRTF** data is not necessarily unique to one user; however, interpolation and matching algorithms can be employed to modify **HRTF** data from the database to improve the accuracy of a Semi-Personalized **HRTF.** The application of Semi-Personalized **HRTF** data to Audio Content provides a Spatial Image that is improved compared to that of Generic **HRTF** data, but less effective than that of Personalized **HRTF** data. The embodiments within speak to a variety of methods for determining the best-fit **HRTF** data for a particular Member including anthropometrical measurements extracted from photographs and deduction.

[0063] Server: A "Server" shall be defined as a system that controls centrally held data and communicates with Clients.

[0064] **Sonification:** "Sonification" shall be defined as the use of non-speech audio to convey information or to aurally perceptualize non-acoustic data (auralize). Due to a variety of phenomena involving human cognition, certain types of information can be better or more efficiently conveyed using auditory means than, for example, visual means.

EXEMPLARY EMBODIMENTS

[0065] Figure 1 illustrates the connection between an earpiece device (103 and 104) and a communication network (101) via communication interface 102, which can be operatively connected (via a wired or wireless connection) to a server system (100) and/or an e-mail server (105). Additionally a radio signal (e.g., satellite radio) can be input into the earpiece 500 (Figure 58) via a communication module (e.g., Bluetooth® wireless module 515).

[0066] Figure 2 illustrates at least one exemplary embodiment where earpiece devices share information with other earpiece devices within range (e.g., GPS location and identity). For example multiple users (e.g., 202, 203, 204, and 206) can send signals to each individual earpiece (e.g., 500) when in range (e.g., via a wireless connection 205) or to a mobile audio communications device 200 via a wireless connection (201) with each earpiece (500). Additionally information (e.g., audio content, software download) can be sent via a client's computer 207 to each earpiece, either directly (e.g., 205), or via 200. For example audio content can be retrieved on a user's computer and sent to the earpieces that have authorization to use it.

[0067] Figure 3 illustrates an example of various elements that can be part of an earpiece device in accordance with at least one exemplary embodiment. The earpiece can include all or some of the elements illustrated in figure 58. For example the logic circuit 572 or the operatively connected memory storage device 585, can include spatial enhancement software 329, a DSP codec 330, a speech synthesis and recognition system 311, and a digital timer system 312. Additional elements can be connected to the logic circuit 572 as needed, for example a power supply 320, a software communication interface 307 (e.g., wireless module 515) (which may be connected to communication network 308), data port interface 306, audio input buffers 300 connected to digital audio input 302 and/or analog audio input 303 converted to digital via an ADC 301, environmental audio input acoustic transducer(s) 321 converted to digital via an ADC 316, user control 324, digital audio output 328, output acoustic transducers 319 (which receive signals converted to analog via a DAC 310 and amplified via amplifier 309), display system 318, communication buffers 325, program memory 305, data and personal memory 315, as well as other electronic devices as known by one of ordinary skill in the relevant arts.

[0068] Figure 4 illustrates an example of a communication system in accordance with at least one exemplary embodiment that a user can use to register via his/her computer 419, via a communication network 400 (e.g., Internet connection) connected to many various database and registration systems as illustrated and labeled in Figure 4. For example, server 401, database management system 402, audio content preview database 403, audio

content database 404, playlist engine 405, user's information database 406, **HRTF** acquisition process module 407, **HRTF** database 408, lock-box server 409, registration engine 410, e-payment system 413, business-to-business module 414, e-tailing system 415, audiogram database 416, audiogram engine 417 and/or e-mail server 418.

[0069] Figure 5A illustrates an earpiece 500 having sealing section 540 in an ear canal that can store and download audio content 560 in accordance with at least one exemplary embodiment. The earpiece 500, can include a first user interaction element 530 (e.g., a button) , that can be used to turn the earpiece 500 on, or if on then activate an audio play command to start playing saved audio content. The earpiece 500 can also include a second user interaction element 550 (e.g., a slide control) that can be used for example to control the volume. The earpiece 500 can also include recharge ports 570, that can accept two wires of varying voltage that can be inserted into the recharge ports 570 to recharge any batteries in the earpiece 500. The earpiece 500 can include an ambient microphone 520 and an optional communication antenna 510, that if needed can aid in the communication between the earpiece 500 and a communication network.

[0070] Figure 58 illustrates a block diagram of the earpiece of Figure 5A, illustrating the first user interaction element 530, the ambient microphone (AM) 520, that can be used to pick up ambient audio content, an ear canal microphone (ECM) 590 that can pick up audio in the ear canal region, an ear canal receiver (ECR) 580 that can direct audio content to the ear drum, all of which can be

connected operatively to a logic circuit 572. A memory storage device 585 can be operatively connected to the logic circuit (LC) 572, and can store data such as registration, preference, and audio content data. The optional communication antenna 510 can be connected to a communication module (e.g., wireless module 515), and can receive or transmit information 560 to a communication network.

[0071] Figure 6 illustrates a user interface for setting the parameters stored in the memory storage device 585. For example a user can use his/her computer 419 to communicate with a server 401 (e.g., via a communication network 400) to start the user's registration (e.g., with an audio content provider). The registration information can then be transmitted 600 to set the stored parameters in the memory storage device 585 of the earpiece 500. Additionally a requested (e.g., bought) audio content can be downloaded 610 into the memory storage device 585 of the earpiece 500.

[0072] At least one exemplary embodiment is directed to an earpiece comprising: an ambient microphone; an ear canal microphone; an ear canal receiver; a sealing section; a logic circuit; a communication module; a memory storage unit; and a user interaction element, where the user interaction element is configured to send a play command to the logic circuit when activated by a user where the logic circuit reads registration parameters stored on the memory storage unit and sends audio content to the ear canal receiver according to the registration parameters.

[0073] In at least one exemplary embodiment the audio content is stored in the memory storage unit. The earpiece according to claim 2, where the communications module is a wireless communications module. Additionally the earpiece can include a second user interaction element configured to alter the volume of the audio content that is emitted from the ear canal receiver.

[0074] Upon a play command being received by the logic circuit the logic circuit can check registration parameters stored in the memory storage device for example one of the registration parameters can be whether the audio content is a sample audio content or a fully purchased audio content, or the allowed number of times an audio content can be played, and a counter value that keeps track of the number of times the audio content has been played.

[0075] The earpiece can send an auditory warning to be emitted by the ear canal receiver when the counter value is greater than or equal to the allowed number of times the audio content can be played, and where the logic circuit does not send the audio content to the ear canal receiver.

FURTHER EXEMPLARY EMBODIMENTS

[0076] At least one exemplary embodiment is directed to a system for the delivery of Personalized Services to Personal Audio Assistants, the system comprising: a Personal Audio Assistant system for presenting Personalized Services to the user as Audio Playback; a Server system for user registration, Personalized Service management, and communication; a Registration Process

for collecting detailed registration information from users, including the information necessary for creating Personalized Services; a communications protocol (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, COMA, or other) and a communications network (i.e. the Internet, cellular networks) connecting the Personal Audio Assistant to the Server or connecting the Personal Audio Assistant to other Personal Audio Assistants (peer-to-peer behavior).

[0077] In at least one exemplary embodiment a Personal Computer acts as an intermediate, connecting to the Server system over a communications network and connecting to the Personal Audio Assistant over a local connection.
At least one exemplary embodiment includes a Personal Hearing Damage Intervention System (e.g., USPTO- 60/805985- Goldstein).

[0078] In at least one exemplary embodiment a Personal Audio Assistant system included as part of a Headphone system, the system comprising: a Communications Port supporting a communications protocol enabling communication with the Server system, peer devices, and other capable devices; a non-volatile program memory storage system for storing Control Data, dictating system behavior; a data memory storage system for storing data and audio content; an analog audio input/output and corresponding ADC/DAC; a digital audio input/output and a digital audio signal path; a user control system allowing the user to adjust the level of the audio output and control the behavior of the system; a user control system allowing the user to purchase the content being auditioned in real time; a user control system allowing the user to control, delete,

fast forward, output level control, scan, advance, the data stored both stored in memory as well as new streaming data emails and reminders; a display system for presenting information to the user(s) visually using any method familiar to those skilled in the art (LED, LCD, or other); a display system for presenting information to the user(s) (e.g., using Earcons and other sound files); a speech synthesis system for converting text-to-speech and generating speech signals; a speech recognition system for converting speech to-text to respond and send emails and to interface with the control language as to provide navigational commands; a digital timer system; a power supply system in the form of a battery; a unique identification number for each Personal Audio Assistant; Input Acoustic Transducers; an Output Acoustic Transducer; an Audio amplification system; Acoustic Isolation Cushions conforming to one of the Ear Mold Styles (CIC, ITC, ITE, or BTE; see definitions) and other elements common to Headphone systems; a digital signal processor (DSP) system; and a CODEC processor capable of improving the perceptual sound quality of the content to be auditioned while governed by delivering the correct SPL dose.

[0079] In at least one exemplary embodiment the system is independent of a Headphone array or can be included and imbedded as part of a Personal Computer system, a Personal Music Player system, a personal monitoring system, an automotive audio system, a home audio system, an avionics audio system, a personal video system, a mobile cell phone system, a personal digital assistant system, a standalone accessory, or an advanced eye-wear system with acoustical transducers.

[0080] In at least one exemplary embodiment the various processing needed to derive the intended functions are distributed among any combination of a Server system, a Personal Computer system, a Personal Music Player system, a personal monitoring system, an automotive audio system, a home audio system, an avionics audio system, a personal video system, a mobile cell phone system, a personal digital assistant system, a standalone accessory, or an advanced eye-wear system with acoustical transducers.

[0081] In at least one exemplary embodiment the Personal Audio Assistant system can exchange audio signals with a mobile phone via the Communications Port, allowing the Personal Audio Assistant to function as a mobile phone accessory.

[0082] In at least one exemplary embodiment a communications buffer is included. For example when a network connection is available, the communications buffer uploads stored content (e.g., Listening Habits Envelope) and stores incoming transmissions (e.g., music, electronic books, and updates to the firmware or operating system) from the Communications Port; The contents of the communications buffer are then transmitted whenever a network connection becomes available. At least one exemplary embodiment includes a perceptual audio codec decoding technology in the DSP, enabling the storage and playback of compressed digital audio formats (e.g., MP3, AAC, FLAG, etc.). At least one exemplary embodiment is compliant and compatible with DRM, FairPlay® and other forms of digital content governance.

[0083] At least one exemplary embodiment includes a user control system for selecting and playing back audio content stored in memory that operates using any combination of the following methods: a button or tactile interface which upon auditioning a song can be pressed to order content; a button, tactile and/ or voice controlled interface which, when pressed once, commanded to, activates playback of short audio clips or audio thumbnails of the audio content stored in memory; When the button is pressed again during audio thumbnail playback, the current audio content selection is played in its entirety; The behavior of this interface is similar to the "scan" button interface common in FM/AM radio devices; a button, tactile and/or voice controlled interface that, when pressed or commanded to, skips to the next piece of audio content, which is selected randomly from all available audio content that has a play count equal to or less than the play count of the piece of audio content currently playing; The behavior of this interface is similar to the "shuffle" behavior found in some personal music players; an interface for browsing audio content storage devices familiar to those skilled in the art; and a process to allow for increased data memory storage capacity for storing audio content.

[0084] In at least one exemplary embodiment the contents of the data memory are encrypted and controlled by the Server system only, prohibiting the end-user from loading unauthorized audio content into the data memory. Further the contents of the data memory can be manipulated by the end-user, allowing the user to transfer audio content to the Personal Audio Assistant system from any device capable of interfacing with the communications port; For example,

audio content can be transferred to the system from a Personal Music Player or a Personal Computer. According to at least one exemplary embodiment, audio content (or other media content) updates are retrieved from the Server system any time a connection is detected by the communications port. Furthermore, an exemplary embodiment can include an acoustical and/or visual indicator informing the user when a transfer of data is activated.

[0085] In at least one exemplary embodiment radio wave transmissions are used to implement some communications protocol and the communications port acts as a radio receiver. Additionally the Personal Audio Assistant can include: interfaces with some personal scheduling software through the communications port; a speech synthesis system which generates speech-signal reminders corresponding to information from the scheduling software, where the digital timer system triggers the presentation of the speech-signal reminders at the appropriate time.

[0086] Additionally the Personal Audio Assistant can interface with an email platform through the communications port; The speech synthesis system converts the email in text to speech and provides email to the user in aural presentation format. The system further comprising: a process in the Registration engine allowing the user to optimize their personalization process of incoming emails by associating a specific Earcon with the importance of the incoming email. As such, normal priority email contains an introduction sound announcing to the user the level of importance the sender associated with their email; a speech recognition system for converting speech-to-text which interfaces with the

control language as to provide navigational commands allowing the user to respond and send emails.

[0087] In at least one exemplary embodiment the communications port system makes use of some wireless communications protocol (802.11, Bluetooth®, A2DP, or other) to transmit and receive digital audio data for playback, the system further comprising: an audio codec to encode and decode digital audio transmissions; a wireless communications system (802.11, Bluetooth®, A2DP, etc.) for transmitting and receiving data (digital audio transmissions, Control Data, etc.); a method for pairing two or more Personal Audio Assistants through a wireless communications protocol to provide a secure exchange of audio content, data such as the user's Public Data; an audio warning signal or visual display system output that notifies the user anytime a compatible transmission becomes available; and a user control system enabling the user to switch between available compatible transmissions.

[0088] In at least one exemplary embodiment the system enables listeners to share digital audio transmissions, the system further comprising: a method for scanning for available digital audio transmissions within range; a user control interface for specifying digital audio transmission behavior; a method for employing the system as a relay to other compliant devices; re-broadcasting digital audio transmissions to increase wireless range. In at least one exemplary embodiment multiple systems are capable of sharing the contents of their program and data memory using the wireless communications protocol.

[0089] In at least one exemplary embodiment of the system, the input Acoustic Transducer is used to record audio content to the data memory storage system, the system further comprising: an implementation of some perceptual audio codec technology in the DSP, enabling the storage of compressed audio formats (e.g., MP3, AAC, FLAG, etc); and an increased data memory storage capacity for storing recorded audio content.

[0090] In at least one exemplary embodiment, the stereo input Acoustic Transducers are ultimately connected to the audio signal path at the DSP, allowing the user to audition Environmental Audio (e.g., speech or music) and mitigating the need for the user to remove the Headphone apparatus to audition Environmental Audio, the system further comprising: a stereo pair of input Acoustic Transducers placed close to the user's ear canal input, conforming to one of the Ear Mold Styles (CIC, ITC, ITE, or BTE, see definitions); and by mounting the input Acoustic Transducers in a CIC or ITC configuration, spatial-acoustic cues are preserved, creating a spatially-accurate Environmental Audio input signal- essentially a personal binaural recording; a method for acoustically compensating for the non-linear frequency response characteristics of the Acoustical Isolation Cushions of a given Headphone system by applying corresponding inverse filters to the Environmental Audio input signal at the DSP; With this method, the system acts as a linear-frequency-response hearing protection apparatus (e.g., USPTO- 60805985- Goldstein).

[0091] At least one exemplary embodiment includes a system for first attenuating Audio Playback and then mixing the Environmental Audio input

signals, at a louder listening level, with the audio signal path using the DSP, where the system is activated by any combination of the following methods: a manual switch to activate / deactivate the system; a speech-detection apparatus to activate the system when speech is detected as the principal component of the Environmental Audio input; and a music-detection apparatus to activate the system when music is detected as the principal component of the Environmental Audio input.

[0092] At least one exemplary embodiment can include active noise reduction, echo cancellation and signal conditioning that can be environmentally customized through the registration process to better meet the user's specific needs (i.e., occupation-related noise cancellation); A typical application would be a special set of noise cancellation parameters tuned to the drilling equipment used by a dentist.

[0093] In at least one exemplary embodiment the input Acoustic Transducers are instead mounted within circum-aural, intra-aural BTE, or intra-aural ITE molds (see Ear Mold Style), the system further comprising: a spatial audio enhancement system for supplementing the spatial-acoustic cues captured by the stereo pair of input Acoustical Transducers to provide improved spatial perception of Environmental Audio using any combination of the following methods: the application of Generic, Semi-Personalized, or Personalized HRTF data to the Environmental Audio input signal; the application of binaural enhancement algorithms, familiar to those skilled in the art, to the Environmental Audio input signals; the application of a pinna simulation algorithm to the

Environmental Audio input signal; and a synthetic pinna apparatus placed just before the stereo input Acoustic Transducers.

[0094] At least one exemplary embodiment includes a Server system for the creation, Registration, management, and delivery of Personalized Services, the system comprising: a communications system for interfacing with public communication networks to exchange data with Personal Audio Assistants, a Client's computer, mobile phones, PDAs or other capable devices; a database and database management system for storing and retrieving information relating to user Registration, Personalized Services, audio content, Control Data, and other data; a Registration interface system for collecting, storing, and applying information provided by users; a method for creating Personalized Services based on user Registration information; an end-user audio content Lock-Box storage system, providing every registered user access to their purchased media content; a business-to-business interface system for acquiring audio content with record labels, copyright holders, and other businesses; an E-tailing system including an electronic transactions system enabling users to purchase content, items offered for sale or pay subscription fees electronically; an E-Payment system compensating the various copyholders upon purchase of content by user; a Playlist engine, which acquires the user's Registration information, Listening History Envelope and then creates audio playlists, which is optimized for the user preferences and further refinements; and an Email server, which distributes communications to the user and others, regarding marketing data, the status of the user weekly SPL dose, and other information.

[0095] At least one exemplary embodiment includes machine-learning techniques employed to better optimize the user's preferences relating to audio content and other media content, the system further comprising: a method for tracking the purchase history of each user, relating the purchase history to media content preferences, and using the purchase history to make media content recommendations; a method for examining a user's digital media library, stored on a Personal Computer, Personal Music Player, or Personal Audio Assistant, from the Server system, and relating media content preferences and media content recommendations to the user's digital media library; and a method for examining a user's Listening History Profile.

[0096] At least one exemplary embodiment includes a Registration system for collecting a wide variety of information from users, including information necessary for creating Personalized Services, the system comprising: a Server system; an interface system for querying the user to collect registration information including demographics (age, gender), Playback Hardware information, Headphone information, occupational information, home and work locations, medication information, music-related preferences, video-related preferences, and other information; a method for customizing Control Data based on registration information; and a method for creating Personalized Services based on registration information.

[0097] In at least one exemplary embodiment a fast **HRTF** acquisition process is included as part of the Registration process, the system further comprising a method for the fast acquisition of Semi-Personalized **HRTF** data via a deduction

process, the method comprising: a database system containing indexed, clustered **HRTF** data sets; an auditory test signal with distinctive spatial characteristics, where two or more distinct sound source locations exist; a system for the application of potential **HRTF** matches to the auditory test signal; and a feedback system, allowing the user to select the best listening experience from a number of candidate listening experiences, based on the spatial quality perceived in the HRTF-processed auditory test signal.

[0098] In at least one exemplary embodiment Personalized **HRTF** data is measured and used instead of Semi-Personalized **HRTF** data, by any method familiar to those skilled in the art.

[0099] In at least one exemplary embodiment the user is provided some Personal Audio Assistant free-of-charge or at a discount, given the user agrees to a subscription service commitment to receive Personalized Services for a certain amount of time.

[00100] In at least one exemplary embodiment, as part of the Personalized Services, the user is provided with temporary audio content corresponding to the preferences indicated during the registration process; Further, the user is given the option to purchase the audio content permanently; Otherwise, the audio content is replaced with new audio content from the Server, after a predetermined amount of time or a predetermined number of playback counts, the system comprising: a Personal Audio Assistant with an enhanced user control system, enabling a registered user to purchase media content directly from the Personal Audio Assistant with a button; and a Personal Audio Assistant

with an enhanced user control system, enabling a registered user to store a reference to media content that can be purchased by the user at a later time.

[00101] In at least one exemplary embodiment, video or gaming content is included as well as audio content, the system further comprising: a Personal Audio Assistant with an enhanced visual display system, capable of playing video and/or gaming content.

[00102] In at least one exemplary embodiment, as part of the Personalized Services, the user receives medication reminders in the form of speech signals, audio signals, text, or graphics on the user's Personal Audio Assistant; Medication reminders are generated by the Server system based on the user's registration information.

[00103] In at least one exemplary embodiment, as part of the Personalized Services, the user receives stock market information in the form of speech signals, audio signals, text, or graphics on the user's Personal Audio Assistant; The stock market information is selected by the Server system based on the user's registration information, the system further comprising: the user having successfully registered their Personal Audio Assistant with a brokerage firm, or other stock trading engines, the user can then purchase or sell a stock by use of a user button or a speech command.

[00104] Further in at least one exemplary embodiment, the user is able to request specific media content to be transferred temporarily or permanently to the user's Personal Audio Assistant, the system further comprising: an interface system operating on the Server allowing users to request specific media content

by artist, title, genre, format, keyword search, or other methods familiar to those skilled in the art; and a media content search engine system.

[00105] In at least one exemplary embodiment a Relative Audiogram compensation filter is applied to audio signal path by the digital signal processor, the system either (e.g., USPTO- 60805985- Goldstein): (a) Retrieves Relative Audiogram compensation information from a remote Server after a registration process (during transmission, the information can include HIPAA compliant encoding); or (b) calculates a compensation filter from Relative Audiogram information obtained by the system locally. For example US Patent No. 6,840,908- Edwards, and US Patent No. 6,379,314- Horn, discuss methods for the acquisition of an individual's Relative Audiogram.

[00106] In at least one exemplary embodiment a Satellite Radio transmitter/receiver (transceiver) is incorporated within the Headphone proper, allowing the user to at least: receive XM®, Sirius® and other broadcasts for playback over the system; select radio stations for playback over the system via the control system, the control system comprising either a single-click tactile interface or the speech-controlled circuitry; store selected portions of such broadcasts in memory for later recall and playback via the control systems; engage a novel commercial-skip feature for attenuating the playback level of suspected sales commercials broadcasts; and engage a speech-skip feature for attenuating the playback of speech (e.g., news, announcements, etc.).

[00107] At least one exemplary embodiment includes a Walkie-Talkie mode, which broadcasts input to the system's built-in microphone, whereby the user's

speech can be detected by the input acoustic transducer and remotely broadcast where at least one of the following occurs: the Walkie-Talkie mode receives input via AM/FM broadcasts (as well as digital communications protocols) from a nearby user; the Walkie-Talkie mode allows nearby users to engage in conversation with increased perceptual clarity in noisy environments (e.g., aircraft cockpits), using for example a noise-cancellation system; selectively engage and disengage the Walkie-Talkie mode using the control system; detect other users of the system within a given range; and alert the user of the system when other detected systems contain certain Public Data and contain a predefined Public Message Key (e.g., "If the detected system belongs to a single male between the ages of 25 and 30 and whose favorite sport is tennis, then broadcast the message, 'I like tennis also; would you like to have coffee?'" or "If the detected system belongs to a user who attended Princeton University, then broadcast the message, 'Go Tigers!'").

[00108] At least one exemplary embodiment can use other communications to accomplish this service rather than AM/FM; as such the system can incorporate communications transmission protocols (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, COMA, or other protocols) and a communications network (i.e. the Internet, cellular networks) connecting the Personal Audio Assistant to other Personal Audio Assistants. At least one exemplary embodiment can selectively control the broadcast of public data and public message keys via the control system.

[00109] At least one exemplary embodiment includes a Sonification algorithm within the Headphone, which enables auditory display of digitally received data, including for example financial data, news, GPS data, the system further containing a variety of sonification "themes" selected during the registration process that map requested data (e.g., current average trading price of AAPL stock, the Dow Jones Industrial Index, and the Nasdaq Composite®) to corresponding audio content (e.g., the frequency of a sine tone presented in the left ear, the frequency of a sine tone presented in the right ear, and the global amplitude of both sine tones, respectively).

[00110] At least one exemplary embodiment includes an auditory display, which is synthesized by the onboard Digital Signal Processor. In at least one exemplary embodiment the auditory display is created through the digital audio signal processing effects applied to any other acoustic data the system is capable of reproducing (e.g., terrestrial radio, prepurchased audio content in the user's digital library, electronic books, etc.); For example, a sudden listening level increase in the playback level of a song to which the user was listening can be triggered by a predefined alert condition (e.g., Nasdaq Composite® has exceeded 2200 points).

[00111] At least one exemplary embodiment includes the ability to create themes using a computer program and uploading a file to the Headphone system.

[00112] At least one exemplary embodiment includes a speech recognition system for converting speech to HTML (Voice Browser), whereby the user can

access the Internet, provide navigational commands, perform searches and receive results via the Headphones through a text (HTML)-speech synthesize.

[00113] Additionally, the Personal Audio Assistant can be totally incorporated with a mobile cell phone, or any portable technology which incorporates any of the following protocols, TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, COMA, or others known to those of ordinary skill in the arts via a communications network (e.g., the Internet, cellular networks), the system further comprising: an Acoustic Transducer constructed as part of the mobile cell phone or a series of Acoustic Transducers, which are constructed as part of mobile cell phone; a commutations path incorporated into the mobile cell phone providing for bi-directional communication with a Headphone array; the incorporation of the mobile cell phone's microphone(s) to act as the Environmental Audio Acoustical Transducer(s); and the incorporation of the mobile cell phone's keyboard or touch sensitive screen to function as a manual input or to complement speech commands and that can act in a way to respond to Personalized Services offered to a user. While the present embodiments have been described with reference to exemplary embodiments, it is to be understood that the claimed embodiments are not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Filer:	John Patrick Keady
Attorney Docket Number:	CONT_14148749

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**785**

Electronic Acknowledgement Receipt	
EFS ID:	38536366
Application Number:	16785822
International Application Number:	
Confirmation Number:	3813
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Customer Number:	150139
Filer:	John Patrick Keady
Filer Authorized By:	
Attorney Docket Number:	CONT_14148749
Receipt Date:	10-FEB-2020
Filing Date:	
Time Stamp:	11:40:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$785
RAM confirmation Number	E202020B42203859
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	WebADS.pdf	122758 e524c69fd6c2a0141d68df0c3b736ba7b7bde57d	no	8
Warnings:					
Information:					
2	Oath or Declaration filed	CONT_14148749_OATH_PARENT.pdf	149675 9f325821f2ef382fe3070383de48f30e20128acd	no	1
Warnings:					
Information:					
3	Drawings-other than black and white line drawings	CONT_14148749_FIGS.pdf	286910 6d544a58da05abc32f8d5dcd5676488707685b36	no	5
Warnings:					
Information:					
4	Abstract	CONT_14148749_ABSTRACT.pdf	102302 969b9b6855cee91cd177f76f2b7a5ba0c44a7182	no	1
Warnings:					
Information:					
5	Claims	CONT_14148749_CLAIMS.pdf	74177 07d21db1b557c97fd9ea18096c0c60546a70ca48	no	3
Warnings:					
Information:					
6	Specification	CONT_14148749_SPEC.pdf	435880 415d1d4ba634faa670db9e6f5a6292d2329bee3d	no	37
Warnings:					
Information:					

7	Fee Worksheet (SB06)	fee-info.pdf	35097 9899e9eb321a43432014cb46588a7f4bfa58fa80	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	1206799	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 16785822 Document Date: 02/10/2020

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via DAV or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: March 1, 2019

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/785,822

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	75		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	330		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	18 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 230 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	785		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/785,822	02/10/2020	Steven Wayne Goldstein	CONT_14148749

CONFIRMATION NO. 3813

150139
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

FORMALITIES LETTER

OC000000114984186

Date Mailed: 02/27/2020

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - More than one figure is present and one or more figure appears to be unnumbered or misnumbered in comparison to the brief description of the figures. See Figure(s) 58. The figures must be labeled "Fig." with a consecutive Arabic numeral (1, 2, etc.) or an Arabic numeral and capital letter in the English alphabet (A, B, etc.) and correspond with a brief description having the same figure number. See 37 CFR 1.84(u)(1).
    (1) To correct the figure numbering, replacement figures must be submitted.
    (2) To add a brief description of an unnumbered figure, or correct the reference in the specification to the figures, a proper substitute specification in compliance with 37 CFR 1.121(b)(3) and 1.125, providing a brief description of each drawing figure presented, added or amended to correspond to the corrected numbering of the figures, must be submitted. See also 37 CFR 1.77(b)(9).
  - The application contains a section in the specification containing the brief description of the figures, but is missing the description of Figure(s) **5B** as required by 37 CFR 1.74 and 37 CFR 1.77(b)(9). A brief description of each drawing figure presented is required to satisfy this requirement.
    - To add a brief description of a figure, a proper substitute specification in compliance with 37 CFR 1.121(b)(3) and 1.125, providing a brief description of each drawing figure presented, must be submitted. See also 37 CFR 1.77(b)(9).

    Note: If applicant wishes to delete the undescribed figure, replacement sheets must be submitted to renumber the figure(s) consecutively.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

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Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/elbanaybanay/

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/785,822	02/10/2020		785	CONT_14148749	18	1

CONFIRMATION NO. 3813

150139
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

FILING RECEIPT

OC000000114984185

Date Mailed: 02/27/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Steven Wayne Goldstein, Delray Beach, FL;

Applicant(s)

Staton Techiya LLC, Delray Beach, FL

Assignment For Published Patent Application

Staton Techiya LLC, Delray Beach, FL

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 14/148,749 01/07/2014
which is a CON of 11/774,965 07/09/2007 ABN
which claims benefit of 60/806,769 07/08/2006

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/785,822**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

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**** SMALL ENTITY ****
Title

PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: Yes

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	:	16/785,822	CONFIRMATION NO. 3813
APPLICATION OF	:	STEVEN WAYNE GOLDSTEIN	
DATE FILED	:	02/10/2020	
EXAMINER	:	UNKNOWN	
TC/A.U.	:	UNKNOWN	
DOCKET	:	CONT-14148749	
TITLE	:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

TRANSMITTAL LETTER

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Date: April 3, 2020

Sir:

These remarks are filed in response to the Notice to File Corrected Application Papers dated 27 Feb 2020.

The Notice to File Corrected Papers states in part (pg. 5):

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - More than one figure is present and one or more figure appears to be unnumbered or misnumbered in comparison to the brief description of the figures. See Figure(s) 58. The figures must be labeled "Fig." with a consecutive Arabic numeral (1, 2, etc.) or an Arabic numeral and capital letter in the English alphabet (A, B, etc.) and correspond with a brief description having the same figure number. See 37 CFR 1.84(u)(1).

The filed figures are attached. There is no Fig. 58, as specified in the Notice to File Corrected Papers. Instead there was an error in the specification during translation between the stored PDF document to a word document, which referred to Fig. 58 instead of the correct referral to Figure 5B. A corrected marked specification is attached as well as a cleaned specification to replace the originally filed specification. Corrections occur on pages 2, 11, 15, 17, 18, 19, 22, 35, and 37. No new matter has been added as is evident by comparing the corrected text to parent application 14/148,749.

Should the Examiner believe that anything further is necessary, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Respectfully submitted,

TECHIYA LLC

Date: April 3, 2020

/John P. Keady/
John P. Keady
Reg. No. 56,389
571-606-1291

CONT 14148749

PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of and claims the priority benefit of U.S. Pat. App. No. 14/148,749, filed 7 Jan. 2014, which claims the priority benefit of U.S. Provisional Application No. 60/806,769, under 35 U.S.C. § 119(e), filed 8 July 2006, and U.S. Non-Provisional Application No. 11/774,965 filed 9 July 2007, all of which are incorporated herein by reference in their entireties.

FIELD

[0002] The claimed embodiments relate in general to methods and devices for the storage and recall of audio content via an earpiece, and in particular, though not exclusively, for the storage and playing of music or verbal content on a system that is built into a headphone.

BACKGROUND

[0003] Present audio content playing devices are separated from the headphone system that normally contains the speakers (also referred to as receivers). The reason for this has typically been that audio content has been stored on disks that require a separate playing system. However, even with the advent of storing audio content on non-disk RAM (Random Access Memory) storage systems, the audio content player has been separated from the earpiece system (e.g., plug in headphones or earbuds). Combining the capacity for audio download and playing in an earpiece system is not obvious over related art since

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the user interaction system (e.g., play button, keyboard system) does not readily appear compatible with the size of an earpiece device and the difficulty of user interaction.

[0004] Additionally, no system currently exists for registration and download of audio content into an earpiece.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Examples of the claimed embodiments will become apparent from the following detailed description, taken in conjunction with the drawings in which:

[0006] Figure 1 illustrates the connection between an earpiece device (103 and 104) and a communication network;

[0007] Figure 2 illustrates at least one exemplary embodiment where earpiece devices share information with other earpiece devices within range (e.g., GPS location and identity);

[0008] Figure 3 illustrates an example of various elements that can be part of an earpiece device in accordance with at least one exemplary embodiment;

[0009] Figure 4 illustrates an example of a communication system in accordance with at least one exemplary embodiment that a user can use to register via his/her computer;

[0010] Figure 5A illustrates an earpiece that can store and download audio content in accordance with at least one exemplary embodiment;

[0011] Figure 5B illustrates a block diagram of the earpiece of Figure 5A; and

[0012] Figure 6 illustrates a user interface for setting the parameters of the Personal Audio Assistant.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0013] The following description of exemplary embodiment(s) is merely illustrative in nature and is in no way intended to limit the claimed embodiments, its application, or uses.

[0014] Processes, methods, materials and devices known by one of ordinary skill in the relevant arts can not be discussed in detail but are intended to be part of the enabling discussion where appropriate for example the generation and use of transfer functions.

[0015] Notice that similar reference numerals and letters refer to similar items in the following figures, and thus once an item is defined in one figure, it can not be discussed for following figures.

[0016] Note that herein when referring to correcting or corrections of an error (e.g., noise), a reduction of the error and/or a correction of the error is intended.

SUMMARY OF EXEMPLARY EMBODIMENTS

[0017] At least one exemplary embodiment is directed to a system for Personalized Services delivered to a Personal Audio Assistant incorporated within an earpiece (e.g., earbuds, headphones). Personalized Services include content such as music files (for preview or purchase) related to a user's preferences, reminders from personal scheduling software, delivery and text-to-speech, speech-to-text processing of email, marketing messages, delivery and

text-to-speech of stock market information, medication reminders, foreign language instruction, academic instruction, time and date information, speech-to-speech delivery, instructions from a GPS system and others. A Personal Audio Assistant can be an audio playback platform for providing the user with Personalized Services.

[0018] At least one exemplary embodiment is directed to a Personal Audio Assistant system that is included as part of an earpiece (e.g., Headphone system). The Personal Audio Assistant is capable of digital audio playback, mitigating the need to carry a personal music player. Furthermore, a subscription-based service provides audio content to the user through the Personal Audio Assistant. The type of audio content, which is automatically provided to the user, is based on the user's preferences, which are obtained through a registration process.

[0019] The audio content, which is seamlessly downloaded to the Personal Audio Assistant in the background, is managed from a Server system and is only available on the Personal Audio Assistant for a predetermined period of time or for a fixed number of playback counts. However, the user can purchase any music file or electronic book directly from the Personal Audio Assistant with a simple one-click control interface, storing the purchased audio content on the Personal Audio Assistant as well as storing the content permanently in a user storage lock-box location on the Server system.

[0020] The system provides for audio content to be new and "fresh" each time the user auditions the content. As such, the content is typically auditioned in a

first-in : first-out scenario. In one such example, the user has turned on the Personal Audio Assistant at 8:00am and by 10:00 am has auditioned 2 hours of content that were created for the user as a manifestation of the user's choices of their preferences of genre, artist, their demographics, day of the week, time of day and purchase history. The system also provides for the elimination of a particular song or playlist *in situ.*

[0021] As the user's Listening History Envelope is updated based on experience, subsequent downloads will only contain content incorporating these revised preferences. The Personal Audio Assistant provides for ample memory, thus permitting hours of uninterrupted playback without the need to download additional content from the server. When in need, the Personal Audio Assistant automatically interrogates various communication platforms as it searches for connections. Once a connection is made, the Listener History Envelope file is uploaded to the server, and a new set of personalized playlist content is downloaded to the Personal Audio Assistant. Accordingly, as the Personal Audio Assistant content is auditioned and thus depleted, the communications system provides for constant replenishment.

[0022] In another embodiment, the Personal Audio Assistant also provides for a new set of business solutions to be offered to the music industry. As the personalized audio content is only available for audition for a limited period of time, and can not be sent to the user again from for weeks to months, the user's purchasing behavior can be demonstrated as spontaneous. The basic model of "Try before you buy" is the expected outcome. In another iteration, the distributor

of the music can choose to offer discounts, which can be time-sensitive or quantity-sensitive in nature, in effect promoting greater purchase activity from the user.

[0023] In another iteration, while in audition a user can wish to place the desired content in a hold status. The hold status forms the basis of a "wish list," thus allowing the user to hold for future consideration audio content while it is being auditioned. This content resides in the memory of the Personal Audio Assistant for a defined period, and is automatically erased, or the user can do so manually. The selected content will also appear on the user's computer via a **URL** address; here it resides on the server ready for audition or purchase and download.

[0024] The system is designed to operate as simply as possible. Using a single button, which has multiple contacts, the interface allows the user to purchase, delete, skip to next, and add to a wish list and even control a listening level.

[0025] In another iteration, the user can download their own music to the Personal Audio Assistant for audition. The Personal Audio Assistant system is capable of text-to-speech processing and can interface with personal scheduling software to provide auditory schedule reminders for the user. Auditory reminders relating to the user's medication schedule are also generated by the system.

[0026] At least one exemplary embodiment includes input Acoustic Transducers (microphones) for capturing user's speech as well as Environmental Audio. In further embodiments, stereo input Acoustic Transducers capture

Environmental Audio, and, mixing it with the audio signal path, present the ambient sound field to the user, mitigating the need to remove the Headphone apparatus for normal conversation.

[0027] Additional exemplary embodiments are directed to various scenarios for the delivery and consumption of audio content. The Personal Audio Assistant can store and play back audio content in compressed digital audio formats. In one embodiment, the storage memory of the Personal Audio Assistant is completely closed to the end-user and controlled from the Server. This allows for audio content to be distributed on a temporary basis, as part of a subscription service. In another iteration of the present embodiments, the storage memory of the Personal Audio Assistant is not completely closed to the end-user, allowing the user to transfer audio content to the Personal Audio Assistant from any capable device such as a Personal Computer or a Personal Music Player.

[0028] In at least one exemplary embodiment the Personal Audio Assistant automatically scans for other Bluetooth®-enabled audio playback systems and notifies the user that additional devices are available. These additional devices can include a Bluetooth® video system, television system, personal video player, video camera, cell phone, another Personal Audio Assistant and others.

[0029] In another iteration, the Personal Audio Assistant can be directly connected to a Terrestrial Radio receiver, or have such a receiver built in to the system.

[0030] In another exemplary embodiment, a technique known as Sonification can be used to convey statistical or other numerical information to

a headphone. For example, the user would be able to receive information about the growth or decline of a particular stock, groups of stocks or even sectors of the markets though the Personal Audio Assistant. Many different components can be altered to change the user's perception of the sound, and in turn, their perception of the underlying information being portrayed. An increase or decrease in some level of share price or trading levels can be presented to the user. A stock market price can be portrayed by an increase in the frequency of a sine tone as the stock price rose, and a decline in frequency as it fell. To allow the user to determine that more than one stock was being portrayed, different timbres and spatial locations might be used for the different stocks, or they can be played to the user from different points in space, for example, through different sides of their headphones. The user can act upon this auditory information and use the controls built-in to the headphone to either purchase or sell a particular stock position.

[0031] Furthermore, specific sonification techniques and preferences can be presented to the user as "themes" from which the user can select. For example, one theme might auralize the current trading price of one stock with an ambient sine tone in the left ear, the price of another stock in the right ear, their respective trade volumes as perceived elevation using personalized head-related transfer function binauralization, and the current global index or other market indicator as the combined perceptual loudness of both tones. Such a scheme affords ambient auditory display in this example of five dimensions of financial data without compromising the user's ability to converse or work on other tasks. In

another embodiment, the system affords users the ability to customize themes to their liking and to rapidly switch among them using simple speech commands. Additionally, the user can search the web from voice commands and receive results via a text to speech synthesizer.

[0032] In yet another exemplary embodiment the Personal Audio Assistant (PAA) functions as a dictation device for medical professionals for dictating clinical information to a patient's medical record, or write prescriptions for medication or devices. Conversely, the PAA can function as text-to-speech allowing the clinician to audition information from a medical record, rather than reading. The PAA can save considerable time preparing clinician interaction with a patient.

[0033] In another iteration, the Personal Audio Assistant can function as a tool to locate other users of Personal Audio Assistant who share common interests, or who are searching for particular attributes of other users. Whereas the first user has stored specific personal information in the Public Data memory of the Personal Audio Assistant, an example of which might be related to schools attended, marital status, profession etc, or the first user can be in search of another user with these attributes and whereas a second user of a Personal Audio Assistant comes within communication range of the first user, the individual Personal Audio Assistants communicate with each other, access the personal information stored in each of their respective Public Data memories to ascertain if these users have common interests. If a match occurs, each unit can contain both audible and visual indicators announcing that a match has been

made and thus each user can start dialog either physically or electronically via the environmental microphones.

EXAMPLES OF TERMINOLOGY

[0034] Note that the following non-limiting examples of terminology are solely intended to aid in understanding various exemplary embodiments and are not intended to be restrictive of the meaning of terms nor all inclusive.

[0035] **Acoustic Isolation Cushion:** An "Acoustic Isolation Cushion" shall be defined as a circum-aural or intra-aural device that provides acoustic isolation from Environmental Noise. Acoustic Isolation Cushions can be included as part of a Headphones system, allowing the output of the acoustical transducers to reach the ear unimpeded, but still providing acoustic isolation from Environmental Noise.

[0036] **Acoustic Transducer:** An "Acoustic Transducer" shall be defined as a device that converts sound pressure level variations into electronic voltages or vice versa. Acoustic Transducers include microphones, loudspeakers, Headphones, and other devices.

[0037] **Audio Playback:** "Audio Playback" shall be defined as the auditory stimuli generated when Playback Hardware reproduces audio content (music, speech, etc) for a listener or a group of listeners listening to Headphones.

[0038] **Audition:** "Audition" shall be defined as the process of detecting sound stimulus using the human auditory system. This includes the physical, psychophysical, psychoacoustic, and cognitive processes associated with the perception of acoustic stimuli.

[0039] **Client:** A "Client" shall be defined as a system that communicates with a Server, usually over a communications network, and directly interfaces with a user. Examples of Client systems include personal computers and mobile phones.

[0040] **Communications Port:** A Communication Port shall be defined as an interface port supporting bidirectional transmission protocols (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, CDMA, or others) via a communications network (e.g., the Internet, cellular networks).

[0041] **Control Data:** "Control Data" shall be defined as information that dictates the operating parameters for a system or a set of systems.

[0042] **Earcon:** An Earcon shall be defined as a Personalized Audio signal that informs the User of a pending event typically inserted in advance of the upcoming audio content.

[0043] **Ear Mold Style:** "Ear Mold Style" shall be defined as a description of the form factor for an intra-aural device (e.g., hearing aids). Ear Mold Styles include completely in the canal (CIC), in the canal (ITC), in the ear (ITE), and behind the ear (BTE).

[0044] **Environmental Audio:** "Environmental Audio" shall be defined as auditory stimuli of interest to the user in the environment where the user is present. Environmental Audio includes speech and music in the environment.

[0045] **Environmental Noise:** "Environmental Noise" shall be defined as the auditory stimuli inherent to a particular environment where the user is present and which the user does not wish to audition. The drone of highway traffic is a

common example of Environmental Noise. Note that Environmental Noise and Audio Playback are two distinct types of auditory stimuli. Environmental Noise does not typically include Music or other audio content.

[0046] E-Tailing System: An "E-tailing System" shall be defined as a web-based solution through which a user can search, preview and acquire some available product or service. Short for "electronic retailing," E-tailing is the offering of retail goods or services on the Internet. Used in Internet discussions as early as 1995, the term E-tailing seems an almost inevitable addition to e-mail, e-business, and e-commerce. E-tailing is synonymous with business-to-consumer (B2C) transactions. Accordingly, the user can be required to register by submitting personal information, and the user can be required to provide payment in the form of Currency or other consideration in exchange for the product or service. Optionally, a sponsor can bear the cost of compensating the E-tailer, while the user would receive the product or service.

[0047] Generic HRTF: A "Generic **HRTF"** shall be defined as a set of **HRTF** data that is intended for use by any Member. A Generic **HRTF** can provide a generalized model of the parts of the human anatomy relevant to audition and localization, or simply a model of the anatomy of an individual other than the Member. The application of Generic **HRTF** data to Audio Content provides the least convincing Spatial Image for the Member, relative to Semi-Personalized and Personalized **HRTF** data. Generic **HRTF** data is generally retrieved from publicly available databases such as the CIPIC **HRTF** database.

[0048] Headphones: "Headphones" (also known as earphones, earbuds, stereophones, headsets, Canalphones, or the slang term "cans") are a pair of transducers that receive an electrical signal from a media player, communication receivers and transceivers, and use speakers placed in close proximity to the ears (hence the name earphone) to convert the signal into audible sound waves. Headphones are intended as personal listening devices that are placed either circum-aural or intra-aural according to one of the Ear Mold Styles, as well as other devices that meet the above definition such as advanced eyewear that includes Acoustical Transducers (i.e. Dataview). Headphones can also include stereo input Acoustic Transducers (microphones) included as part of the Ear Mold Style form factor.

[0049] HRTF: "HRTF" is an acronym for head-related transfer function- a set of data that describes the acoustical reflection characteristics of an individual's anatomy relevant to audition. Although in practice they are distinct (but directly related), this definition of HRTF encompasses the head-related impulse response (HRIR) or any other set of data that describes some aspects of an individual's anatomy relevant to audition.

[0050] Informed Consent: "Informed Consent" shall be defined as a legal condition whereby a person can provide formal consent based upon an appreciation and understanding of the facts and implications associated with a specific action. For minors or individuals without complete possession of their faculties, Informed Consent includes the formal consent of a parent or guardian.

[0051] Listening History Envelope: "Listening History Envelope" shall be defined as a record of a user's listening habits over time. The envelope includes system data, time system was turned off, time the system is presenting content, when the system doesn't audition, system transducers, when the user auditions content, time stamp of content being auditioned, content which is: skipped, deleted, played multiple times, saved in the Wish List, and time between listening sessions.

[0052] Music: "Music" shall be defined as a form of expression in the medium of time using the structures of tones and silence to create complex forms in time through construction of patterns and combinations of natural stimuli, principally sound. Music can also be referred to as audio media or audio content.

[0053] Playback Hardware: Any device used to play previously recorded or live streaming audio. Playback Hardware includes Headphones, loudspeakers, personal music players, mobile phones, and other devices.

[0054] Personal Audio Assistant: A "Personal Audio Assistant" shall be defined as a portable system capable of interfacing with a communications network, directly or through an intermediate, to transmit and receive audio signals and other data.

[0055] Personal Computer: "Personal Computer" shall be defined as any piece of hardware that is an open system capable of compiling, linking, and executing a programming language (such as C/C++, Java™, etc.).

[0056] Personal Music Player: "Personal Music Player" shall be defined as any portable device that implements perceptual audio decoder technology but is

a closed system in that users are not generally allowed or able to write software for the device.

[0057] Personalized HRTF: A "Personalized **HRTF"** shall be defined as a set of **HRTF** data that is measured for a specific Member and unique to that Member. The application of Personalized **HRTF** data to Audio Content creates, by far, the most convincing Spatial Image for the Member (Begault et. al. 2001, D. Zotkin, R. Duraiswami, and L. Davis 2002).

[0058] Personalized Services: "Personalized Services" shall be defined as services customized to better meet the needs of an individual. Personalized Services include media content (for preview or purchase) related to a user's preferences, reminders from personal scheduling software, delivery and text-to-speech processing of email, marketing messages, delivery and text-to-speech of stock market information, medication reminders, foreign language instruction [real-time foreign language translation], academic instruction, time and date information, and others.

[0059] Public Data: "Public Data" shall be defined as data which contains specific and personal information about the registered user of the Personal Audio Assistant. The registered user chooses which portions of their complete Registration Process data they wish to include in this subset. This data becomes distributed to other users who have compliant devices thus allowing other users to know specific details of the registered user.

[0060] Registration Process: "Registration Process" includes the acquisition of the user's preference via a web page. Typically, the process would include the

items to be captured: Age, demographics, email, gender, Relative Audiogram, Personal Preferences, banking information, credit card information, wake-up and sleep times, music preferences by genre, artist, preferences for writers and authors, desire to receive advertising, turn-on listening level, equalization, email preferences, parental control setup as well as other user-controlled settings.

[0061] Relative Audiogram: A "Relative Audiogram" shall be defined as a measured set of data describing a specific individual's hearing threshold level as a function of frequency. A Relative Audiogram is only an approximate Audiogram, leaving more complete Audiogram analysis to qualified audiologists.

[0062] Semi-Personalized HRTF: A "Semi-Personalized **HRTF"** shall be defined as a set of **HRTF** data that is selected from a database of known **HRTF** data as the "best-fit" for a specific user. Semi-Personalized **HRTF** data is not necessarily unique to one user; however, interpolation and matching algorithms can be employed to modify **HRTF** data from the database to improve the accuracy of a Semi-Personalized **HRTF.** The application of Semi-Personalized **HRTF** data to Audio Content provides a Spatial Image that is improved compared to that of Generic **HRTF** data, but less effective than that of Personalized **HRTF** data. The embodiments within speak to a variety of methods for determining the best-fit **HRTF** data for a particular Member including anthropometrical measurements extracted from photographs and deduction.

[0063] Server: A "Server" shall be defined as a system that controls centrally held data and communicates with Clients.

[0064] **Sonification:** "Sonification" shall be defined as the use of non-speech audio to convey information or to aurally perceptualize non-acoustic data (auralize). Due to a variety of phenomena involving human cognition, certain types of information can be better or more efficiently conveyed using auditory means than, for example, visual means.

EXEMPLARY EMBODIMENTS

[0065] Figure 1 illustrates the connection between an earpiece device (103 and 104) and a communication network (101) via communication interface 102, which can be operatively connected (via a wired or wireless connection) to a server system (100) and/or an e-mail server (105). Additionally a radio signal (e.g., satellite radio) can be input into the earpiece 500 (Figure 5B) via a communication module (e.g., Bluetooth® wireless module 515).

[0066] Figure 2 illustrates at least one exemplary embodiment where earpiece devices share information with other earpiece devices within range (e.g., GPS location and identity). For example multiple users (e.g., 202, 203, 204, and 206) can send signals to each individual earpiece (e.g., 500) when in range (e.g., via a wireless connection 205) or to a mobile audio communications device 200 via a wireless connection (201) with each earpiece (500). Additionally information (e.g., audio content, software download) can be sent via a client's computer 207 to each earpiece, either directly (e.g., 205), or via 200. For example audio content can be retrieved on a user's computer and sent to the earpieces that have authorization to use it.

[0067] Figure 3 illustrates an example of various elements that can be part of an earpiece device in accordance with at least one exemplary embodiment. The earpiece can include all or some of the elements illustrated in figure 5B. For example the logic circuit 572 or the operatively connected memory storage device 585, can include spatial enhancement software 329, a DSP codec 330, a speech synthesis and recognition system 311, and a digital timer system 312. Additional elements can be connected to the logic circuit 572 as needed, for example a power supply 320, a software communication interface 307 (e.g., wireless module 515) (which may be connected to communication network 308), data port interface 306, audio input buffers 300 connected to digital audio input 302 and/or analog audio input 303 converted to digital via an ADC 301, environmental audio input acoustic transducer(s) 321 converted to digital via an ADC 316, user control 324, digital audio output 328, output acoustic transducers 319 (which receive signals converted to analog via a DAC 310 and amplified via amplifier 309), display system 318, communication buffers 325, program memory 305, data and personal memory 315, as well as other electronic devices as known by one of ordinary skill in the relevant arts.

[0068] Figure 4 illustrates an example of a communication system in accordance with at least one exemplary embodiment that a user can use to register via his/her computer 419, via a communication network 400 (e.g., Internet connection) connected to many various database and registration systems as illustrated and labeled in Figure 4. For example, server 401, database management system 402, audio content preview database 403, audio

content database 404, playlist engine 405, user's information database 406, **HRTF** acquisition process module 407, **HRTF** database 408, lock-box server 409, registration engine 410, e-payment system 413, business-to-business module 414, e-tailing system 415, audiogram database 416, audiogram engine 417 and/or e-mail server 418.

[0069] Figure 5A illustrates an earpiece 500 having sealing section 540 in an ear canal that can store and download audio content 560 in accordance with at least one exemplary embodiment. The earpiece 500, can include a first user interaction element 530 (e.g., a button) , that can be used to turn the earpiece 500 on, or if on then activate an audio play command to start playing saved audio content. The earpiece 500 can also include a second user interaction element 550 (e.g., a slide control) that can be used for example to control the volume. The earpiece 500 can also include recharge ports 570, that can accept two wires of varying voltage that can be inserted into the recharge ports 570 to recharge any batteries in the earpiece 500. The earpiece 500 can include an ambient microphone 520 and an optional communication antenna 510, that if needed can aid in the communication between the earpiece 500 and a communication network.

[0070] Figure 5B illustrates a block diagram of the earpiece of Figure 5A, illustrating the first user interaction element 530, the ambient microphone (AM) 520, that can be used to pick up ambient audio content, an ear canal microphone (ECM) 590 that can pick up audio in the ear canal region, an ear canal receiver (ECR) 580 that can direct audio content to the ear drum, all of which can be

connected operatively to a logic circuit 572. A memory storage device 585 can be operatively connected to the logic circuit (LC) 572, and can store data such as registration, preference, and audio content data. The optional communication antenna 510 can be connected to a communication module (e.g., wireless module 515), and can receive or transmit information 560 to a communication network.

[0071] Figure 6 illustrates a user interface for setting the parameters stored in the memory storage device 585. For example a user can use his/her computer 419 to communicate with a server 401 (e.g., via a communication network 400) to start the user's registration (e.g., with an audio content provider). The registration information can then be transmitted 600 to set the stored parameters in the memory storage device 585 of the earpiece 500. Additionally a requested (e.g., bought) audio content can be downloaded 610 into the memory storage device 585 of the earpiece 500.

[0072] At least one exemplary embodiment is directed to an earpiece comprising: an ambient microphone; an ear canal microphone; an ear canal receiver; a sealing section; a logic circuit; a communication module; a memory storage unit; and a user interaction element, where the user interaction element is configured to send a play command to the logic circuit when activated by a user where the logic circuit reads registration parameters stored on the memory storage unit and sends audio content to the ear canal receiver according to the registration parameters.

[0073] In at least one exemplary embodiment the audio content is stored in the memory storage unit. The earpiece according to claim 2, where the communications module is a wireless communications module. Additionally the earpiece can include a second user interaction element configured to alter the volume of the audio content that is emitted from the ear canal receiver.

[0074] Upon a play command being received by the logic circuit the logic circuit can check registration parameters stored in the memory storage device for example one of the registration parameters can be whether the audio content is a sample audio content or a fully purchased audio content, or the allowed number of times an audio content can be played, and a counter value that keeps track of the number of times the audio content has been played.

[0075] The earpiece can send an auditory warning to be emitted by the ear canal receiver when the counter value is greater than or equal to the allowed number of times the audio content can be played, and where the logic circuit does not send the audio content to the ear canal receiver.

FURTHER EXEMPLARY EMBODIMENTS

[0076] At least one exemplary embodiment is directed to a system for the delivery of Personalized Services to Personal Audio Assistants, the system comprising: a Personal Audio Assistant system for presenting Personalized Services to the user as Audio Playback; a Server system for user registration, Personalized Service management, and communication; a Registration Process

for collecting detailed registration information from users, including the information necessary for creating Personalized Services; a communications protocol (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, CDMA, or other) and a communications network (i.e. the Internet, cellular networks) connecting the Personal Audio Assistant to the Server or connecting the Personal Audio Assistant to other Personal Audio Assistants (peer-to-peer behavior).

[0077] In at least one exemplary embodiment a Personal Computer acts as an intermediate, connecting to the Server system over a communications network and connecting to the Personal Audio Assistant over a local connection.
At least one exemplary embodiment includes a Personal Hearing Damage Intervention System (e.g., USPTO- 60/805985- Goldstein).

[0078] In at least one exemplary embodiment a Personal Audio Assistant system included as part of a Headphone system, the system comprising: a Communications Port supporting a communications protocol enabling communication with the Server system, peer devices, and other capable devices; a non-volatile program memory storage system for storing Control Data, dictating system behavior; a data memory storage system for storing data and audio content; an analog audio input/output and corresponding ADC/DAC; a digital audio input/output and a digital audio signal path; a user control system allowing the user to adjust the level of the audio output and control the behavior of the system; a user control system allowing the user to purchase the content being auditioned in real time; a user control system allowing the user to control, delete,

fast forward, output level control, scan, advance, the data stored both stored in memory as well as new streaming data emails and reminders; a display system for presenting information to the user(s) visually using any method familiar to those skilled in the art (LED, LCD, or other); a display system for presenting information to the user(s) (e.g., using Earcons and other sound files); a speech synthesis system for converting text-to-speech and generating speech signals; a speech recognition system for converting speech to-text to respond and send emails and to interface with the control language as to provide navigational commands; a digital timer system; a power supply system in the form of a battery; a unique identification number for each Personal Audio Assistant; Input Acoustic Transducers; an Output Acoustic Transducer; an Audio amplification system; Acoustic Isolation Cushions conforming to one of the Ear Mold Styles (CIC, ITC, ITE, or BTE; see definitions) and other elements common to Headphone systems; a digital signal processor (DSP) system; and a CODEC processor capable of improving the perceptual sound quality of the content to be auditioned while governed by delivering the correct SPL dose.

[0079] In at least one exemplary embodiment the system is independent of a Headphone array or can be included and imbedded as part of a Personal Computer system, a Personal Music Player system, a personal monitoring system, an automotive audio system, a home audio system, an avionics audio system, a personal video system, a mobile cell phone system, a personal digital assistant system, a standalone accessory, or an advanced eye-wear system with acoustical transducers.

[0080] In at least one exemplary embodiment the various processing needed to derive the intended functions are distributed among any combination of a Server system, a Personal Computer system, a Personal Music Player system, a personal monitoring system, an automotive audio system, a home audio system, an avionics audio system, a personal video system, a mobile cell phone system, a personal digital assistant system, a standalone accessory, or an advanced eye-wear system with acoustical transducers.

[0081] In at least one exemplary embodiment the Personal Audio Assistant system can exchange audio signals with a mobile phone via the Communications Port, allowing the Personal Audio Assistant to function as a mobile phone accessory.

[0082] In at least one exemplary embodiment a communications buffer is included. For example when a network connection is available, the communications buffer uploads stored content (e.g., Listening Habits Envelope) and stores incoming transmissions (e.g., music, electronic books, and updates to the firmware or operating system) from the Communications Port; The contents of the communications buffer are then transmitted whenever a network connection becomes available. At least one exemplary embodiment includes a perceptual audio codec decoding technology in the DSP, enabling the storage and playback of compressed digital audio formats (e.g., MP3, AAC, FLAG, etc.). At least one exemplary embodiment is compliant and compatible with DRM, FairPlay® and other forms of digital content governance.

[0083] At least one exemplary embodiment includes a user control system for selecting and playing back audio content stored in memory that operates using any combination of the following methods: a button or tactile interface which upon auditioning a song can be pressed to order content; a button, tactile and/ or voice controlled interface which, when pressed once, commanded to, activates playback of short audio clips or audio thumbnails of the audio content stored in memory; When the button is pressed again during audio thumbnail playback, the current audio content selection is played in its entirety; The behavior of this interface is similar to the "scan" button interface common in FM/AM radio devices; a button, tactile and/or voice controlled interface that, when pressed or commanded to, skips to the next piece of audio content, which is selected randomly from all available audio content that has a play count equal to or less than the play count of the piece of audio content currently playing; The behavior of this interface is similar to the "shuffle" behavior found in some personal music players; an interface for browsing audio content storage devices familiar to those skilled in the art; and a process to allow for increased data memory storage capacity for storing audio content.

[0084] In at least one exemplary embodiment the contents of the data memory are encrypted and controlled by the Server system only, prohibiting the end-user from loading unauthorized audio content into the data memory. Further the contents of the data memory can be manipulated by the end-user, allowing the user to transfer audio content to the Personal Audio Assistant system from any device capable of interfacing with the communications port; For example,

audio content can be transferred to the system from a Personal Music Player or a Personal Computer. According to at least one exemplary embodiment, audio content (or other media content) updates are retrieved from the Server system any time a connection is detected by the communications port. Furthermore, an exemplary embodiment can include an acoustical and/or visual indicator informing the user when a transfer of data is activated.

[0085] In at least one exemplary embodiment radio wave transmissions are used to implement some communications protocol and the communications port acts as a radio receiver. Additionally the Personal Audio Assistant can include: interfaces with some personal scheduling software through the communications port; a speech synthesis system which generates speech-signal reminders corresponding to information from the scheduling software, where the digital timer system triggers the presentation of the speech-signal reminders at the appropriate time.

[0086] Additionally the Personal Audio Assistant can interface with an email platform through the communications port; The speech synthesis system converts the email in text to speech and provides email to the user in aural presentation format. The system further comprising: a process in the Registration engine allowing the user to optimize their personalization process of incoming emails by associating a specific Earcon with the importance of the incoming email. As such, normal priority email contains an introduction sound announcing to the user the level of importance the sender associated with their email; a speech recognition system for converting speech-to-text which interfaces with the

control language as to provide navigational commands allowing the user to respond and send emails.

[0087] In at least one exemplary embodiment the communications port system makes use of some wireless communications protocol (802.11, Bluetooth®, A2DP, or other) to transmit and receive digital audio data for playback, the system further comprising: an audio codec to encode and decode digital audio transmissions; a wireless communications system (802.11, Bluetooth®, A2DP, etc.) for transmitting and receiving data (digital audio transmissions, Control Data, etc.); a method for pairing two or more Personal Audio Assistants through a wireless communications protocol to provide a secure exchange of audio content, data such as the user's Public Data; an audio warning signal or visual display system output that notifies the user anytime a compatible transmission becomes available; and a user control system enabling the user to switch between available compatible transmissions.

[0088] In at least one exemplary embodiment the system enables listeners to share digital audio transmissions, the system further comprising: a method for scanning for available digital audio transmissions within range; a user control interface for specifying digital audio transmission behavior; a method for employing the system as a relay to other compliant devices; re-broadcasting digital audio transmissions to increase wireless range. In at least one exemplary embodiment multiple systems are capable of sharing the contents of their program and data memory using the wireless communications protocol.

[0089] In at least one exemplary embodiment of the system, the input Acoustic Transducer is used to record audio content to the data memory storage system, the system further comprising: an implementation of some perceptual audio codec technology in the DSP, enabling the storage of compressed audio formats (e.g., MP3, AAC, FLAG, etc); and an increased data memory storage capacity for storing recorded audio content.

[0090] In at least one exemplary embodiment, the stereo input Acoustic Transducers are ultimately connected to the audio signal path at the DSP, allowing the user to audition Environmental Audio (e.g., speech or music) and mitigating the need for the user to remove the Headphone apparatus to audition Environmental Audio, the system further comprising: a stereo pair of input Acoustic Transducers placed close to the user's ear canal input, conforming to one of the Ear Mold Styles (CIC, ITC, ITE, or BTE, see definitions); and by mounting the input Acoustic Transducers in a CIC or ITC configuration, spatial-acoustic cues are preserved, creating a spatially-accurate Environmental Audio input signal- essentially a personal binaural recording; a method for acoustically compensating for the non-linear frequency response characteristics of the Acoustical Isolation Cushions of a given Headphone system by applying corresponding inverse filters to the Environmental Audio input signal at the DSP; With this method, the system acts as a linear-frequency-response hearing protection apparatus (e.g., USPTO- 60805985- Goldstein).

[0091] At least one exemplary embodiment includes a system for first attenuating Audio Playback and then mixing the Environmental Audio input

signals, at a louder listening level, with the audio signal path using the DSP, where the system is activated by any combination of the following methods: a manual switch to activate / deactivate the system; a speech-detection apparatus to activate the system when speech is detected as the principal component of the Environmental Audio input; and a music-detection apparatus to activate the system when music is detected as the principal component of the Environmental Audio input.

[0092] At least one exemplary embodiment can include active noise reduction, echo cancellation and signal conditioning that can be environmentally customized through the registration process to better meet the user's specific needs (i.e., occupation-related noise cancellation); A typical application would be a special set of noise cancellation parameters tuned to the drilling equipment used by a dentist.

[0093] In at least one exemplary embodiment the input Acoustic Transducers are instead mounted within circum-aural, intra-aural BTE, or intra-aural ITE molds (see Ear Mold Style), the system further comprising: a spatial audio enhancement system for supplementing the spatial-acoustic cues captured by the stereo pair of input Acoustical Transducers to provide improved spatial perception of Environmental Audio using any combination of the following methods: the application of Generic, Semi-Personalized, or Personalized HRTF data to the Environmental Audio input signal; the application of binaural enhancement algorithms, familiar to those skilled in the art, to the Environmental Audio input signals; the application of a pinna simulation algorithm to the

Environmental Audio input signal; and a synthetic pinna apparatus placed just before the stereo input Acoustic Transducers.

[0094] At least one exemplary embodiment includes a Server system for the creation, Registration, management, and delivery of Personalized Services, the system comprising: a communications system for interfacing with public communication networks to exchange data with Personal Audio Assistants, a Client's computer, mobile phones, PDAs or other capable devices; a database and database management system for storing and retrieving information relating to user Registration, Personalized Services, audio content, Control Data, and other data; a Registration interface system for collecting, storing, and applying information provided by users; a method for creating Personalized Services based on user Registration information; an end-user audio content Lock-Box storage system, providing every registered user access to their purchased media content; a business-to-business interface system for acquiring audio content with record labels, copyright holders, and other businesses; an E-tailing system including an electronic transactions system enabling users to purchase content, items offered for sale or pay subscription fees electronically; an E-Payment system compensating the various copyholders upon purchase of content by user; a Playlist engine, which acquires the user's Registration information, Listening History Envelope and then creates audio playlists, which is optimized for the user preferences and further refinements; and an Email server, which distributes communications to the user and others, regarding marketing data, the status of the user weekly SPL dose, and other information.

[0095] At least one exemplary embodiment includes machine-learning techniques employed to better optimize the user's preferences relating to audio content and other media content, the system further comprising: a method for tracking the purchase history of each user, relating the purchase history to media content preferences, and using the purchase history to make media content recommendations; a method for examining a user's digital media library, stored on a Personal Computer, Personal Music Player, or Personal Audio Assistant, from the Server system, and relating media content preferences and media content recommendations to the user's digital media library; and a method for examining a user's Listening History Profile.

[0096] At least one exemplary embodiment includes a Registration system for collecting a wide variety of information from users, including information necessary for creating Personalized Services, the system comprising: a Server system; an interface system for querying the user to collect registration information including demographics (age, gender), Playback Hardware information, Headphone information, occupational information, home and work locations, medication information, music-related preferences, video-related preferences, and other information; a method for customizing Control Data based on registration information; and a method for creating Personalized Services based on registration information.

[0097] In at least one exemplary embodiment a fast **HRTF** acquisition process is included as part of the Registration process, the system further comprising a method for the fast acquisition of Semi-Personalized **HRTF** data via a deduction

process, the method comprising: a database system containing indexed, clustered **HRTF** data sets; an auditory test signal with distinctive spatial characteristics, where two or more distinct sound source locations exist; a system for the application of potential **HRTF** matches to the auditory test signal; and a feedback system, allowing the user to select the best listening experience from a number of candidate listening experiences, based on the spatial quality perceived in the HRTF-processed auditory test signal.

[0098] In at least one exemplary embodiment Personalized **HRTF** data is measured and used instead of Semi-Personalized **HRTF** data, by any method familiar to those skilled in the art.

[0099] In at least one exemplary embodiment the user is provided some Personal Audio Assistant free-of-charge or at a discount, given the user agrees to a subscription service commitment to receive Personalized Services for a certain amount of time.

[00100] In at least one exemplary embodiment, as part of the Personalized Services, the user is provided with temporary audio content corresponding to the preferences indicated during the registration process; Further, the user is given the option to purchase the audio content permanently; Otherwise, the audio content is replaced with new audio content from the Server, after a predetermined amount of time or a predetermined number of playback counts, the system comprising: a Personal Audio Assistant with an enhanced user control system, enabling a registered user to purchase media content directly from the Personal Audio Assistant with a button; and a Personal Audio Assistant

with an enhanced user control system, enabling a registered user to store a reference to media content that can be purchased by the user at a later time.

[00101] In at least one exemplary embodiment, video or gaming content is included as well as audio content, the system further comprising: a Personal Audio Assistant with an enhanced visual display system, capable of playing video and/or gaming content.

[00102] In at least one exemplary embodiment, as part of the Personalized Services, the user receives medication reminders in the form of speech signals, audio signals, text, or graphics on the user's Personal Audio Assistant; Medication reminders are generated by the Server system based on the user's registration information.

[00103] In at least one exemplary embodiment, as part of the Personalized Services, the user receives stock market information in the form of speech signals, audio signals, text, or graphics on the user's Personal Audio Assistant; The stock market information is selected by the Server system based on the user's registration information, the system further comprising: the user having successfully registered their Personal Audio Assistant with a brokerage firm, or other stock trading engines, the user can then purchase or sell a stock by use of a user button or a speech command.

[00104] Further in at least one exemplary embodiment, the user is able to request specific media content to be transferred temporarily or permanently to the user's Personal Audio Assistant, the system further comprising: an interface system operating on the Server allowing users to request specific media content

by artist, title, genre, format, keyword search, or other methods familiar to those skilled in the art; and a media content search engine system.

[00105] In at least one exemplary embodiment a Relative Audiogram compensation filter is applied to audio signal path by the digital signal processor, the system either (e.g., USPTO- 60805985- Goldstein): (a) Retrieves Relative Audiogram compensation information from a remote Server after a registration process (during transmission, the information can include HIPAA compliant encoding); or (b) calculates a compensation filter from Relative Audiogram information obtained by the system locally. For example US Patent No. 6,840,908- Edwards, and US Patent No. 6,379,314- Horn, discuss methods for the acquisition of an individual's Relative Audiogram.

[00106] In at least one exemplary embodiment a Satellite Radio transmitter/receiver (transceiver) is incorporated within the Headphone proper, allowing the user to at least: receive XM®, Sirius® and other broadcasts for playback over the system; select radio stations for playback over the system via the control system, the control system comprising either a single-click tactile interface or the speech-controlled circuitry; store selected portions of such broadcasts in memory for later recall and playback via the control systems; engage a novel commercial-skip feature for attenuating the playback level of suspected sales commercials broadcasts; and engage a speech-skip feature for attenuating the playback of speech (e.g., news, announcements, etc.).

[00107] At least one exemplary embodiment includes a Walkie-Talkie mode, which broadcasts input to the system's built-in microphone, whereby the user's

speech can be detected by the input acoustic transducer and remotely broadcast where at least one of the following occurs: the Walkie-Talkie mode receives input via AM/FM broadcasts (as well as digital communications protocols) from a nearby user; the Walkie-Talkie mode allows nearby users to engage in conversation with increased perceptual clarity in noisy environments (e.g., aircraft cockpits), using for example a noise-cancellation system; selectively engage and disengage the Walkie-Talkie mode using the control system; detect other users of the system within a given range; and alert the user of the system when other detected systems contain certain Public Data and contain a predefined Public Message Key (e.g., "If the detected system belongs to a single male between the ages of 25 and 30 and whose favorite sport is tennis, then broadcast the message, 'I like tennis also; would you like to have coffee?'" or "If the detected system belongs to a user who attended Princeton University, then broadcast the message, 'Go Tigers!'").

[00108] At least one exemplary embodiment can use other communications to accomplish this service rather than AM/FM; as such the system can incorporate communications transmission protocols (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, CDMA, or other protocols) and a communications network (i.e. the Internet, cellular networks) connecting the Personal Audio Assistant to other Personal Audio Assistants. At least one exemplary embodiment can selectively control the broadcast of public data and public message keys via the control system.

[00109] At least one exemplary embodiment includes a Sonification algorithm within the Headphone, which enables auditory display of digitally received data, including for example financial data, news, GPS data, the system further containing a variety of sonification "themes" selected during the registration process that map requested data (e.g., current average trading price of AAPL stock, the Dow Jones Industrial Index, and the Nasdaq Composite®) to corresponding audio content (e.g., the frequency of a sine tone presented in the left ear, the frequency of a sine tone presented in the right ear, and the global amplitude of both sine tones, respectively).

[00110] At least one exemplary embodiment includes an auditory display, which is synthesized by the onboard Digital Signal Processor. In at least one exemplary embodiment the auditory display is created through the digital audio signal processing effects applied to any other acoustic data the system is capable of reproducing (e.g., terrestrial radio, prepurchased audio content in the user's digital library, electronic books, etc.); For example, a sudden listening level increase in the playback level of a song to which the user was listening can be triggered by a predefined alert condition (e.g., Nasdaq Composite® has exceeded 2200 points).

[00111] At least one exemplary embodiment includes the ability to create themes using a computer program and uploading a file to the Headphone system.

[00112] At least one exemplary embodiment includes a speech recognition system for converting speech to HTML (Voice Browser), whereby the user can

access the Internet, provide navigational commands, perform searches and receive results via the Headphones through a text (HTML)-speech synthesize.

[00113] Additionally, the Personal Audio Assistant can be totally incorporated with a mobile cell phone, or any portable technology which incorporates any of the following protocols, TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, CDMA, or others known to those of ordinary skill in the arts via a communications network (e.g., the Internet, cellular networks), the system further comprising: an Acoustic Transducer constructed as part of the mobile cell phone or a series of Acoustic Transducers, which are constructed as part of mobile cell phone; a commutations path incorporated into the mobile cell phone providing for bi-directional communication with a Headphone array; the incorporation of the mobile cell phone's microphone(s) to act as the Environmental Audio Acoustical Transducer(s); and the incorporation of the mobile cell phone's keyboard or touch sensitive screen to function as a manual input or to complement speech commands and that can act in a way to respond to Personalized Services offered to a user. While the present embodiments have been described with reference to exemplary embodiments, it is to be understood that the claimed embodiments are not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

CONT 14148749

PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of and claims the priority benefit of U.S. Pat. App. No. 14/148,749, filed 7 Jan. 2014, which claims the priority benefit of U.S. Provisional Application No. 60/806,769, under 35 U.S.C. § 119(e), filed 8 July 2006, and U.S. Non-Provisional Application No. 11/774,965 filed 9 July 2007, all of which are incorporated herein by reference in their entireties.

FIELD

[0002] The claimed embodiments relate in general to methods and devices for the storage and recall of audio content via an earpiece, and in particular, though not exclusively, for the storage and playing of music or verbal content on a system that is built into a headphone.

BACKGROUND

[0003] Present audio content playing devices are separated from the headphone system that normally contains the speakers (also referred to as receivers). The reason for this has typically been that audio content has been stored on disks that require a separate playing system. However, even with the advent of storing audio content on non-disk RAM (Random Access Memory) storage systems, the audio content player has been separated from the earpiece system (e.g., plug in headphones or earbuds). Combining the capacity for audio download and playing in an earpiece system is not obvious over related art since

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the user interaction system (e.g., play button, keyboard system) does not readily appear compatible with the size of an earpiece device and the difficulty of user interaction.

[0004] Additionally, no system currently exists for registration and download of audio content into an earpiece.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Examples of the claimed embodiments will become apparent from the following detailed description, taken in conjunction with the drawings in which:

[0006] Figure 1 illustrates the connection between an earpiece device (103 and 104) and a communication network;

[0007] Figure 2 illustrates at least one exemplary embodiment where earpiece devices share information with other earpiece devices within range (e.g., GPS location and identity);

[0008] Figure 3 illustrates an example of various elements that can be part of an earpiece device in accordance with at least one exemplary embodiment;

[0009] Figure 4 illustrates an example of a communication system in accordance with at least one exemplary embodiment that a user can use to register via his/her computer;

[0010] Figure 5A illustrates an earpiece that can store and download audio content in accordance with at least one exemplary embodiment;

[0011] Figure 5[[8]]B illustrates a block diagram of the earpiece of Figure 5A; and

[0012] Figure 6 illustrates a user interface for setting the parameters of the Personal Audio Assistant.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0013] The following description of exemplary embodiment(s) is merely illustrative in nature and is in no way intended to limit the claimed embodiments, its application, or uses.

[0014] Processes, methods, materials and devices known by one of ordinary skill in the relevant arts can not be discussed in detail but are intended to be part of the enabling discussion where appropriate for example the generation and use of transfer functions.

[0015] Notice that similar reference numerals and letters refer to similar items in the following figures, and thus once an item is defined in one figure, it can not be discussed for following figures.

[0016] Note that herein when referring to correcting or corrections of an error (e.g., noise), a reduction of the error and/or a correction of the error is intended.

SUMMARY OF EXEMPLARY EMBODIMENTS

[0017] At least one exemplary embodiment is directed to a system for Personalized Services delivered to a Personal Audio Assistant incorporated within an earpiece (e.g., earbuds, headphones). Personalized Services include content such as music files (for preview or purchase) related to a user's preferences, reminders from personal scheduling software, delivery and text-to-speech, speech-to-text processing of email, marketing messages, delivery and

text-to-speech of stock market information, medication reminders, foreign language instruction, academic instruction, time and date information, speech-to-speech delivery, instructions from a GPS system and others. A Personal Audio Assistant can be an audio playback platform for providing the user with Personalized Services.

[0018] At least one exemplary embodiment is directed to a Personal Audio Assistant system that is included as part of an earpiece (e.g., Headphone system). The Personal Audio Assistant is capable of digital audio playback, mitigating the need to carry a personal music player. Furthermore, a subscription-based service provides audio content to the user through the Personal Audio Assistant. The type of audio content, which is automatically provided to the user, is based on the user's preferences, which are obtained through a registration process.

[0019] The audio content, which is seamlessly downloaded to the Personal Audio Assistant in the background, is managed from a Server system and is only available on the Personal Audio Assistant for a predetermined period of time or for a fixed number of playback counts. However, the user can purchase any music file or electronic book directly from the Personal Audio Assistant with a simple one-click control interface, storing the purchased audio content on the Personal Audio Assistant as well as storing the content permanently in a user storage lock-box location on the Server system.

[0020] The system provides for audio content to be new and "fresh" each time the user auditions the content. As such, the content is typically auditioned in a

first-in : first-out scenario. In one such example, the user has turned on the Personal Audio Assistant at 8:00am and by 10:00 am has auditioned 2 hours of content that were created for the user as a manifestation of the user's choices of their preferences of genre, artist, their demographics, day of the week, time of day and purchase history. The system also provides for the elimination of a particular song or playlist *in situ.*

[0021] As the user's Listening History Envelope is updated based on experience, subsequent downloads will only contain content incorporating these revised preferences. The Personal Audio Assistant provides for ample memory, thus permitting hours of uninterrupted playback without the need to download additional content from the server. When in need, the Personal Audio Assistant automatically interrogates various communication platforms as it searches for connections. Once a connection is made, the Listener History Envelope file is uploaded to the server, and a new set of personalized playlist content is downloaded to the Personal Audio Assistant. Accordingly, as the Personal Audio Assistant content is auditioned and thus depleted, the communications system provides for constant replenishment.

[0022] In another embodiment, the Personal Audio Assistant also provides for a new set of business solutions to be offered to the music industry. As the personalized audio content is only available for audition for a limited period of time, and can not be sent to the user again from for weeks to months, the user's purchasing behavior can be demonstrated as spontaneous. The basic model of "Try before you buy" is the expected outcome. In another iteration, the distributor

of the music can choose to offer discounts, which can be time-sensitive or quantity-sensitive in nature, in effect promoting greater purchase activity from the user.

[0023] In another iteration, while in audition a user can wish to place the desired content in a hold status. The hold status forms the basis of a "wish list," thus allowing the user to hold for future consideration audio content while it is being auditioned. This content resides in the memory of the Personal Audio Assistant for a defined period, and is automatically erased, or the user can do so manually. The selected content will also appear on the user's computer via a **URL** address; here it resides on the server ready for audition or purchase and download.

[0024] The system is designed to operate as simply as possible. Using a single button, which has multiple contacts, the interface allows the user to purchase, delete, skip to next, and add to a wish list and even control a listening level.

[0025] In another iteration, the user can download their own music to the Personal Audio Assistant for audition. The Personal Audio Assistant system is capable of text-to-speech processing and can interface with personal scheduling software to provide auditory schedule reminders for the user. Auditory reminders relating to the user's medication schedule are also generated by the system.

[0026] At least one exemplary embodiment includes input Acoustic Transducers (microphones) for capturing user's speech as well as Environmental Audio. In further embodiments, stereo input Acoustic Transducers capture

Environmental Audio, and, mixing it with the audio signal path, present the ambient sound field to the user, mitigating the need to remove the Headphone apparatus for normal conversation.

[0027] Additional exemplary embodiments are directed to various scenarios for the delivery and consumption of audio content. The Personal Audio Assistant can store and play back audio content in compressed digital audio formats. In one embodiment, the storage memory of the Personal Audio Assistant is completely closed to the end-user and controlled from the Server. This allows for audio content to be distributed on a temporary basis, as part of a subscription service. In another iteration of the present embodiments, the storage memory of the Personal Audio Assistant is not completely closed to the end-user, allowing the user to transfer audio content to the Personal Audio Assistant from any capable device such as a Personal Computer or a Personal Music Player.

[0028] In at least one exemplary embodiment the Personal Audio Assistant automatically scans for other Bluetooth®-enabled audio playback systems and notifies the user that additional devices are available. These additional devices can include a Bluetooth® video system, television system, personal video player, video camera, cell phone, another Personal Audio Assistant and others.

[0029] In another iteration, the Personal Audio Assistant can be directly connected to a Terrestrial Radio receiver, or have such a receiver built in to the system.

[0030] In another exemplary embodiment, a technique known as Sonification can be used to convey statistical or other numerical information to

a headphone. For example, the user would be able to receive information about the growth or decline of a particular stock, groups of stocks or even sectors of the markets though the Personal Audio Assistant. Many different components can be altered to change the user's perception of the sound, and in turn, their perception of the underlying information being portrayed. An increase or decrease in some level of share price or trading levels can be presented to the user. A stock market price can be portrayed by an increase in the frequency of a sine tone as the stock price rose, and a decline in frequency as it fell. To allow the user to determine that more than one stock was being portrayed, different timbres and spatial locations might be used for the different stocks, or they can be played to the user from different points in space, for example, through different sides of their headphones. The user can act upon this auditory information and use the controls built-in to the headphone to either purchase or sell a particular stock position.

[0031] Furthermore, specific sonification techniques and preferences can be presented to the user as "themes" from which the user can select. For example, one theme might auralize the current trading price of one stock with an ambient sine tone in the left ear, the price of another stock in the right ear, their respective trade volumes as perceived elevation using personalized head-related transfer function binauralization, and the current global index or other market indicator as the combined perceptual loudness of both tones. Such a scheme affords ambient auditory display in this example of five dimensions of financial data without compromising the user's ability to converse or work on other tasks. In

another embodiment, the system affords users the ability to customize themes to their liking and to rapidly switch among them using simple speech commands. Additionally, the user can search the web from voice commands and receive results via a text to speech synthesizer.

[0032] In yet another exemplary embodiment the Personal Audio Assistant (PAA) functions as a dictation device for medical professionals for dictating clinical information to a patient's medical record, or write prescriptions for medication or devices. Conversely, the PAA can function as text-to-speech allowing the clinician to audition information from a medical record, rather than reading. The PAA can save considerable time preparing clinician interaction with a patient.

[0033] In another iteration, the Personal Audio Assistant can function as a tool to locate other users of Personal Audio Assistant who share common interests, or who are searching for particular attributes of other users. Whereas the first user has stored specific personal information in the Public Data memory of the Personal Audio Assistant, an example of which might be related to schools attended, marital status, profession etc, or the first user can be in search of another user with these attributes and whereas a second user of a Personal Audio Assistant comes within communication range of the first user, the individual Personal Audio Assistants communicate with each other, access the personal information stored in each of their respective Public Data memories to ascertain if these users have common interests. If a match occurs, each unit can contain both audible and visual indicators announcing that a match has been

made and thus each user can start dialog either physically or electronically via the environmental microphones.

EXAMPLES OF TERMINOLOGY

[0034] Note that the following non-limiting examples of terminology are solely intended to aid in understanding various exemplary embodiments and are not intended to be restrictive of the meaning of terms nor all inclusive.

[0035] **Acoustic Isolation Cushion:** An "Acoustic Isolation Cushion" shall be defined as a circum-aural or intra-aural device that provides acoustic isolation from Environmental Noise. Acoustic Isolation Cushions can be included as part of a Headphones system, allowing the output of the acoustical transducers to reach the ear unimpeded, but still providing acoustic isolation from Environmental Noise.

[0036] **Acoustic Transducer:** An "Acoustic Transducer" shall be defined as a device that converts sound pressure level variations into electronic voltages or vice versa. Acoustic Transducers include microphones, loudspeakers, Headphones, and other devices.

[0037] **Audio Playback:** "Audio Playback" shall be defined as the auditory stimuli generated when Playback Hardware reproduces audio content (music, speech, etc) for a listener or a group of listeners listening to Headphones.

[0038] **Audition:** "Audition" shall be defined as the process of detecting sound stimulus using the human auditory system. This includes the physical, psychophysical, psychoacoustic, and cognitive processes associated with the perception of acoustic stimuli.

[0039] **Client:** A "Client" shall be defined as a system that communicates with a Server, usually over a communications network, and directly interfaces with a user. Examples of Client systems include personal computers and mobile phones.

[0040] **Communications Port:** A Communication Port shall be defined as an interface port supporting bidirectional transmission protocols (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, C[[O]]DMA, or others) via a communications network (e.g., the Internet, cellular networks).

[0041] **Control Data:** "Control Data" shall be defined as information that dictates the operating parameters for a system or a set of systems.

[0042] **Earcon:** An Earcon shall be defined as a Personalized Audio signal that informs the User of a pending event typically inserted in advance of the upcoming audio content.

[0043] **Ear Mold Style:** "Ear Mold Style" shall be defined as a description of the form factor for an intra-aural device (e.g., hearing aids). Ear Mold Styles include completely in the canal (CIC), in the canal (ITC), in the ear (ITE), and behind the ear (BTE).

[0044] **Environmental Audio:** "Environmental Audio" shall be defined as auditory stimuli of interest to the user in the environment where the user is present. Environmental Audio includes speech and music in the environment.

[0045] **Environmental Noise:** "Environmental Noise" shall be defined as the auditory stimuli inherent to a particular environment where the user is present and which the user does not wish to audition. The drone of highway traffic is a

common example of Environmental Noise. Note that Environmental Noise and Audio Playback are two distinct types of auditory stimuli. Environmental Noise does not typically include Music or other audio content.

[0046] E-Tailing System: An "E-tailing System" shall be defined as a web-based solution through which a user can search, preview and acquire some available product or service. Short for "electronic retailing," E-tailing is the offering of retail goods or services on the Internet. Used in Internet discussions as early as 1995, the term E-tailing seems an almost inevitable addition to e-mail, e-business, and e-commerce. E-tailing is synonymous with business-to-consumer (B2C) transactions. Accordingly, the user can be required to register by submitting personal information, and the user can be required to provide payment in the form of Currency or other consideration in exchange for the product or service. Optionally, a sponsor can bear the cost of compensating the E-tailer, while the user would receive the product or service.

[0047] Generic HRTF: A "Generic **HRTF"** shall be defined as a set of **HRTF** data that is intended for use by any Member. A Generic **HRTF** can provide a generalized model of the parts of the human anatomy relevant to audition and localization, or simply a model of the anatomy of an individual other than the Member. The application of Generic **HRTF** data to Audio Content provides the least convincing Spatial Image for the Member, relative to Semi-Personalized and Personalized **HRTF** data. Generic **HRTF** data is generally retrieved from publicly available databases such as the CIPIC **HRTF** database.

[0048] Headphones: "Headphones" (also known as earphones, earbuds, stereophones, headsets, Canalphones, or the slang term "cans") are a pair of transducers that receive an electrical signal from a media player, communication receivers and transceivers, and use speakers placed in close proximity to the ears (hence the name earphone) to convert the signal into audible sound waves. Headphones are intended as personal listening devices that are placed either circum-aural or intra-aural according to one of the Ear Mold Styles, as well as other devices that meet the above definition such as advanced eyewear that includes Acoustical Transducers (i.e. Dataview). Headphones can also include stereo input Acoustic Transducers (microphones) included as part of the Ear Mold Style form factor.

[0049] HRTF: "HRTF" is an acronym for head-related transfer function- a set of data that describes the acoustical reflection characteristics of an individual's anatomy relevant to audition. Although in practice they are distinct (but directly related), this definition of HRTF encompasses the head-related impulse response (HRIR) or any other set of data that describes some aspects of an individual's anatomy relevant to audition.

[0050] Informed Consent: "Informed Consent" shall be defined as a legal condition whereby a person can provide formal consent based upon an appreciation and understanding of the facts and implications associated with a specific action. For minors or individuals without complete possession of their faculties, Informed Consent includes the formal consent of a parent or guardian.

[0051] Listening History Envelope: "Listening History Envelope" shall be defined as a record of a user's listening habits over time. The envelope includes system data, time system was turned off, time the system is presenting content, when the system doesn't audition, system transducers, when the user auditions content, time stamp of content being auditioned, content which is: skipped, deleted, played multiple times, saved in the Wish List, and time between listening sessions.

[0052] Music: "Music" shall be defined as a form of expression in the medium of time using the structures of tones and silence to create complex forms in time through construction of patterns and combinations of natural stimuli, principally sound. Music can also be referred to as audio media or audio content.

[0053] Playback Hardware: Any device used to play previously recorded or live streaming audio. Playback Hardware includes Headphones, loudspeakers, personal music players, mobile phones, and other devices.

[0054] Personal Audio Assistant: A "Personal Audio Assistant" shall be defined as a portable system capable of interfacing with a communications network, directly or through an intermediate, to transmit and receive audio signals and other data.

[0055] Personal Computer: "Personal Computer" shall be defined as any piece of hardware that is an open system capable of compiling, linking, and executing a programming language (such as C/C++, Java™, etc.).

[0056] Personal Music Player: "Personal Music Player" shall be defined as any portable device that implements perceptual audio decoder technology but is

a closed system in that users are not generally allowed or able to write software for the device.

[0057] Personalized HRTF: A "Personalized **HRTF"** shall be defined as a set of **HRTF** data that is measured for a specific Member and unique to that Member. The application of Personalized **HRTF** data to Audio Content creates, by far, the most convincing Spatial Image for the [[the]] Member (Begault et. al. 2001, D. Zotkin, R. Duraiswami, and L. Davis 2002).

[0058] Personalized Services: "Personalized Services" shall be defined as services customized to better meet the needs of an individual. Personalized Services include media content (for preview or purchase) related to a user's preferences, reminders from personal scheduling software, delivery and text-to-speech processing of email, marketing messages, delivery and text-to-speech of stock market information, medication reminders, foreign language instruction [real-time foreign language translation], academic instruction, time and date information, and others.

[0059] Public Data: "Public Data" shall be defined as data which contains specific and personal information about the registered user of the Personal Audio Assistant. The registered user chooses which portions of their complete Registration Process data they wish to include in this subset. This data becomes distributed to other users who have compliant devices thus allowing other users to know specific details of the registered user.

[0060] Registration Process: "Registration Process" includes the acquisition of the user's preference via a web page. Typically, the process would include the

items to be captured: Age, demographics, email, gender, Relative Audiogram, Personal Preferences, banking information, credit card information, wake-up and sleep times, music preferences by genre, artist, preferences for writers and authors, desire to receive advertising, turn-on listening level, equalization, email preferences, parental control setup as well as other user-controlled settings.

[0061] Relative Audiogram: A "Relative Audiogram" shall be defined as a measured set of data describing a specific individual's hearing threshold level as a function of frequency. A Relative Audiogram is only an approximate Audiogram, leaving more complete Audiogram analysis to qualified audiologists.

[0062] Semi-Personalized HRTF: A "Semi-Personalized **HRTF"** shall be defined as a set of **HRTF** data that is selected from a database of known **HRTF** data as the "best-fit" for a specific user. Semi-Personalized **HRTF** data is not necessarily unique to one user; however, interpolation and matching algorithms can be employed to modify **HRTF** data from the database to improve the accuracy of a Semi-Personalized **HRTF.** The application of Semi-Personalized **HRTF** data to Audio Content provides a Spatial Image that is improved compared to that of Generic **HRTF** data, but less effective than that of Personalized **HRTF** data. The embodiments within speak to a variety of methods for determining the best-fit **HRTF** data for a particular Member including anthropometrical measurements extracted from photographs and deduction.

[0063] Server: A "Server" shall be defined as a system that controls centrally held data and communicates with Clients.

[0064] **Sonification:** "Sonification" shall be defined as the use of non-speech audio to convey information or to aurally perceptualize non-acoustic data (auralize). Due to a variety of phenomena involving human cognition, certain types of information can be better or more efficiently conveyed using auditory means than, for example, visual means.

EXEMPLARY EMBODIMENTS

[0065] Figure 1 illustrates the connection between an earpiece device (103 and 104) and a communication network (101) via communication interface 102, which can be operatively connected (via a wired or wireless connection) to a server system (100) and/or an e-mail server (105). Additionally a radio signal (e.g., satellite radio) can be input into the earpiece 500 (Figure [[58]]5B) via a communication module (e.g., Bluetooth® wireless module 515).

[0066] Figure 2 illustrates at least one exemplary embodiment where earpiece devices share information with other earpiece devices within range (e.g., GPS location and identity). For example multiple users (e.g., 202, 203, 204, and 206) can send signals to each individual earpiece (e.g., 500) when in range (e.g., via a wireless connection 205) or to a mobile audio communications device 200 via a wireless connection (201) with each earpiece (500). Additionally information (e.g., audio content, software download) can be sent via a client's computer 207 to each earpiece, either directly (e.g., 205), or via 200. For example audio content can be retrieved on a user's computer and sent to the earpieces that have authorization to use it.

[0067] Figure 3 illustrates an example of various elements that can be part of an earpiece device in accordance with at least one exemplary embodiment. The earpiece can include all or some of the elements illustrated in figure [[58]]5B. For example the logic circuit 572 or the operatively connected memory storage device 585, can include spatial enhancement software 329, a DSP codec 330, a speech synthesis and recognition system 311, and a digital timer system 312. Additional elements can be connected to the logic circuit 572 as needed, for example a power supply 320, a software communication interface 307 (e.g., wireless module 515) (which may be connected to communication network 308), data port interface 306, audio input buffers 300 connected to digital audio input 302 and/or analog audio input 303 converted to digital via an ADC 301, environmental audio input acoustic transducer(s) 321 converted to digital via an ADC 316, user control 324, digital audio output 328, output acoustic transducers 319 (which receive signals converted to analog via a DAC 310 and amplified via amplifier 309), display system 318, communication buffers 325, program memory 305, data and personal memory 315, as well as other electronic devices as known by one of ordinary skill in the relevant arts.

[0068] Figure 4 illustrates an example of a communication system in accordance with at least one exemplary embodiment that a user can use to register via his/her computer 419, via a communication network 400 (e.g., Internet connection) connected to many various database and registration systems as illustrated and labeled in Figure 4. For example, server 401, database management system 402, audio content preview database 403, audio

content database 404, playlist engine 405, user's information database 406, **HRTF** acquisition process module 407, **HRTF** database 408, lock-box server 409, registration engine 410, e-payment system 413, business-to-business module 414, e-tailing system 415, audiogram database 416, audiogram engine 417 and/or e-mail server 418.

[0069] Figure 5A illustrates an earpiece 500 having sealing section 540 in an ear canal that can store and download audio content 560 in accordance with at least one exemplary embodiment. The earpiece 500, can include a first user interaction element 530 (e.g., a button) , that can be used to turn the earpiece 500 on, or if on then activate an audio play command to start playing saved audio content. The earpiece 500 can also include a second user interaction element 550 (e.g., a slide control) that can be used for example to control the volume. The earpiece 500 can also include recharge ports 570, that can accept two wires of varying voltage that can be inserted into the recharge ports 570 to recharge any batteries in the earpiece 500. The earpiece 500 can include an ambient microphone 520 and an optional communication antenna 510, that if needed can aid in the communication between the earpiece 500 and a communication network.

[0070] Figure [[58]]5B illustrates a block diagram of the earpiece of Figure 5A, illustrating the first user interaction element 530, the ambient microphone (AM) 520, that can be used to pick up ambient audio content, an ear canal microphone (ECM) 590 that can pick up audio in the ear canal region, an ear canal receiver (ECR) 580 that can direct audio content to the ear drum, all of which can be

connected operatively to a logic circuit 572. A memory storage device 585 can be operatively connected to the logic circuit (LC) 572, and can store data such as registration, preference, and audio content data. The optional communication antenna 510 can be connected to a communication module (e.g., wireless module 515), and can receive or transmit information 560 to a communication network.

[0071] Figure 6 illustrates a user interface for setting the parameters stored in the memory storage device 585. For example a user can use his/her computer 419 to communicate with a server 401 (e.g., via a communication network 400) to start the user's registration (e.g., with an audio content provider). The registration information can then be transmitted 600 to set the stored parameters in the memory storage device 585 of the earpiece 500. Additionally a requested (e.g., bought) audio content can be downloaded 610 into the memory storage device 585 of the earpiece 500.

[0072] At least one exemplary embodiment is directed to an earpiece comprising: an ambient microphone; an ear canal microphone; an ear canal receiver; a sealing section; a logic circuit; a communication module; a memory storage unit; and a user interaction element, where the user interaction element is configured to send a play command to the logic circuit when activated by a user where the logic circuit reads registration parameters stored on the memory storage unit and sends audio content to the ear canal receiver according to the registration parameters.

[0073] In at least one exemplary embodiment the audio content is stored in the memory storage unit. The earpiece according to claim 2, where the communications module is a wireless communications module. Additionally the earpiece can include a second user interaction element configured to alter the volume of the audio content that is emitted from the ear canal receiver.

[0074] Upon a play command being received by the logic circuit the logic circuit can check registration parameters stored in the memory storage device for example one of the registration parameters can be whether the audio content is a sample audio content or a fully purchased audio content, or the allowed number of times an audio content can be played, and a counter value that keeps track of the number of times the audio content has been played.

[0075] The earpiece can send an auditory warning to be emitted by the ear canal receiver when the counter value is greater than or equal to the allowed number of times the audio content can be played, and where the logic circuit does not send the audio content to the ear canal receiver.

FURTHER EXEMPLARY EMBODIMENTS

[0076] At least one exemplary embodiment is directed to a system for the delivery of Personalized Services to Personal Audio Assistants, the system comprising: a Personal Audio Assistant system for presenting Personalized Services to the user as Audio Playback; a Server system for user registration, Personalized Service management, and communication; a Registration Process

for collecting detailed registration information from users, including the information necessary for creating Personalized Services; a communications protocol (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, C[[O]]DMA, or other) and a communications network (i.e. the Internet, cellular networks) connecting the Personal Audio Assistant to the Server or connecting the Personal Audio Assistant to other Personal Audio Assistants (peer-to-peer behavior).

[0077] In at least one exemplary embodiment a Personal Computer acts as an intermediate, connecting to the Server system over a communications network and connecting to the Personal Audio Assistant over a local connection. At least one exemplary embodiment includes a Personal Hearing Damage Intervention System (e.g., USPTO- 60/805985- Goldstein).

[0078] In at least one exemplary embodiment a Personal Audio Assistant system included as part of a Headphone system, the system comprising: a Communications Port supporting a communications protocol enabling communication with the Server system, peer devices, and other capable devices; a non-volatile program memory storage system for storing Control Data, dictating system behavior; a data memory storage system for storing data and audio content; an analog audio input/output and corresponding ADC/DAC; a digital audio input/output and a digital audio signal path; a user control system allowing the user to adjust the level of the audio output and control the behavior of the system; a user control system allowing the user to purchase the content being auditioned in real time; a user control system allowing the user to control, delete,

fast forward, output level control, scan, advance, the data stored both stored in memory as well as new streaming data emails and reminders; a display system for presenting information to the user(s) visually using any method familiar to those skilled in the art (LED, LCD, or other); a display system for presenting information to the user(s) (e.g., using Earcons and other sound files); a speech synthesis system for converting text-to-speech and generating speech signals; a speech recognition system for converting speech to-text to respond and send emails and to interface with the control language as to provide navigational commands; a digital timer system; a power supply system in the form of a battery; a unique identification number for each Personal Audio Assistant; Input Acoustic Transducers; an Output Acoustic Transducer; an Audio amplification system; Acoustic Isolation Cushions conforming to one of the Ear Mold Styles (CIC, ITC, ITE, or BTE; see definitions) and other elements common to Headphone systems; a digital signal processor (DSP) system; and a CODEC processor capable of improving the perceptual sound quality of the content to be auditioned while governed by delivering the correct SPL dose.

[0079] In at least one exemplary embodiment the system is independent of a Headphone array or can be included and imbedded as part of a Personal Computer system, a Personal Music Player system, a personal monitoring system, an automotive audio system, a home audio system, an avionics audio system, a personal video system, a mobile cell phone system, a personal digital assistant system, a standalone accessory, or an advanced eye-wear system with acoustical transducers.

[0080] In at least one exemplary embodiment the various processing needed to derive the intended functions are distributed among any combination of a Server system, a Personal Computer system, a Personal Music Player system, a personal monitoring system, an automotive audio system, a home audio system, an avionics audio system, a personal video system, a mobile cell phone system, a personal digital assistant system, a standalone accessory, or an advanced eye-wear system with acoustical transducers.

[0081] In at least one exemplary embodiment the Personal Audio Assistant system can exchange audio signals with a mobile phone via the Communications Port, allowing the Personal Audio Assistant to function as a mobile phone accessory.

[0082] In at least one exemplary embodiment a communications buffer is included. For example when a network connection is available, the communications buffer uploads stored content (e.g., Listening Habits Envelope) and stores incoming transmissions (e.g., music, electronic books, and updates to the firmware or operating system) from the Communications Port; The contents of the communications buffer are then transmitted whenever a network connection becomes available. At least one exemplary embodiment includes a perceptual audio codec decoding technology in the DSP, enabling the storage and playback of compressed digital audio formats (e.g., MP3, AAC, FLAG, etc.). At least one exemplary embodiment is compliant and compatible with DRM, FairPlay® and other forms of digital content governance.

[0083] At least one exemplary embodiment includes a user control system for selecting and playing back audio content stored in memory that operates using any combination of the following methods: a button or tactile interface which upon auditioning a song can be pressed to order content; a button, tactile and/ or voice controlled interface which, when pressed once, commanded to, activates playback of short audio clips or audio thumbnails of the audio content stored in memory; When the button is pressed again during audio thumbnail playback, the current audio content selection is played in its entirety; The behavior of this interface is similar to the "scan" button interface common in FM/AM radio devices; a button, tactile and/or voice controlled interface that, when pressed or commanded to, skips to the next piece of audio content, which is selected randomly from all available audio content that has a play count equal to or less than the play count of the piece of audio content currently playing; The behavior of this interface is similar to the "shuffle" behavior found in some personal music players; an interface for browsing audio content storage devices familiar to those skilled in the art; and a process to allow for increased data memory storage capacity for storing audio content.

[0084] In at least one exemplary embodiment the contents of the data memory are encrypted and controlled by the Server system only, prohibiting the end-user from loading unauthorized audio content into the data memory. Further the contents of the data memory can be manipulated by the end-user, allowing the user to transfer audio content to the Personal Audio Assistant system from any device capable of interfacing with the communications port; For example,

audio content can be transferred to the system from a Personal Music Player or a Personal Computer. According to at least one exemplary embodiment, audio content (or other media content) updates are retrieved from the Server system any time a connection is detected by the communications port. Furthermore, an exemplary embodiment can include an acoustical and/or visual indicator informing the user when a transfer of data is activated.

[0085] In at least one exemplary embodiment radio wave transmissions are used to implement some communications protocol and the communications port acts as a radio receiver. Additionally the Personal Audio Assistant can include: interfaces with some personal scheduling software through the communications port; a speech synthesis system which generates speech-signal reminders corresponding to information from the scheduling software, where the digital timer system triggers the presentation of the speech-signal reminders at the appropriate time.

[0086] Additionally the Personal Audio Assistant can interface with an email platform through the communications port; The speech synthesis system converts the email in text to speech and provides email to the user in aural presentation format. The system further comprising: a process in the Registration engine allowing the user to optimize their personalization process of incoming emails by associating a specific Earcon with the importance of the incoming email. As such, normal priority email contains an introduction sound announcing to the user the level of importance the sender associated with their email; a speech recognition system for converting speech-to-text which interfaces with the

control language as to provide navigational commands allowing the user to respond and send emails.

[0087] In at least one exemplary embodiment the communications port system makes use of some wireless communications protocol (802.11, Bluetooth®, A2DP, or other) to transmit and receive digital audio data for playback, the system further comprising: an audio codec to encode and decode digital audio transmissions; a wireless communications system (802.11, Bluetooth®, A2DP, etc.) for transmitting and receiving data (digital audio transmissions, Control Data, etc.); a method for pairing two or more Personal Audio Assistants through a wireless communications protocol to provide a secure exchange of audio content, data such as the user's Public Data; an audio warning signal or visual display system output that notifies the user anytime a compatible transmission becomes available; and a user control system enabling the user to switch between available compatible transmissions.

[0088] In at least one exemplary embodiment the system enables listeners to share digital audio transmissions, the system further comprising: a method for scanning for available digital audio transmissions within range; a user control interface for specifying digital audio transmission behavior; a method for employing the system as a relay to other compliant devices; re-broadcasting digital audio transmissions to increase wireless range. In at least one exemplary embodiment multiple systems are capable of sharing the contents of their program and data memory using the wireless communications protocol.

[0089] In at least one exemplary embodiment of the system, the input Acoustic Transducer is used to record audio content to the data memory storage system, the system further comprising: an implementation of some perceptual audio codec technology in the DSP, enabling the storage of compressed audio formats (e.g., MP3, AAC, FLAG, etc); and an increased data memory storage capacity for storing recorded audio content.

[0090] In at least one exemplary embodiment, the stereo input Acoustic Transducers are ultimately connected to the audio signal path at the DSP, allowing the user to audition Environmental Audio (e.g., speech or music) and mitigating the need for the user to remove the Headphone apparatus to audition Environmental Audio, the system further comprising: a stereo pair of input Acoustic Transducers placed close to the user's ear canal input, conforming to one of the Ear Mold Styles (CIC, ITC, ITE, or BTE, see definitions); and by mounting the input Acoustic Transducers in a CIC or ITC configuration, spatial-acoustic cues are preserved, creating a spatially-accurate Environmental Audio input signal- essentially a personal binaural recording; a method for acoustically compensating for the non-linear frequency response characteristics of the Acoustical Isolation Cushions of a given Headphone system by applying corresponding inverse filters to the Environmental Audio input signal at the DSP; With this method, the system acts as a linear-frequency-response hearing protection apparatus (e.g., USPTO- 60805985- Goldstein).

[0091] At least one exemplary embodiment includes a system for first attenuating Audio Playback and then mixing the Environmental Audio input

signals, at a louder listening level, with the audio signal path using the DSP, where the system is activated by any combination of the following methods: a manual switch to activate / deactivate the system; a speech-detection apparatus to activate the system when speech is detected as the principal component of the Environmental Audio input; and a music-detection apparatus to activate the system when music is detected as the principal component of the Environmental Audio input.

[0092] At least one exemplary embodiment can include active noise reduction, echo cancellation and signal conditioning that can be environmentally customized through the registration process to better meet the user's specific needs (i.e., occupation-related noise cancellation); A typical application would be a special set of noise cancellation parameters tuned to the drilling equipment used by a dentist.

[0093] In at least one exemplary embodiment the input Acoustic Transducers are instead mounted within circum-aural, intra-aural BTE, or intra-aural ITE molds (see Ear Mold Style), the system further comprising: a spatial audio enhancement system for supplementing the spatial-acoustic cues captured by the stereo pair of input Acoustical Transducers to provide improved spatial perception of Environmental Audio using any combination of the following methods: the application of Generic, Semi-Personalized, or Personalized HRTF data to the Environmental Audio input signal; the application of binaural enhancement algorithms, familiar to those skilled in the art, to the Environmental Audio input signals; the application of a pinna simulation algorithm to the

Environmental Audio input signal; and a synthetic pinna apparatus placed just before the stereo input Acoustic Transducers.

[0094] At least one exemplary embodiment includes a Server system for the creation, Registration, management, and delivery of Personalized Services, the system comprising: a communications system for interfacing with public communication networks to exchange data with Personal Audio Assistants, a Client's computer, mobile phones, PDAs or other capable devices; a database and database management system for storing and retrieving information relating to user Registration, Personalized Services, audio content, Control Data, and other data; a Registration interface system for collecting, storing, and applying information provided by users; a method for creating Personalized Services based on user Registration information; an end-user audio content Lock-Box storage system, providing every registered user access to their purchased media content; a business-to-business interface system for acquiring audio content with record labels, copyright holders, and other businesses; an E-tailing system including an electronic transactions system enabling users to purchase content, items offered for sale or pay subscription fees electronically; an E-Payment system compensating the various copyholders upon purchase of content by user; a Playlist engine, which acquires the user's Registration information, Listening History Envelope and then creates audio playlists, which is optimized for the user preferences and further refinements; and an Email server, which distributes communications to the user and others, regarding marketing data, the status of the user weekly SPL dose, and other information.

[0095] At least one exemplary embodiment includes machine-learning techniques employed to better optimize the user's preferences relating to audio content and other media content, the system further comprising: a method for tracking the purchase history of each user, relating the purchase history to media content preferences, and using the purchase history to make media content recommendations; a method for examining a user's digital media library, stored on a Personal Computer, Personal Music Player, or Personal Audio Assistant, from the Server system, and relating media content preferences and media content recommendations to the user's digital media library; and a method for examining a user's Listening History Profile.

[0096] At least one exemplary embodiment includes a Registration system for collecting a wide variety of information from users, including information necessary for creating Personalized Services, the system comprising: a Server system; an interface system for querying the user to collect registration information including demographics (age, gender), Playback Hardware information, Headphone information, occupational information, home and work locations, medication information, music-related preferences, video-related preferences, and other information; a method for customizing Control Data based on registration information; and a method for creating Personalized Services based on registration information.

[0097] In at least one exemplary embodiment a fast **HRTF** acquisition process is included as part of the Registration process, the system further comprising a method for the fast acquisition of Semi-Personalized **HRTF** data via a deduction

process, the method comprising: a database system containing indexed, clustered **HRTF** data sets; an auditory test signal with distinctive spatial characteristics, where two or more distinct sound source locations exist; a system for the application of potential **HRTF** matches to the auditory test signal; and a feedback system, allowing the user to select the best listening experience from a number of candidate listening experiences, based on the spatial quality perceived in the HRTF-processed auditory test signal.

[0098] In at least one exemplary embodiment Personalized **HRTF** data is measured and used instead of Semi-Personalized **HRTF** data, by any method familiar to those skilled in the art.

[0099] In at least one exemplary embodiment the user is provided some Personal Audio Assistant free-of-charge or at a discount, given the user agrees to a subscription service commitment to receive Personalized Services for a certain amount of time.

[00100] In at least one exemplary embodiment, as part of the Personalized Services, the user is provided with temporary audio content corresponding to the preferences indicated during the registration process; Further, the user is given the option to purchase the audio content permanently; Otherwise, the audio content is replaced with new audio content from the Server, after a predetermined amount of time or a predetermined number of playback counts, the system comprising: a Personal Audio Assistant with an enhanced user control system, enabling a registered user to purchase media content directly from the Personal Audio Assistant with a button; and a Personal Audio Assistant

with an enhanced user control system, enabling a registered user to store a reference to media content that can be purchased by the user at a later time.

[00101] In at least one exemplary embodiment, video or gaming content is included as well as audio content, the system further comprising: a Personal Audio Assistant with an enhanced visual display system, capable of playing video and/or gaming content.

[00102] In at least one exemplary embodiment, as part of the Personalized Services, the user receives medication reminders in the form of speech signals, audio signals, text, or graphics on the user's Personal Audio Assistant; Medication reminders are generated by the Server system based on the user's registration information.

[00103] In at least one exemplary embodiment, as part of the Personalized Services, the user receives stock market information in the form of speech signals, audio signals, text, or graphics on the user's Personal Audio Assistant; The stock market information is selected by the Server system based on the user's registration information, the system further comprising: the user having successfully registered their Personal Audio Assistant with a brokerage firm, or other stock trading engines, the user can then purchase or sell a stock by use of a user button or a speech command.

[00104] Further in at least one exemplary embodiment, the user is able to request specific media content to be transferred temporarily or permanently to the user's Personal Audio Assistant, the system further comprising: an interface system operating on the Server allowing users to request specific media content

by artist, title, genre, format, keyword search, or other methods familiar to those skilled in the art; and a media content search engine system.

[00105] In at least one exemplary embodiment a Relative Audiogram compensation filter is applied to audio signal path by the digital signal processor, the system either (e.g., USPTO- 60805985- Goldstein): (a) Retrieves Relative Audiogram compensation information from a remote Server after a registration process (during transmission, the information can include HIPAA compliant encoding); or (b) calculates a compensation filter from Relative Audiogram information obtained by the system locally. For example US Patent No. 6,840,908- Edwards, and US Patent No. 6,379,314- Horn, discuss methods for the acquisition of an individual's Relative Audiogram.

[00106] In at least one exemplary embodiment a Satellite Radio transmitter/receiver (transceiver) is incorporated within the Headphone proper, allowing the user to at least: receive XM®, Sirius® and other broadcasts for playback over the system; select radio stations for playback over the system via the control system, the control system comprising either a single-click tactile interface or the speech-controlled circuitry; store selected portions of such broadcasts in memory for later recall and playback via the control systems; engage a novel commercial-skip feature for attenuating the playback level of suspected sales commercials broadcasts; and engage a speech-skip feature for attenuating the playback of speech (e.g., news, announcements, etc.).

[00107] At least one exemplary embodiment includes a Walkie-Talkie mode, which broadcasts input to the system's built-in microphone, whereby the user's

speech can be detected by the input acoustic transducer and remotely broadcast where at least one of the following occurs: the Walkie-Talkie mode receives input via AM/FM broadcasts (as well as digital communications protocols) from a nearby user; the Walkie-Talkie mode allows nearby users to engage in conversation with increased perceptual clarity in noisy environments (e.g., aircraft cockpits), using for example a noise-cancellation system; selectively engage and disengage the Walkie-Talkie mode using the control system; detect other users of the system within a given range; and alert the user of the system when other detected systems contain certain Public Data and contain a predefined Public Message Key (e.g., "If the detected system belongs to a single male between the ages of 25 and 30 and whose favorite sport is tennis, then broadcast the message, 'I like tennis also; would you like to have coffee?'" or "If the detected system belongs to a user who attended Princeton University, then broadcast the message, 'Go Tigers!'").

[00108] At least one exemplary embodiment can use other communications to accomplish this service rather than AM/FM; as such the system can incorporate communications transmission protocols (TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, C[[O]]DMA, or other protocols) and a communications network (i.e. the Internet, cellular networks) connecting the Personal Audio Assistant to other Personal Audio Assistants. At least one exemplary embodiment can selectively control the broadcast of public data and public message keys via the control system.

[00109] At least one exemplary embodiment includes a Sonification algorithm within the Headphone, which enables auditory display of digitally received data, including for example financial data, news, GPS data, the system further containing a variety of sonification "themes" selected during the registration process that map requested data (e.g., current average trading price of AAPL stock, the Dow Jones Industrial Index, and the Nasdaq Composite®) to corresponding audio content (e.g., the frequency of a sine tone presented in the left ear, the frequency of a sine tone presented in the right ear, and the global amplitude of both sine tones, respectively).

[00110] At least one exemplary embodiment includes an auditory display, which is synthesized by the onboard Digital Signal Processor. In at least one exemplary embodiment the auditory display is created through the digital audio signal processing effects applied to any other acoustic data the system is capable of reproducing (e.g., terrestrial radio, prepurchased audio content in the user's digital library, electronic books, etc.); For example, a sudden listening level increase in the playback level of a song to which the user was listening can be triggered by a predefined alert condition (e.g., Nasdaq Composite® has exceeded 2200 points).

[00111] At least one exemplary embodiment includes the ability to create themes using a computer program and uploading a file to the Headphone system.

[00112] At least one exemplary embodiment includes a speech recognition system for converting speech to HTML (Voice Browser), whereby the user can

access the Internet, provide navigational commands, perform searches and receive results via the Headphones through a text (HTML)-speech synthesize.

[00113] Additionally, the Personal Audio Assistant can be totally incorporated with a mobile cell phone, or any portable technology which incorporates any of the following protocols, TCP/IP, USB, IEEE 1394, IEEE 802.11, Bluetooth®, A2DP, GSM, C[[O]]DMA, or others known to those of ordinary skill in the arts via a communications network (e.g., the Internet, cellular networks), the system further comprising: an Acoustic Transducer constructed as part of the mobile cell phone or a series of Acoustic Transducers, which are constructed as part of mobile cell phone; a commutations path incorporated into the mobile cell phone providing for bi-directional communication with a Headphone array; the incorporation of the mobile cell phone's microphone(s) to act as the Environmental Audio Acoustical Transducer(s); and the incorporation of the mobile cell phone's keyboard or touch sensitive screen to function as a manual input or to complement speech commands and that can act in a way to respond to Personalized Services offered to a user. While the present embodiments have been described with reference to exemplary embodiments, it is to be understood that the claimed embodiments are not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

Electronic Acknowledgement Receipt

EFS ID:	39055443
Application Number:	16785822
International Application Number:	
Confirmation Number:	3813
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Customer Number:	150139
Filer:	John Patrick Keady
Filer Authorized By:	
Attorney Docket Number:	CONT_14148749
Receipt Date:	03-APR-2020
Filing Date:	10-FEB-2020
Time Stamp:	12:33:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	16785822-LTR_JPK.pdf	118983 24fe766313402ad000cdfba0f3c4fc99687613c8	no	2

Warnings:

Information:					
2	Specification	CONT_14148749_SPEC_CLEAN.pdf	434502 1698a13f17ff43d0983c730a0295008d6fbefd08	no	37
Warnings:					
Information:					
3	Specification	CONT_14148749_SPEC_MARKED.pdf	434956 96f1f4e8f46d326340c95720f8226fa3300c0c66	no	37
Warnings:					
Information:					
			Total Files Size (in bytes):	988441	

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National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/785,822	02/10/2020		785	CONT_14148749	18	1

CONFIRMATION NO. 3813

UPDATED FILING RECEIPT

150139
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

OC000000116013355

Date Mailed: 04/08/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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Inventor(s)

Steven Wayne Goldstein, Delray Beach, FL;

Applicant(s)

Staton Techiya LLC, Delray Beach, FL

Assignment For Published Patent Application

Staton Techiya LLC, Delray Beach, FL

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 14/148,749 01/07/2014 PAT 10629219
which is a CON of 11/774,965 07/09/2007 ABN
which claims benefit of 60/806,769 07/08/2006

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 02/25/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/785,822**

Projected Publication Date: 07/16/2020

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: Yes

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/785,822

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	75		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	330		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	18 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 230 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	785		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749

CONFIRMATION NO. 3813

150139
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

PUBLICATION NOTICE



Title:PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

Publication No.US-2020-0227062-A1
Publication Date:07/16/2020

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	EASON, MATTHEW A
Attorney Docket Number	11472-40-10_CONT_14148749

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6804638		2004-10-12	Fiedler; Mark	
	2	6163508		2000-12-19	Kim et al.	
	3	6400652		2002-06-04	Goldberg et al.	
	4	7433714		2008-10-07	Howard et al.	
	5	7562020		2009-06-14	Le et al.	
	6	9135797		2015-09-15	Couper et al.	
	7	9123343		2015-09-01	Kurki-Suonio	
	8	7756285		2010-07-13	Sjursen et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

	9	5903868		1999-05-11	Yuen et al.	
	10	3876843		1975-04-08	Moen	
	11	5208867		1993-05-04	Stites, III	
	12	6226389		2001-05-01	Lemelson et al.	
	13	8493204		2013-07-23	Wong et al.	
	14	6661901		2003-12-09	Svean et al.	
	15	7430299		2008-09-30	Armstrong et al.	
	16	6567524		2003-05-20	Svean et al.	
	17	7107109		2006-09-12	Nathan et al.	
	18	4947440		1990-08-07	Bateman et al.	
	19	9037458		2015-05-19	Park et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

	20	4054749		1977-10-18	Suzuki et al.	
	21	6298323		2001-10-02	Kaemmerer	
	22	6804643		2004-10-12	Kiss	
	23	6163338		2000-12-19	Johnson et al.	
	24	6748238		2004-06-08	Lau	
	25	6021325		2000-02-01	Hall	
	26	8750295		2014-06-10	Liron	
	27	7920557		2011-04-05	Moote	

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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030165246		2003-09-04	Kvaloy et al.	

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	2	20050288057		2005-12-29	Lai et al.	
	3	20060195322		2006-08-31	Broussard et al.	
	4	20070043563		2007-02-22	Comerford et al.	
	5	20010046304		2001-11-29	Rast	
	6	20070189544		2007-08-16	Rosenberg	
	7	20060092043		2006-05-04	Lagassey	
	8	20020106091		2002-08-08	Furst et al.	
	9	20040109668		2004-06-10	Stuckman	
	10	20020118798		2002-08-29	Langhart et al.	
	11	20040042103		2004-03-04	Mayer	
	12	20030161097		2003-08-28	Le et al.	

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	13	20160104452		2016-04-14	Guan et al.	
	14	20040203351		2004-10-14	Shearer et al.	
	15	20080165988		2008-07-10	Terlizzi et al.	
	16	20070291953		2007-12-20	Ngia et al.	
	17	20110096939		2011-04-28	Ichimura	
	18	20060067551		2006-03-30	Cartwright et al.	
	19	20090024234		2009-01-22	Archibald	
	20	20090010456		2009-01-08	Goldstein et al.	
	21	20070086600		2007-04-19	Boesen	
	22	20040190737		2004-09-30	Kuhnel et al.	
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	24	20050123146		2005-06-09	Voix et al.	
	25	20040125965		2004-07-01	Alberth Jr., et al.	
	26	20060083395		2006-04-20	Allen et al.	
	27	20110264447		2011-10-27	Visser et al.	
	28	20100296668		2010-11-25	Lee et al.	
	29	20110293103		2011-12-01	Park et al.	
	30	20100061564		2010-03-11	Clemow et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	EP1519625	EP	A2		Victorian		
	2	2006037156	WO	A1		Mejia et al.		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Attorney Docket Number	11472-40-10_CONT_14148749

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Olwal, A. and Feiner S. Interaction Techniques Using Prosodic Features of Speech and Audio Localization. Proceedings of IUI 2005 (International Conference on Intelligent User Interfaces), San Diego, CA, Jan 9-12, 2005, p. 284-286.	
	2	Bernard Widrow, John R. Glover Jr., John M. McCool, John Kaunitz, Charles S. Williams, Robert H. Hearn, James R. Zeidler, Eugene Dong Jr, and Robert C. Goodlin, Adaptive Noise Cancelling: Principles and Applications, PROCEEDINGS OF THE IEEE, VOL. 63, NO. 12, DECEMBER 1975	
	3	Mauro Dentino, John M. McCool, and Bernard Widrow, Adaptive Filtering in the Frequency Domain, PROCEEDINGS OF THE IEEE, VOL. 66, NO. 12, DECEMBER 1978	

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Examiner Signature		Date Considered	

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	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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See attached certification statement.

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☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John P. Keady/	Date (YYYY-MM-DD)	2022-01-11
Name/Print	John P. Keady	Registration Number	56389

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4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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(Not for submission under 37 CFR 1.99)

Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	EASON, MATTHEW A
Attorney Docket Number	11472-40-10_CONT_14148749

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6359993		2002-03-19	Brimhall	
	2	7072482		2006-07-04	Van Doorn et al.	
	3	7778434		2010-08-17	Juneau et al.	
	4	5524056		1996-06-04	Killion et al.	
	5	6415034		2002-07-02	Hietanen	
	6	8014553		2011-09-06	Radivojevic et al.	
	7	4088849		1978-05-09	Usami et al.	
	8	7209569		2007-04-24	Boesen	

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	9	6754359		2004-06-22	Svean et al.	
	10	6021207		2000-02-01	Puthuff et al.	
	11	5267321		1993-11-30	Langberg	
	12	RE38351		2003-12-16	Iseberg et al.	
	13	7477756		2009-01-13	Wickstrom et al.	
	14	7450730		2008-11-11	Bertg et al.	
	15	6567524		2003-05-20	Svean et al.	
	16	6728385		2004-04-27	Kvaloy et al.	

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	2	20080037801		2008-02-14	Alves et al.	
	3	20060204014		2006-09-14	Isenberg et al.	
	4	20050078838		2005-04-14	Simon	

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Name/Print	John P. Keady	Registration Number	56389

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Electronic Acknowledgement Receipt

EFS ID:	44722787
Application Number:	16785822
International Application Number:	
Confirmation Number:	3813
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Customer Number:	150139
Filer:	John Patrick Keady
Filer Authorized By:	
Attorney Docket Number:	11472-40-10_CONT_14148749
Receipt Date:	11-JAN-2022
Filing Date:	10-FEB-2020
Time Stamp:	23:52:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	16785822_transmittal_ltr.pdf	125735 5daed1eddbb233aff7d0fd913a8e753c54708134	no	1

Warnings:

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Warnings:					
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4	Non Patent Literature	ref2-pdf2.pdf	3762561 39646ce913fa97e4a1efb547fcce8a48fc8e6d08	no	10
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	:	16/785,822	CONFIRMATION NO.	3813
APPLICATION OF	:	Steven Wayne Goldstein		

TRANSMITTAL LETTER

Commissioner for Patents
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Alexandria, VA 22313-1450

Date: January 11, 2022

Sir:

Please find attached:

- **IDS:** The attached IDS, consisting of two parts, list references that were cited in several IPRs for related Patents with some of the same inventors in the Staton Techiya LLC Patent Portfolio. Applicant appreciates the Examiner for taking the time to consider the extensive list for the present application. Attached are also three non-patent references cited. Should the Examiner have any questions, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Respectfully submitted,

TECHIYA LLC

/John P. Keady/

John P. Keady
Ph.D. (Physics), Ph.D.(Comp. Sci.)
Assistant General Counsel: Intellectual Property
and Chief Technical Officer
Staton Techiya LLC
Reg. No. 56,389
Tel: 571-606-1291

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

150139 7590 01/20/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

EXAMINER
EASON, MATTHEW A

ART UNIT	PAPER NUMBER
2651	

NOTIFICATION DATE	DELIVERY MODE
01/20/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip@akerman.com
jp.keady@techiya.co
personics_docketing@cardinal-ip.com

Office Action Summary	**Application No.** 16/785,822	**Applicant(s)** Goldstein, Steven Wayne	
	Examiner MATTHEW A EASON	**Art Unit** 2651	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-18 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-4 and 6-18 is/are rejected.

8) ☑ Claim(s) 5 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 2/10/2020 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

1. Notice of Pre-AIA or AIA Status

2. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 103

3. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

4. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3 is/are rejected under 35 U.S.C. 103 as being unpatentable over Tanaka (US 20030130852 A1), in view of Rezvani (US 20070165875 A1).

6. **Regarding Claim 1**, Tanaka teaches: *An earpiece* (Figs. 1-34), *comprising: a sealing section* (ear cover 11)*; an ambient microphone* (microphone 13)*; a speaker* (speaker 17)*; an interaction element* (function selecting switch 14)*; a memory that stores instructions* (recognition vocabulary memory unit 47; acoustic model production and memory unit 49)*; and a logic circuit that executes the instructions to perform operations* (speech recognition unit 23; CPU board 16 and associated components of Fig. 2)*, the operations comprising: detecting the manual activation of the interaction element; and switching the mode of the earpiece to voice command mode when manual activation of the interaction element is detected* (¶ [0025], [0067], [0069]; Figs. 3, 9, 13, 17, 21 and associated descriptions). Tanaka does not

teach: *a location unit*. In a related field, Rezvani teaches for a headset to provide multiple communication technologies including GPS (165, Fig. 1). The inclusion of GPS in a headset would enable its location to be identified, which may be useful when deciding which devices the headset can communicate with via its proximity to them. Therefore, it would have been obvious to a person of ordinary skill in the art prior to the effective filing date of the claimed invention to modify Tanaka to include at least a GPS module, such as taught by Rezvani. Motivation for doing so would lie in improving the headsets ability to accurately communicate with devices based on a proximity to them.

7. **Regarding Claim 2**, Tanaka, in view of Rezvani, teaches: *further including the operations of: detecting a user's voice; and extracting an audio signal of the user's voice* (¶ [0078]-[0083], Tanaka).

8. **Regarding Claim 3**, Tanaka, in view of Rezvani, teaches: *further including the operations of: analyzing the audio signal to determine a voice command; and initiating a response in response to the voice command* (¶ [0078]-[0083], Figs. 5-6, Tanaka).

9. Claim 4 is/are rejected under 35 U.S.C. 103 as being unpatentable over Tanaka (US 20030130852 A1), in view of Rezvani (US 20070165875 A1), and in further view of Othmer (US 20090286515 A1).

10. **Regarding Claim 4**, Tanaka, in view of Rezvani, does not teach: *where the voice command is to create an audio content wish list*. In a related field, Othmer teaches to use a voice command to create an audio content wish list (Figs. 1-5, Abstract, ¶ [0023]-[0033]). It would have been obvious to a person of ordinary skill in the art prior to the effective filing date of the claimed invention to modify the headset of Tanaka, in view of Rezvani, to be able to send its recorded voice for processing in order to perform further functions. Motivation for doing so would lie in granting a user of the device to command otherwise manual tasks using their voice which would allow them to keep their hands relatively free while doing so.

11. Claims 6-15 is/are rejected under 35 U.S.C. 103 as being unpatentable over Tanaka (US 20030130852 A1), in view of Rezvani (US 20070165875 A1), and in further view of Borovitski (US 20060173563 A1).

12. **Regarding Claims 6-15,** various voice command functions are recited using the recognized voice of a user. Tanaka does not specifically teach the use of the Internet for performing searches and other functions involving music or stocks. In a related field, Borovitski teaches to use a users recognized voice for performing such functions (¶ [0027]-[0032]). It would have been obvious to a person of ordinary skill in the art prior to the effective filing date of the claimed invention to modify the headset of Tanaka, in view of Rezvani, to be able to send its recorded voice for processing in order to perform further functions via Internet services. Motivation for doing so would lie in granting a user of the device to command otherwise manual tasks using their voice which would allow them to keep their hands relatively free while doing so.

13. Claims 16-18 is/are rejected under 35 U.S.C. 103 as being unpatentable over Tanaka (US 20030130852 A1), in view of Rezvani (US 20070165875 A1), and in further view of Victorian (US 20050058313 A1).

14. **Regarding Claims 16-18**, Tanaka, in view of Rezvani, does not teach: *including an ear canal microphone, further including the operations of: measuring the sound pressure level using the ear canal microphone, further including the operations of: calculating the sound pressure level dosage of a user using the measured sound pressure level*. In a related field, Victorian teaches that in place of a traditional headset, an ear canal microphone (Figs. 1-3) for detecting a users voice may be used (¶ [0003], [0031]). Additionally, sound pressure levels are able to be detected using the ear canal microphone (Figs. 1-4B, 9, 10 and ¶ [0043]-[0053]). Therefore, it would have been obvious to a person of ordinary skill in the art

prior to the effective filing date of the claimed invention to modify Tanaka, in view of Rezvani, to instead use an ear canal microphone for detection of a users own voice. Motivation for doing so would lie in allowing a more convenient form factor not requiring an over the head headband which might prove uncomfortable during prolonged use. The additional features of sound pressure level detection would aid in switching to and from a voice command mode.

Allowable Subject Matter

15. Claim 5 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW A EASON whose telephone number is (571)270-7230. The examiner can normally be reached M-F 8AM-5PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duc Nguyen can be reached on 571-272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit

https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MATTHEW A EASON/
Primary Examiner, Art Unit 2651

Notice of References Cited	Application/Control No. 16/785,822	Applicant(s)/Patent Under Reexamination Goldstein, Steven Wayne	
	Examiner MATTHEW A EASON	Art Unit 2651	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20030130852-A1	07-2003	Tanaka, Shinichi	H04M1/05	704/275
*	B	US-20070165875-A1	07-2007	Rezvani; Behrooz	H04R1/10	381/74
*	C	US-20060173563-A1	08-2006	Borovitski; Michael D.	H04L51/00	700/94
*	D	US-20090286515-A1	11-2009	Othmer; Konstantin	H04M1/7243	455/413
*	E	US-20050058313-A1	03-2005	Victorian, Thomas A.	H04R25/558	381/315
	F					
	G					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	Art Unit
	MATTHEW A EASON	2651

CPC - Searched*		
Symbol	**Date**	**Examiner**
G10L21/00	01/14/2022	ME
G06F3/165	01/14/2022	ME
G06F3/167	01/14/2022	ME
G06F16/60	01/14/2022	ME
G10L13/00	01/14/2022	ME
G10L15/26	01/14/2022	ME
G10L21/06	01/14/2022	ME
G10L25/48	01/14/2022	ME
H04M1/05	01/14/2022	ME
H04M1/2471	01/14/2022	ME
H04R1/1016	01/14/2022	ME
H04R3/00	01/14/2022	ME
H04W4/80	01/14/2022	ME
H04M1/6066	01/14/2022	ME
H04M1/72442	01/14/2022	ME

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	Art Unit
	MATTHEW A EASON	2651

Search Notes		
Search Notes	**Date**	**Examiner**
Text/picture. Inventor.	01/14/2022	ME

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	**Art Unit**
	MATTHEW A EASON	2651

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/14/2022								
	1	✓								
	2	✓								
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	4	✓								
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	8	✓								
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	15	✓								
	16	✓								
	17	✓								
	18	✓								

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	EASON, MATTHEW A
Attorney Docket Number	11472-40-10_CONT_14148749

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6804638		2004-10-12	Fiedler; Mark	
	2	6163508		2000-12-19	Kim et al.	
	3	6400652		2002-06-04	Goldberg et al.	
	4	7433714		2008-10-07	Howard et al.	
	5	7562020		2009-06-14	Le et al.	
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	7	9123343		2015-09-01	Kurki-Suonio	
	8	7756285		2010-07-13	Sjursen et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.E/

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	Attorney Docket Number	11472-40-10_CONT_14148749

	9	5903868		1999-05-11	Yuen et al.	
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	11	5208867		1993-05-04	Stites, III	
	12	6226389		2001-05-01	Lemelson et al.	
	13	8493204		2013-07-23	Wong et al.	
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	20	4054749		1977-10-18	Suzuki et al.	
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	22	6804643		2004-10-12	Kiss	
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	27	7920557		2011-04-05	Moote	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030165246		2003-09-04	Kvaloy et al.	

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	24	20050123146		2005-06-09	Voix et al.	
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	27	20110264447		2011-10-27	Visser et al.	
	28	20100296668		2010-11-25	Lee et al.	
	29	20110293103		2011-12-01	Park et al.	
	30	20100061564		2010-03-11	Clemow et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	EP1519625	EP	A2		Victorian		
	2	2006037156	WO	A1		Mejia et al.		

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Olwal, A. and Feiner S. Interaction Techniques Using Prosodic Features of Speech and Audio Localization. Proceedings of IUI 2005 (International Conference on Intelligent User Interfaces), San Diego, CA, Jan 9-12, 2005, p. 284-286.	
	2	Bernard Widrow, John R. Glover Jr., John M. McCool, John Kaunitz, Charles S. Williams, Robert H. Hearn, James R. Zeidler, Eugene Dong Jr, and Robert C. Goodlin, Adaptive Noise Cancelling: Principles and Applications, PROCEEDINGS OF THE IEEE, VOL. 63, NO. 12, DECEMBER 1975	
	3	Mauro Dentino, John M. McCool, and Bernard Widrow, Adaptive Filtering in the Frequency Domain, PROCEEDINGS OF THE IEEE, VOL. 66, NO. 12, DECEMBER 1978	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/MATTHEW A EASON/	Date Considered	01/14/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John P. Keady/	Date (YYYY-MM-DD)	2022-01-11
Name/Print	John P. Keady	Registration Number	56389

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.E/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	EASON, MATTHEW A
Attorney Docket Number	11472-40-10_CONT_14148749

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6359993		2002-03-19	Brimhall	
	2	7072482		2006-07-04	Van Doorn et al.	
	3	7778434		2010-08-17	Juneau et al.	
	4	5524056		1996-06-04	Killion et al.	
	5	6415034		2002-07-02	Hietanen	
	6	8014553		2011-09-06	Radivojevic et al.	
	7	4088849		1978-05-09	Usami et al.	
	8	7209569		2007-04-24	Boesen	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
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	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

	9	6754359		2004-06-22	Svean et al.	
	10	6021207		2000-02-01	Puthuff et al.	
	11	5267321		1993-11-30	Langberg	
	12	RE38351		2003-12-16	Iseberg et al.	
	13	7477756		2009-01-13	Wickstrom et al.	
	14	7450730		2008-11-11	Bertg et al.	
	15	6567524		2003-05-20	Svean et al.	
	16	6728385		2004-04-27	Kvaloy et al.	

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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030165246		2003-09-04	Kvaloy et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

	2	20080037801		2008-02-14	Alves et al.	
	3	20060204014		2006-09-14	Isenberg et al.	
	4	20050078838		2005-04-14	Simon	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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EXAMINER SIGNATURE

Examiner Signature	/MATTHEW A EASON/	Date Considered	01/14/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.E/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
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	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Application Number	16785822
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	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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OR

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Signature	/John P. Keady/	Date (YYYY-MM-DD)	2022-01-11
Name/Print	John P. Keady	Registration Number	56389

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Bibliographic Data

Application No: 16/785,822

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /MATTHEW A EASON/ (Examiner's Signature) | (Initials)

Title: PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
02/10/2020 RULE	381	2651	11472-40-10_CONT_14148749

APPLICANTS

Staton Techiya LLC, Delray Beach, FL,

INVENTORS

Steven Wayne Goldstein, Delray Beach, FL, UNITED STATES

CONTINUING DATA

This application is a CON of 14148749 01/07/2014 PAT 10629219

14148749 is a CON of 11774965 07/09/2007ABN

11774965 has PRO of 60806769 07/08/2006

FOREIGN APPLICATIONS

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UNITED STATES

ADDRESS

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401
UNITED STATES

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$785

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L5	2	"20200227062"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/14 10:29
L6	542	((("GOLDSTEIN") near3 ("Steven"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2022/01/14 11:21
L7	3	L6 and (content near wish).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/14 11:21
L8	2	"20060173563"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/14 12:13
L9	4	"20090286515"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/14 12:23
L10	4	"20050058313"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/14 12:30
L11	185	("20010046304" | "20020106091" | "20020118798" | "20030161097" | "20030165246" | "20040042103" |	US-PGPUB; USPAT; USOCR;	OR	ON	2022/01/14 12:48

		"20040109668" | "20040125965" | "20040190737" | "20040196992" | "20040203351" | "20050123146" | "20050288057" | "20060067551" | "20060083395" | "20060092043" | "20060195322" | "20070043563" | "20070086600" | "20070189544" | "20070291953" | "20080165988" | "20090010456" | "20090024234" | "20100061564" | "20100296668" | "20110096939" | "20110264447" | "20110293103" | "20160104452" | "3876843" | "4054749" | "4947440" | "5208867" | "5903868" | "6021325" | "6163338" | "6163508" | "6226389" | "6298323" | "6400652" | "6567524" | "6661901" | "6748238" | "6804638" | "6804643" | "7107109" | "7430299" | "7433714" | "7562020" | "7756285" | "7920557" | "8493204" | "8750295" | "9037458" | "9123343" | "9135797").PN.	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S1	79	("7533061" | "4539439" | "20060086236" | "7031437" | "20020007315" | "7558529" | "20030069854" | "20060031257" | "3865998" | "6661901" | "7133924" | "6965770" | "20040224723" | "20060193450" | "6636953" | "5694475" | "5751820" | "20070079692" | "7546144" | "20050125354" | "6379314" | "6840908" | "7206429" | "20050078843" | "20070025194" | "6587822").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/04/17 10:08
S2	3	S1 and voice adj control	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/04/17 10:08
S3	4	S1 and voice near control	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/04/17 10:08
S4	2	"20200227062"	US-PGPUB; USPAT;	OR	ON	2022/01/07 08:53

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S5	541	((("GOLDSTEIN") near3 ("Steven"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2022/01/07 08:54
S6	53	S5 and voice near control	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 08:54
S7	47	S5 and user near interaction	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 08:56
S8	33	S5 and user near interaction same headphone	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 08:56
S9	257,433	(G10L21/00 or G06F3/165 or G06F3/167 or G06F16/60 or G10L13/00 or G10L15/26 or G10L21/06 or G10L25/48 or H04M1/05 or H04M1/2471 or H04R1/1016 or H04R3/00 or H04W4/80 or H04M1/6066 or H04M1/72442).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 09:05
S10	4	("20030130852" | "20070165875").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 09:10
S11	87	("7533061" | "4539439" | "20060086236" | "7031437" | "20020007315" | "7558529" | "20030069854" | "20060031257" | "3865998" | "6661901" | "7133924" |	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2022/01/07 09:47

		"6965770" | "20040224723" | "20060193450" | "6636953" | "5694475" | "5751820" | "20070079692" | "7546144" | "20050125354" | "6379314" | "6840908" | "7206429" | "20050078843" | "20070025194" | "6587822").PN.	DERWENT; IBM_TDB			
S12	257,433	(G10L21/00 or G06F3/165 or G06F3/167 or G06F16/60 or G10L13/00 or G10L15/26 or G10L21/06 or G10L25/48 or H04M1/05 or H04M1/2471 or H04R1/1016 or H04R3/00 or H04W4/80 or H04M1/6066 or H04M1/72442).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 10:41
S13	17,954	S12 and voice near command	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 10:41
S14	151	S13 and (ear$1phone ear$1bud).ab.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2022/01/07 10:41

1/14/2022 12:50:08 PM
C:\Users\meason2\Desktop\Pending\16784822 Earbud with voice control button\16785822.wsp

Electronic Acknowledgement Receipt

EFS ID:	45282511
Application Number:	16785822
International Application Number:	
Confirmation Number:	3813
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Customer Number:	150139
Filer:	John Patrick Keady
Filer Authorized By:	
Attorney Docket Number:	11472-40-10_CONT_14148749
Receipt Date:	22-MAR-2022
Filing Date:	10-FEB-2020
Time Stamp:	00:17:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Arguments/Remarks Made in an Amendment	16785822-RESPONSE.pdf	355260 8c36412a46b0a0a79eb93d14ddc419d71c723291	no	10

Warnings:

Information:	
Total Files Size (in bytes):	355260

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	:	16/785,822	CONFIRMATION NO. 3813
APPLICATION OF	:	Steven Wayne Goldstein	
DATE FILED	:	10 Feb. 2020	
EXAMINER	:	EASON, MATTHEW A	
TC/A.U.	:	2651	
DOCKET	:	11472-40-10_CONT_14148749	
TITLE	:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD	

RESPONSE TO OFFICE ACTION

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Date: March 22, 2022

Sir:

These remarks are filed in response to the Final Office Action dated 20 Jan. 2022. Please amend the above-identified patent application as follows:

- **Amendments to the Claims** begin on page 2 of this paper; and
- **Remarks/Arguments** begin on page 6 of this paper.

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1.(currently amended) An earpiece, comprising:

a sealing section configured to be inserted into and seal an ear canal of a user;

an ambient microphone configured to measure ambient audio content in the ambient environment near the user's ear;

an ear canal microphone configured to measure internal audio in the ear canal of the user;

a speaker;

an interaction element, wherein the interaction element is a tactile interface;

a location unit configured to determine the location of the earpiece;

a memory that stores instructions; and

a logic circuit configured to ~~that~~ execute[[s]] the instructions to perform operations, the operations

comprising:

generating active noise reduction using at least one of the measured ambient audio, the internal audio or a combination of both;

activating a voice controlled interface when a ~~detecting the~~ manual activation of the interaction element is detected; ~~and~~

detecting a user's voice from measured ambient audio content;

extracting an audio signal of the user's voice; and

analyzing the audio signal to determine a voice command.

~~switching the mode of the earpiece to voice command mode when manual activation of the interaction element is detected.~~

2.(cancelled)

3.(currently amended) An earpiece according to claim [[2]]1, further including the operations of:

analyzing the audio signal to determine a voice command; and

initiating a response in response to the voice command.

4.(original) An earpiece according to claim 3, where the voice command is to create an audio content wish list.

5.(currently amended) An earpiece, comprising:

a sealing section;

an ambient microphone;

a speaker;

an interaction element;

a location unit;

a memory that stores instructions; and

a logic circuit configured to execute the instructions to perform operations, the operations

comprising:

detecting the manual activation of the interaction element;

switching the mode of the earpiece to voice command mode when manual activation of the interaction element is detected;

detecting a user's voice;

extracting an audio signal of the user's voice;

analyzing the audio signal to determine a voice command; and

initiating a response in response to the voice command,

~~An earpiece according to claim 3,~~ where the voice command is perform at least one of the following actions with respect to an audio content list stored in the memory, purchase a song in the audio content list, delete a song from the audio content list,

skip to the next song in the audio content list, add a song to the audio content list, and delete the audio content list.

6.(original) An earpiece according to claim 3, where the voice command is to search the internet.

7.(original) An earpiece according to claim 6, where the internet search results are received via a text to speech analyzer resulting in an audio result and the user receives the audio result.

8.(original) An earpiece according to claim 3, where the voice command is to play audio from the internet.

9.(original) An earpiece according to claim 8, where a second voice command is to scan audio from the internet.

10.(original) An earpiece according to claim 3, where the voice command is to play audio from a radio station.

11.(original) An earpiece according to claim 3, where the voice command is to search for a particular stock value.

12.(original) An earpiece according to claim 3, where the voice command is to link to a user's investment account.

13.(original) An earpiece according to claim 12, where a second voice command is to search for a particular stock value.

14.(original) An earpiece according to claim 13, where a third voice command is to buy the particular stock.

15.(original) An earpiece according to claim 13, where a third voice command is to sell the particular stock.

16.(original) The earpiece according to claim 3 including an ear canal microphone.

17.(original) An earpiece according to claim 16, further including the operations of: measuring the sound pressure level using the ear canal microphone.

18.(original) An earpiece according to claim 16, further including the operations of: calculating the sound pressure level dosage of a user using the measured sound pressure level.

REMARKS

The foregoing amendments and the following remarks are made in response to the Office Action dated 20 Jan. 2022. At the time of the Office Action, the Examiner noted that claims 1-18 were pending. The Examiner has rejected claim 1-4 and 6-18 under 35 U.S.C. § 103, as discussed in further detail below. The Examiner has also objected to Claim 5 but has indicated allowability if rewritten to independent form. Claim 5 has been rewritten into independent form, claims 1 and 3 have been amended and claim 2 cancelled. Examiner is respectfully requested to withdraw the rejection and issue a Notice of Allowance.

Applicant respectfully notes herein that the Applicant may address only one difference between the cited art and the claimed inventions and such should not be interpreted as acceptance of the Examiner's assertions which have not been addressed.

I. Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 1-3 under 35 U.S.C. § 103 as being unpatentable over Tanaka (US 20030130852) in view of Rezvani (US 20070165875). The Examiner rejected claim 4 under 35 U.S.C. § 103 as being unpatentable over Tanaka (US 20030130852) in view of Rezvani (US 20070165875) and further in view of Othmer (US 20090286515). The Examiner rejected claims 6-15 under 35 U.S.C. § 103 as being unpatentable over Tanaka (US 20030130852) in view of Rezvani (US 20070165875) and further in view of Borovitski (US 20060173563). The Examiner rejected claims 16-18 under 35 U.S.C. § 103 as being unpatentable over Tanaka (US 20030130852) in view of Rezvani (US 20070165875) and further in view of Victorian (US 20050058313).

Applicant directs attention to claim 1 which has been amended for clarity, and which states in part:

1.(currently amended) An earpiece, comprising:
a sealing section configured to be inserted into and seal an ear canal of a user;

an ambient microphone configured to measure ambient audio content in the ambient environment near the user's ear;

an ear canal microphone configured to measure internal audio in the ear canal of the user;

a speaker;

an interaction element, wherein the interaction element is a tactile interface;

a location unit configured to determine the location of the earpiece;

a memory that stores instructions; and

a logic circuit configured to ~~that~~ execute[[s]] the instructions to perform operations, the operations

comprising:

generating active noise reduction signal using at least one of the measured ambient audio, the internal audio or a combination of both;

activating a voice controlled interface when a ~~detecting the~~ manual activation of the interaction element is detected; ~~and~~

detecting a user's voice from measured ambient audio content;

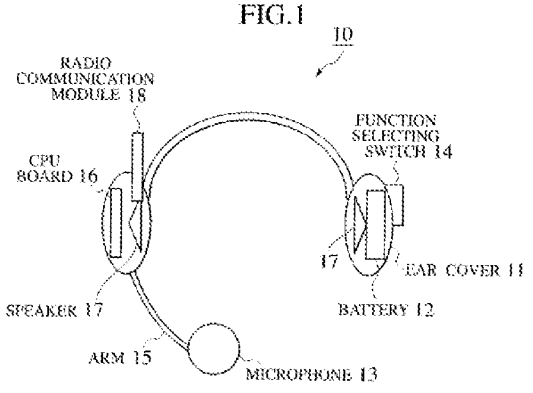
extracting an audio signal of the user's voice; and

analyzing the audio signal to determine a voice command.

~~switching the mode of the earpiece to voice command mode when manual activation of the interaction element is detected.~~

Applicant directs the Examiner's attention to Tanaka (US 20030130852) Figure 1 which illustrates the system of Tanaka. Which states in part "…[0067] FIG. 1 and FIG. 2 respectively show an outward appearance and a Schematic System configuration of **a head set 10** with a radio communication function according to the first embodiment of the present invention…." (emphasis added)

FIG.1



Tanaka shows a headset, not an earpiece, and shows a headset with a microphone away from the user's ear. An ambient microphone near a user's ear is more effective in noise cancellation.

Applicant directs the Examiner's attention to Rezvani Figure 4, directed to a beam firming headset. Rezvani states with respect to Figure 4: "… The microphone array 405 includes an ambient noise microphone 410 located on a part of the headset optimized to pick up background ambient noise and cancel it through a background noise canceller 412, as well as additional microphone elements 415,420.430 in different locations on the headset…." (Rezvani, [0026]) Rezvani does not discuss an ambient mic near the user's ear canal and additionally discusses headsets not earpieces, the two of which are not combinable since the placement of microphones is limited in an earpiece (thus difficult for beam forming), and the acoustics of ear canal pickup is more difficult with a sealing section of an earpiece (e.g., occlusion effect).

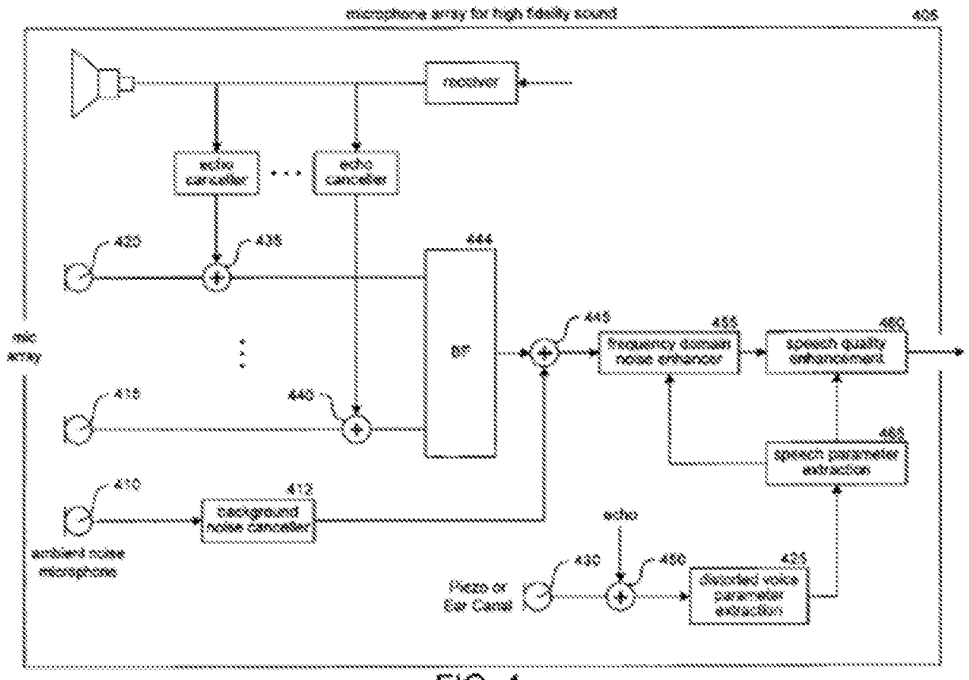


FIG. 4

Thus, Tanaka in view of Rezvani (although Applicant does not admit they are combinable) fails to show, suggest, or teach all the elements of amended claim 1.

Likewise the additional references, Othmer, Borovitski, and Victorian fail to show all the elements of claim 1 when considered in combination with Tanaka in view of Rezvani, Although Applicants do not admit any of the references are combinable.

Therefore, for at least these reasons, independent claims 1, and those claims depending therefrom, are allowable, and the Examiner is respectfully requested to withdraw the rejections under 35 U.S.C. § 103 and issue a Notice of Allowance.

II. Allowable Subject Matter

Applicant directs the Examiner's attention to amended claim 5, which has been amended to independent form. Thus, as indicated by the Examiner, claim 5 is allowable.

III. Conclusion

For at least the reasons given above, claims 1 and 3-18 are allowable, and the Examiner is respectfully requested to withdraw all rejections. Should the Examiner believe that anything further is necessary, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Respectfully submitted,

TECHIYA LLC

Date: March 22, 2022

/John P. Keady/
John P. Keady
Ph.D (Physics), Ph.D (Comp. Sci.)
CTO and Assistant General Counsel of IP
Reg. No. 56,389

571-606-1291

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/785,822	Filing Date 02/10/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/22/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/KIMBERLY N PANNELL/
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	EASON, MATTHEW A
Attorney Docket Number	11472-40-10_CONT_14148749

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

	1	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00282, December 21, 2021	
	2	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00242, December 23, 2021	
	3	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00243, December 23, 2021	
	4	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00234, December 21, 2021	
	5	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00253, January 18, 2022	
	6	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00324, January 13, 2022	
	7	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00281, January 18, 2022	
	8	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00302, January 13, 2022	
	9	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00369, February 18, 2022	
	10	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00388, February 18, 2022	
	11	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00410, February 18, 2022	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John P. Keady/	Date (YYYY-MM-DD)	2022-04-18
Name/Print	John P. Keady	Registration Number	56389

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	16785822
Filing Date:	10-Feb-2020
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Filer:	John Patrick Keady
Attorney Docket Number:	11472-40-10_CONT_14148749

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	130	130
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt	
EFS ID:	45501855
Application Number:	16785822
International Application Number:	
Confirmation Number:	3813
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Customer Number:	150139
Filer:	John Patrick Keady
Filer Authorized By:	
Attorney Docket Number:	11472-40-10_CONT_14148749
Receipt Date:	19-APR-2022
Filing Date:	10-FEB-2020
Time Stamp:	00:18:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$130
RAM confirmation Number	E20224I121274427
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	16785822-IDS-transmittal-ltr.pdf	120343 4892a231b1d2cd43ae01e36bef06412e296489d7	no	1
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	IPR-IDS.pdf	1034808 3ebe119a7d69bab5142f8b4544fe214a51a57d17	no	5
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
3	Non Patent Literature	IPR1A.pdf	1065114 b32633d9277d1d5cbb0af2066ff5867d862385c1	no	80
Warnings:					
Information:					
4	Non Patent Literature	IPR2A.pdf	1943835 da801697fc2947375e698af3715a85d228c3169b	no	79
Warnings:					
Information:					
5	Non Patent Literature	IPR3A.pdf	1479136 586f5587012890efc764c06c62325f6658d3e6b0	no	80
Warnings:					
Information:					

6	Non Patent Literature	IPR4A.pdf	5856275 bbb6e06c8da39022bf9185c6f1f5e759e4c972a1	no	88
Warnings:					
Information:					
7	Non Patent Literature	IPR5A.pdf	8407299 889345276652cbf08e8b18236b62f4a383c4f305	no	93
Warnings:					
Information:					
8	Non Patent Literature	IPR6A.pdf	2934158 e3cdedca197bf8edfaca52fd01beac9ae8e9dc1f	no	96
Warnings:					
Information:					
9	Non Patent Literature	IPR7A.pdf	8015419 daf57ea06e8b5a9fac276fdf4986680d2d48e57a	no	91
Warnings:					
Information:					
10	Non Patent Literature	IPR8A.pdf	1207844 e3045ff9a612a959a7d0b32668a27ada07cb7f9f	no	79
Warnings:					
Information:					
11	Non Patent Literature	IPR9A.pdf	2841009 9ef3d0e90e5f4822674c42f5aafb0d7a2ac41139	no	84
Warnings:					
Information:					
12	Non Patent Literature	IPR10A.pdf	1712217 0fc9ba7b23d69dc17b42f5eceb527eae3739084f	no	58
Warnings:					
Information:					

13	Non Patent Literature	IPR11A.pdf	2025912 bc48559c25842c20f54e91f5b4ff83950ac0ced29	no	84
Warnings:					
Information:					
14	Fee Worksheet (SB06)	fee-info.pdf	38088 0d739aa524017b239efc5c7a0ffb01eab3180766	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	38681457	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	:	16/785,822 CONFIRMATION NO. 3813
APPLICATION OF	:	STEVEN WAYNE GOLDSTEIN
DATE FILED	:	10 FEB. 2020
EXAMINER	:	EASON, MATTHEW A
TC/A.U.	:	2651
DOCKET	:	11472-40-10_CONT_14148749
TITLE	:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

TRANSMITTAL LETTER

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Date: April 18, 2022

Sir:

The attached IDS contains the IPRs whose references have already been sent to the Examiner, however in the abundance of due diligence, Applicant has included the IPRs in the attached IDS for the Examiner's consideration. Note the Patent Owner POPR responses have not been included.

Should the Examiner believe that anything further is necessary, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Respectfully submitted,
TECHIYA LLC

Date: April 18, 2022

/John P. Keady/
John P. Keady, Ph.D (Physics), Ph.D (Comp. Sci)
Assistant General Counsel: Intellectual Property
and Chief Technical Officer
Staton Techiya LLC
Reg. No. 56,389
571-606-1291

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

150139 7590 04/29/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

EXAMINER
EASON, MATTHEW A

ART UNIT	PAPER NUMBER
2651	

DATE MAILED: 04/29/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

TITLE OF INVENTION: PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	07/29/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

150139 7590 04/29/2022
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

TITLE OF INVENTION: PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	07/29/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
EASON, MATTHEW A	2651	381-312000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

IPR2024-01303 Page 00229

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

150139 7590 04/29/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

EXAMINER	
EASON, MATTHEW A	
ART UNIT	PAPER NUMBER
2651	

DATE MAILED: 04/29/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/785,822	Applicant(s) Goldstein, Steven Wayne	
	Examiner MATTHEW A EASON	Art Unit 2651	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to amendment filed 3/22/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1 and 3-18 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MATTHEW A EASON/
Primary Examiner, Art Unit 2651

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	**Art Unit**
	MATTHEW A EASON	2651

CPC						
Symbol					**Type**	**Version**
G10L	/	21	/	00	F	2013-01-01
H04W	/	4	/	80	I	2018-02-01
G06F	/	16	/	60	I	2019-01-01
H04M	/	1	/	05	I	2013-01-01
H04R	/	1	/	1016	I	2013-01-01
G10L	/	21	/	06	I	2013-01-01
H04R	/	3	/	00	I	2013-01-01
G10L	/	13	/	00	I	2013-01-01
G10L	/	15	/	26	I	2013-01-01
G06F	/	3	/	165	I	2013-01-01
G06F	/	3	/	167	I	2013-01-01
G10L	/	25	/	48	I	2013-01-01
H04M	/	1	/	2471	I	2013-01-01
H04M	/	1	/	6066	A	2013-01-01
H04M	/	1	/	72442	A	2021-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	22 April 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office — Part of Paper No.: 20220422

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	**Art Unit**
	MATTHEW A EASON	2651

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04R	/	1	/	00	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	22 April 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office — Part of Paper No.: 20220422

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	**Art Unit**
	MATTHEW A EASON	2651

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10												
	2	10	11												
2	3	11	12												
3	4	12	13												
4	5	13	14												
5	6	14	15												
6	7	15	16												
7	8	16	17												
8	9	17	18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	17	
/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	22 April 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office Part of Paper No.: 20220422

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	Art Unit
	MATTHEW A EASON	2651

CPC - Searched*		
Symbol	**Date**	**Examiner**
G10L21/00	04/22/2022	ME
G06F3/165	04/22/2022	ME
G06F3/167	04/22/2022	ME
G06F16/60	04/22/2022	ME
G10L13/00	04/22/2022	ME
G10L15/26	04/22/2022	ME
G10L21/06	04/22/2022	ME
G10L25/48	04/22/2022	ME
H04M1/05	04/22/2022	ME
H04M1/2471	04/22/2022	ME
H04R1/1016	04/22/2022	ME
H04R3/00	04/22/2022	ME
H04W4/80	04/22/2022	ME
H04M1/6066	04/22/2022	ME
H04M1/72442	04/22/2022	ME

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	Art Unit
	MATTHEW A EASON	2651

Search Notes		
Search Notes	**Date**	**Examiner**
Text/picture. Inventor.	01/14/2022	ME
Updated text/picture. Inventor.	04/22/2022	ME

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	See above.	04/22/2022	ME

/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	79	("7533061"|"4539439"|"20060086236"|"7031437"|"20020007315"|"7558529"|"20030069854"|"20060031257"|"3865998"|"6661901"|"7133924"|"6965770"|"20040224723"|"20060193450"|"6636953"|"5694475"|"5751820"|"20070079692"|"7546144"|"20050125354"|"6379314"|"6840908"|"7206429"|"20050078843"|"20070025194"|"6587822").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2020/04/17 10:08 AM
L2	3	L1 and voice adj control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2020/04/17 10:08 AM
L3	4	L1 and voice near control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2020/04/17 10:08 AM
L4	2	"20200227062"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:53 AM
L5	541	((("GOLDSTEIN") near3 ("Steven"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/01/07 08:54 AM
L6	53	L5 and voice near control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:54 AM
L7	47	L5 and user near interaction	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:56 AM
L8	33	L5 and user near interaction same headphone	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:56 AM
L9	257433	(G10L21/00 or G06F3/165 or G06F3/167 or G06F16/60 or G10L13/00 or G10L15/26 or G10L21/06 or G10L25/48 or	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 09:05 AM

		H04M1/05 or H04M1/2471 or H04R1/1016 or H04R3/00 or H04W4/80 or H04M1/6066 or H04M1/72442).cpc.					
L10	4	("20030130852"|"20070165875").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 09:10 AM
L11	87	("7533061"|"4539439"|"20060086236"|"7031437"|"20020007315"|"7558529"|"20030069854"|"20060031257"|"3865998"|"6661901"|"7133924"|"6965770"|"20040224723"|"20060193450"|"6636953"|"5694475"|"5751820"|"20070079692"|"7546144"|"20050125354"|"6379314"|"6840908"|"7206429"|"20050078843"|"20070025194"|"6587822").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 09:47 AM
L12	257433	(G10L21/00 or G06F3/165 or G06F3/167 or G06F16/60 or G10L13/00 or G10L15/26 or G10L21/06 or G10L25/48 or H04M1/05 or H04M1/2471 or H04R1/1016 or H04R3/00 or H04W4/80 or H04M1/6066 or H04M1/72442).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 10:41 AM
L13	17954	L12 and voice near command	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 10:41 AM
L14	151	L13 and (ear$1phone ear$1bud).ab.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 10:41 AM
L15	2	"20200227062"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 10:29 AM
L16	542	((("GOLDSTEIN") near3 ("Steven"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/01/14 11:21 AM
L17	3	L16 and (content near	(US-PGPUB; USPAT;	OR	ON	ON	2022/01/14

		wish).clm.	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)				11:21 AM
L18	2	"20060173563"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 12:13 PM
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L20	4	"20050058313"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 12:30 PM
L21	185	("20010046304"|"20020106091"|"20020118798"|"20030161097"|"20030165246"|"20040042103"|"20040109668"|"20040125965"|"20040190737"|"20040196992"|"20040203351"|"20050123146"|"20050288057"|"20060067551"|"20060083395"|"20060092043"|"20060195322"|"20070043563"|"20070086600"|"20070189544"|"20070291953"|"20080165988"|"20090010456"|"20090024234"|"20100061564"|"20100296668"|"20110096939"|"20110264447"|"20110293103"|"20160104452"|"3876843"|"4054749"|"4947440"|"5208867"|"5903868"|"6021325"|"6163338"|"6163508"|"6226389"|"6298323"|"6400652"|"6567524"|"6661901"|"6748238"|"6804638"|"6804643"|"7107109"|"7430299"|"7433714"|"7562020"|"7756285"|"7920557"|"8493204"|"8750295"|"9037458"|"9123343"|"9135797").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 12:48 PM
L22	2	"20200227062"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:00 AM
L23	55	L5 and voice near control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/04/22 08:00 AM

			IBM_TDB)				
L24	33	L5 and user near interaction same headphone	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:00 AM
L25	4	("20030130852"|"20070165875").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:00 AM
L26	3	L16 and (content near wish).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:01 AM
L27	3	L16 and (content near wish).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:01 AM
L28	555	((("GOLDSTEIN") near3 ("Steven"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/04/22 08:01 AM
L29	78	L28 AND sealing.clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:09 AM
L30	14	L28 AND sealing.clm. AND (voice ADJ command).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:10 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	EASON, MATTHEW A
Attorney Docket Number	11472-40-10_CONT_14148749

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.E/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

	1	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00282, December 21, 2021	
	2	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00242, December 23, 2021	
	3	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00243, December 23, 2021	
	4	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00234, December 21, 2021	
	5	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00253, January 18, 2022	
	6	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00324, January 13, 2022	
	7	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00281, January 18, 2022	
	8	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00302, January 13, 2022	
	9	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00369, February 18, 2022	
	10	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00388, February 18, 2022	
	11	SAMSUNG ELECTRONICS CO., LTD., and SAMSUNG ELECTRONICS, AMERICA, INC., v. STATON TECHIYA, LLC, IPR2022-00410, February 18, 2022	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
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	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/MATTHEW A EASON/	Date Considered	04/22/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.E/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John P. Keady/	Date (YYYY-MM-DD)	2022-04-18
Name/Print	John P. Keady	Registration Number	56389

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.E/

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

150139 7590 05/12/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

EXAMINER	
EASON, MATTHEW A	

ART UNIT	PAPER NUMBER
2651	

NOTIFICATION DATE	DELIVERY MODE
05/12/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip@akerman.com
jp.keady@techiya.co
personics_docketing@cardinal-ip.com

Supplemental ***Notice of Allowability***	**Application No.** 16/785,822	**Applicant(s)** Goldstein, Steven Wayne	
	Examiner MATTHEW A EASON	**Art Unit** 2651	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1 and 3-18 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MATTHEW A EASON/
Primary Examiner, Art Unit 2651

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

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Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	EASON, MATTHEW A
Attorney Docket Number	11472-40-10_CONT_14148749

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6804638		2004-10-12	Fiedler; Mark	
	2	6163508		2000-12-19	Kim et al.	
	3	6400652		2002-06-04	Goldberg et al.	
	4	7433714		2008-10-07	Howard et al.	
	5	7562020		2009-06-14	Le et al.	
	6	9135797		2015-09-15	Couper et al.	
	7	9123343		2015-09-01	Kurki-Suonio	
	8	7756285		2010-07-13	Sjursen et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

	9	5903868		1999-05-11	Yuen et al.	
	10	3876843		1975-04-08	Moen	
	11	5208867		1993-05-04	Stites, III	
	12	6226389		2001-05-01	Lemelson et al.	
	13	8493204		2013-07-23	Wong et al.	
	14	6661901		2003-12-09	Svean et al.	
	15	7430299		2008-09-30	Armstrong et al.	
	16	6567524		2003-05-20	Svean et al.	
	17	7107109		2006-09-12	Nathan et al.	
	18	4947440		1990-08-07	Bateman et al.	
	19	9037458		2015-05-19	Park et al.	

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	Attorney Docket Number	11472-40-10_CONT_14148749

	20	4054749		1977-10-18	Suzuki et al.	
	21	6298323		2001-10-02	Kaemmerer	
	22	6804643		2004-10-12	Kiss	
	23	6163338		2000-12-19	Johnson et al.	
	24	6748238		2004-06-08	Lau	
	25	6021325		2000-02-01	Hall	
	26	8750295		2014-06-10	Liron	
	27	7920557		2011-04-05	Moote	

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	1	20030165246		2003-09-04	Kvaloy et al.	

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	2	20050288057		2005-12-29	Lai et al.	
	3	20060195322		2006-08-31	Broussard et al.	
	4	20070043563		2007-02-22	Comerford et al.	
	5	20010046304		2001-11-29	Rast	
	6	20070189544		2007-08-16	Rosenberg	
	7	20060092043		2006-05-04	Lagassey	
	8	20020106091		2002-08-08	Furst et al.	
	9	20040109668		2004-06-10	Stuckman	
	10	20020118798		2002-08-29	Langhart et al.	
	11	20040042103		2004-03-04	Mayer	
	12	20030161097		2003-08-28	Le et al.	

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	13	20160104452		2016-04-14	Guan et al.	
	14	20040203351		2004-10-14	Shearer et al.	
	15	20080165988		2008-07-10	Terlizzi et al.	
	16	20070291953		2007-12-20	Ngia et al.	
	17	20110096939		2011-04-28	Ichimura	
	18	20060067551		2006-03-30	Cartwright et al.	
	19	20090024234		2009-01-22	Archibald	
	20	20090010456		2009-01-08	Goldstein et al.	
	21	20070086600		2007-04-19	Boesen	
	22	20040190737		2004-09-30	Kuhnel et al.	
	23	20040196992		2004-10-07	Ryan	

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	24	20050123146		2005-06-09	Voix et al.	
	25	20040125965		2004-07-01	Alberth Jr., et al.	
	26	20060083395		2006-04-20	Allen et al.	
	27	20110264447		2011-10-27	Visser et al.	
	28	20100296668		2010-11-25	Lee et al.	
	29	20110293103		2011-12-01	Park et al.	
	30	20100061564		2010-03-11	Clemow et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	EP1519625	EP	A2		Victorian		
	2	2008037150	WO	A1		Mejia et al.		

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	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Olwal, A. and Feiner S. Interaction Techniques Using Prosodic Features of Speech and Audio Localization. Proceedings of IUI 2005 (International Conference on Intelligent User Interfaces), San Diego, CA, Jan 9-12, 2005, p. 284-286.	
	2	Bernard Widrow, John R. Glover Jr., John M. McCool, John Kaunitz, Charles S. Williams, Robert H. Hearn, James R. Zeidler, Eugene Dong Jr, and Robert C. Goodlin, Adaptive Noise Cancelling: Principles and Applications, PROCEEDINGS OF THE IEEE, VOL. 63, NO. 12, DECEMBER 1975	
	3	Mauro Dentino, John M. McCool, and Bernard Widrow, Adaptive Filtering in the Frequency Domain, PROCEEDINGS OF THE IEEE, VOL. 66, NO. 12, DECEMBER 1978	

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Examiner Signature	/MATTHEW A EASON/	Date Considered	01/14/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Examiner Name	EASON, MATTHEW A
	Attorney Docket Number	11472-40-10_CONT_14148749

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John P. Keady/	Date (YYYY-MM-DD)	2022-01-11
Name/Print	John P. Keady	Registration Number	56389

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16785822	Filing Date	2020-02-10	Docket Number (if applicable)	11472-40-10_Cont_1414874	Art Unit	2651
First Named Inventor	Steven Wayne Goldstein			Examiner Name	Matthew A. Eason		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☐ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 500951

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (01-22)
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Signature of Registered U.S. Patent Practitioner			
Signature	/Peter A. Chiabotti/	Date (YYYY-MM-DD)	2022-07-15
Name	Peter A. Chiabotti	Registration Number	54603

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

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Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	Matthew A. Eason
Attorney Docket Number	11472-40-10_Cont_1414874

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	1	1519625	EP		2005-03-30	Victorian		
	2	2000037156	WO		2006-04-13	Mejia et al.		

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	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	Matthew A. Eason
	Attorney Docket Number	11472-40-10_Cont_1414874

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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Examiner Signature		Date Considered	

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Art Unit	2651
	Examiner Name	Matthew A. Eason
	Attorney Docket Number	11472-40-10_Cont_1414874

CERTIFICATION STATEMENT

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OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Peter A. Chiabotti	Date (YYYY-MM-DD)	2022-07-15
Name/Print	Peter A. Chiabotti	Registration Number	54603

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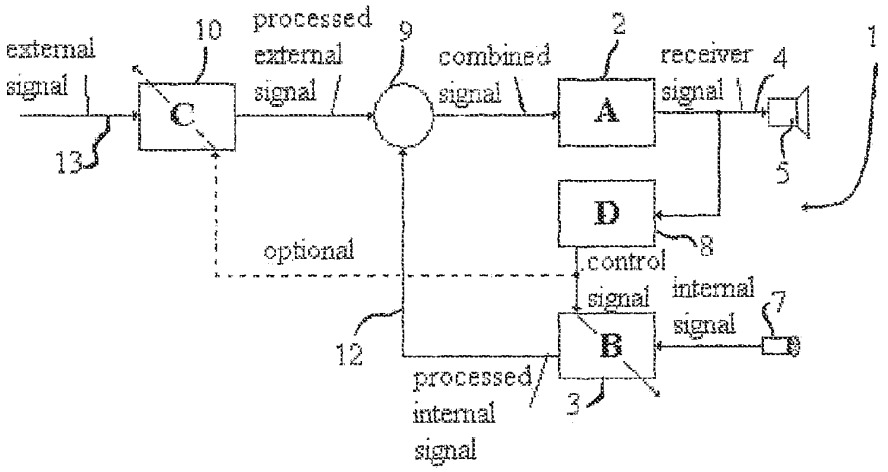
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(54) Title: ACOUSTICALLY TRANSPARENT OCCLUSION REDUCTION SYSTEM AND METHOD



(57) Abstract: A system and method that reduces the perceptual effect resulting from ear occlusion is disclosed. It comprises of an electro-acoustic feedback network that produces phase cancelling sounds in the ear, where a receiver and a microphone are located. A novel control mechanism is disclosed that controls the response of the feedback network to minimise distortion in the ear while maintaining a desired frequency response for external signals. Devices producing the external signal include hearing aids, personal sound devices, in ear monitors, communications headsets and hearing protectors. The integration of the present invention with these devices improves the user's perception of their own voice.

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Acoustically Transparent Occlusion Reduction System and Method

Field of Invention

The present invention relates to an improved occlusion reduction system for applications such as hearing aids, personal sound devices, in ear monitors, communications headsets and hearing protection devices.

Description of Background Art

An electro-acoustic negative feedback scheme was originally presented by H.F Olson, in 1961 in U.S Patent No 2,983,790. A more comprehensive implementation was later proposed by Bose et al, in 1982 in U.S Patent No 4,494,074 under the title "Feedback Control". Using headphones, Bose proposed the idea of an electro-acoustic feedback in the proximity of the ear canal. The concept was later used by Langberg et al, in 1988 in U.S. Patent No 4,985,925, describing a system functioning as a bilateral transducer drive with a shunt feedback correction network. Later on in 1991, Langberg et al, in U.S Patent No. 5,267,321 entitled "Active Sound Absorption" describes an electro-acoustical feedback system, with the receiver acting as both a diaphragm actuator and motion sensor. In 1996, U.S Patent No. 5,774,565 to Benning et al describes an electro-acoustic feedback subsystem with oscillation prevention circuit in the forward path of the loop. In 2002, U.S Patent Application No. 2003/0012391 A1 to Armstrong et al, entitled "Digital Hearing Aids System" discloses a hearing aid including an occlusion processing subsystem.

The occlusion effect is commonly described as a hollow or echoing like sound of a person's own voice. The occlusion effect results from acoustically sealing or partially sealing the ear, or to a greater effect sealing or partially sealing the ear canal from the external acoustic environment. As a result, the occlusion effect creates discomfort and/or an unnatural sound sensation. This problem is commonly reported to clinicians in the

hearing aid industry as it affects a large number of hearing aid wearers (those with mild low-frequency hearing loss). Until now, there were at least two common schemes to decrease the occlusion effect in hearing aids, either using a vent or by increasing the insertion depth of the earmold into the ear canal. To restore naturalness of a hearing aid wearer's voice, vents of up to 3.5 mm in diameter may be employed. These vents need to be sufficiently large so that the residual sound pressure in the canal due to the occlusion effect is not significant. On the other hand, a sufficiently large vent limits the hearing aid amplification due to oscillations created by positive feedback occurring around the loop defined by an external microphone, amplifier, receiver, and path through the vent back to the external microphone.

The soft tissue in the ear canal is excited by vibration energy propagated by the skull and jaw due to the wearer's voice and this results in an increased sound pressure within the occluded of partially occluded ear relative to an open ear. Another solution is to insert the earmold further into the ear canal to fill the cartilaginous portion of the canal and hence reduce the occlusion effect at its source. However there are a number of practical problems relating to the deep insertion of an earmold, for instance physical discomfort.

While some of the aforementioned patents include methods to alter the response of the electro-acoustic feedback system, none of these patents incorporate methods to compensate for the effect that response alteration within the feedback system has on external signals such as from an external microphone or hearing aid processor. In addition, the aforementioned patents do not provide a mechanism to prevent the receiver from overloading by sensing the level of signal at the optimum point, being the input to the receiver.

Summary of Invention

It is an object of the present invention to provide an improved occlusion reduction system for applications such as hearing aids, personal sound devices, in ear monitors, communications headsets and hearing protection devices.

In accordance with a first aspect of the present invention, there is provided an electro-acoustic system comprising of: an electro-acoustic circuit including a negative-feedback loop comprising of: a microphone for generating an internal signal from an acoustical signal located within or closely coupled to an occluded or partially occluded ear; a second electronic circuit, (B) for modifying the internal signal to produce a processed internal signal; a combiner for combining the processed internal signal with a processed external signal to produce a combined signal; a first electronic circuit (A), for modifying the combined signal to produce an receiver signal; and a receiver for generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear; a third electronic circuit (C) for modifying an external signal such as from an external microphone or hearing aid processor to produce an external processed signal; a fourth electronic circuit (D), for estimating the level of the receiver signal optimally from the receiver signal and producing a control signal; wherein the processing performed by the second electronic circuit (B) preferably is controlled by the control signal.

The negative-feedback loop preferably can include a filter that alters the open loop response so that the real component of the response is large and negative at frequencies where the occlusion effect can be typically the greatest. Consequently reducing all signals introduced into the closed loop within this frequency range.

The third electronic circuit (C) preferably can include filtering that provides compensation for the closed loop response of the negative-feedback loop.

Optionally the filtering provided by the third electronic circuit (C) adapts to compensate for changes in the closed response of the negative-feedback loop.

Optionally the control signal can control the response of the first electronic circuit (A) while controlling the response of the third electronic circuit (C).

The microphone for generating the internal signal optionally can be coupled to the occluded or partially occluded ear by a tube. The receiver optionally can be coupled to the occluded or partially occluded ear by a tube. The microphone and receiver optionally can be combined in a single unit or jointly coupled to the occluded or partially occluded ear by a common tube. At least one of the electronic circuits can be implemented digitally. At least one of the digital electronic circuits can performed signal processing at a sampling rate at least four times that of the bandwidth of the signal.

In accordance with a further aspect of the present invention, there is provided an electro-acoustic system including a negative-feedback loop comprising of: a microphone for generating an internal signal from an acoustical signal located within or closely coupled to an occluded or partially occluded ear; a second electronic circuit (B) for modifying the internal signal to produce a processed internal signal; a combiner for combining the processed internal signal with a processed external signal to produce a combined signal; a first electronic circuit (A) for modifying the combined signal to produce a receiver signal; and a receiver for generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear; a third electronic circuit (C) for modifying an external signal such as from external microphone to produce a processed external signal; a fourth electronic circuit (D) for estimating the level of the receiver signal and producing a control signal from this estimate; wherein the control signal controls the processing performed by the second

electronic circuit (B) and controls the processing performed by the third electronic circuit (C).

In accordance with a further aspect of the present invention, there is provided an electro-acoustic system including a negative-feedback loop comprising of: a microphone for generating an internal signal from an acoustical signal located within or closely coupled to an occluded or partially occluded ear; a second electronic circuit (B) for modifying the internal signal to produce a processed internal signal; a combiner for combining the processed internal signal with a processed external signal to produce a combined signal; a first electronic circuit (A) for modifying the combined signal to produce a receiver signal; and a receiver for generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear; a third electronic circuit (C) for modifying an external signal to produce a processed external signal; a fourth electronic circuit (D) for estimating the level of the receiver signal and producing a control signal from this estimate; wherein the control signal controls the processing performed by first electronic circuit (A) and controls the processing performed by the third electronic circuit (C).

In accordance with a further aspect of the present invention, there is provided a method of providing a negative feedback loop for an electro-acoustic system, the method including the steps of: (a) generating an internal signal representing an acoustical signal located within or closely coupled to an occluded or partially occluded ear; (b) modifying the internal signal to produce a processed internal signal; (c) combining the processed internal signal with a processed external signal to produce a combined signal; (d) modifying the combined signal to produce a receiver signal; (e) generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear; (f) modifying an external signal to produce a processed external

signal; (g) estimating the level of the receiver signal either directly from the receiver signal or from the combined signal and producing a control signal from this estimate; wherein the degree of modification in step (b) is controlled by the control signal. The control signal can be utilised to control the amount of modification occurring in step (f).

In any of the aforementioned aspects of the present invention the fourth electronic circuit (D) optionally produces a control signal using estimates of the signal levels from the internal signal or the processed internal signal and the receiver signal or the combined signal.

Brief Description of the Drawings

Preferred embodiments of the present invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a block diagram of the occlusion reduction scheme of the preferred embodiment;

Fig. 2 is a schematic diagram of an analog electronic circuit for the electro-acoustic negative feedback loop;

Fig. 3 is a schematic diagram of an analog adaptive pre-compensation electronic circuit;

Fig. 4 is a schematic diagram of an analog level estimator and control signal generation electronic circuit;

Fig. 5 is a schematic diagram of a digital implementation of the occlusion reduction scheme;

Fig. 6 is a schematic diagram of an adaptive IIR filter;

Fig. 7 is a schematic diagram of a level estimator and control signal generator ;

Fig. 8 is a graph of the simulated closed loop response in a Zwislocki coupler;

Fig. 9 is a graph of the measured response of the effective gain reduction inside a real ear;

Fig. 10 is a graph of the measured responses from an external signal to a Zwislocki coupler microphone; and

Fig. 11 is an illustration of the occlusion reduction scheme implemented as an in-the-canal hearing aid device.

Detail Description of the Preferred and Other Embodiments

The preferred embodiment operates to reduce the level of signals generated within an electro-acoustic negative feedback loop, such as signals produced by vibration in the ear canal walls due to bone conduction of a user's voice. The reduction occurs in the low to mid audible frequencies, typically ranging from 80 Hz up to 1 kHz, where the occlusion effect is more predominant and perceptually apparent.

A negative feedback scheme is provided which combines a processed externally generated signal such as from an external microphone or a sound system with a processed internal signal such as from a microphone located within or closely coupled to the occluded or partially occluded ear. The combined signal after optional further processing is applied to a receiver located within or closely coupled to the occluded or partially occluded ear. The level of the signal to be applied to the receiver is optimally estimated either from the signal applied to the receiver or from the combined processed external and processed internal signals. Optionally this signal level can be estimated from signals at other points within the scheme. High signal levels applied to the receiver may produce a distorted output from the receiver. This distortion is reduced by applying active gain reduction in the feedback path in response to estimated high signal levels being present. Optionally low signal levels can be detected so that noise inherent in the negative feedback components such as the internal microphone can be minimised by

applying active gain reduction in the feedback path. Thus, the high and the low signal level thresholds for gain reduction in the loop can depend on the dynamic operational range of the discrete components within the system. In addition, an adaptive equalisation filter is applied to the external signal to compensate for variations of the transfer response of the closed loop.

The preferred embodiment includes of a microphone to sense the sound pressure in the ear. The preferred embodiment also includes a novel design of estimating the level of the signal to be applied to the receiver and reducing the gain in the feedback path of the loop when this level is high. This mechanism effectively improves the robustness of the closed loop system by limiting excessive driving levels being applied to the receiver. A filter within the feedback path of the loop yields the necessary phase and gain around the loop to generate a phase cancelling sound in the ear without creating acoustic feedback. This negative feedback response also causes a sound pressure reduction for external signals thus affecting the response from the external processed signal to the receiver signal. As a result, an adaptive pre-compensation filter is provided. The adaptive pre-compensation filter performs adaptive equalisation to maintain a constant frequency response between the external signal and the receiver signal in response to changes in loop response.

In addition, the negative feedback response also causes a reduction in external sounds transmitted through a vent or leakage, thus minimising both effects.

Referring initially to **Fig. 1**, a schematic diagram 1 illustrates the occlusion reduction scheme of the preferred embodiment. This electronic circuit can be encapsulated in an earmold 100 as discussed hereinafter with reference to **Fig. 11**. The earmold optionally contains tubing for coupling the receiver to the ear. The earmold optionally contains tubing for coupling the internal microphone to the ear. The

microphone and receiver optionally can be combined into a single unit or jointly coupled to the occluded or partially occluded ear by a common tube. Optionally these tubes can be protected from wax blockage using wax guards. The lengths of these tubes are preferably as short as possible to minimise delays around the feedback loop, but can be any length. The earmold can optionally contain an open vent to depressurise the ear thus reducing the sensation of stuffiness in the ear. Optionally, the vent can be fitted with an acoustic damper for compensating for the vent resonance that may affect the closed loop response.

The internal signal from an internal microphone 7 is proportional to the ear canal sound pressure. This internal signal is filtered in a feedback loop shown as first electronic circuit **(A)** 2 and second electronic circuit **(B) 3** to produce the receiver signal 4 output to the receiver 5. The aim is to produce cancellation around the loop, limited to a given low to mid frequency band.

An analog implementation of the occlusion reduction scheme is depicted in **Figs. 2-4** and a digital implementation is shown in **Figs. 5-7**.

In addition, **Fig. 1** shows fourth electronic circuit (D) 8 that estimates the level of the receiver signal to produce a control signal. Optionally the input to the fourth electronic circuit (D) 8 can be obtained from the output of a combiner 9 with appropriate compensation for the effects of the first electronic circuit (A) 2. The response of the negative feedback loop is controlled by the control signal. The estimated level of the receive signal 4 can be compared to a reference level which is not shown in this figure. The control signal reduces the gain in the loop as the level of the receive signal increases above the reference level. The reference level is set to a level to minimise distortion occurring within the loop.

The combined signal within the loop results from a combination 9 of processed internal signal 12 and processed external signal. The processed external signal results from a filtered external signal 13. The pre-compensation filter 10 depicted as the third electronic circuit (C) 10 in **Fig. 1**, equalises the magnitude of the transfer function from the external signal 13 to the receiver signal 4 so that it is approximately constant across frequency, assuming a fixed closed loop response. Optionally, the filter in the third electronic circuit (C) 10 is adaptively controlled by fourth electronic circuit (D) 8 so that the magnitude of the transfer function from the external signal 13 to the receiver signal 4 is approximately constant across frequency regardless of changes in the closed loop response.

Optionally the fourth electronic circuit (D) uses estimates of signal levels from the receiver signal or combined signal and from the internal signal or processed internal signal to produce a control signal to control the loop response. This control signal can control the loop response by directly applying gain reduction to the first electronic circuit (A) or to the second electronic circuit (B). The control signal produce from this arrangement can be used in combination with the fixed or adaptive third electronic circuit (C).

Analog Implementation

Fig. 2, depicts an analog implementation 20 of the negative feedback loop of **Fig. 1**. Firstly, the internal signal is applied to a high pass filter 21 and lead-lag filter 22 in order to reduce effects from jaw movements and very low frequency instability in the loop. The equations for the transfer function in relation to the corresponding discrete components are shown below:

$$H_{HP}(j\omega) = \frac{j\omega \cdot R_1 C_2}{1 + j\omega \cdot R_1 \times C_1}$$

if $R_4 = R_5, C_2 = C_3$ then the lead lag transfer function equation is shown below

$$H_{Lead-Lag}(j\omega) = \frac{(R_3 + R_6) + j\omega * C_2 * (2R_3R_6 + R_5R_4 + R_3R_4)}{R_6 + j\omega * C_2 * (R_3R_6 + R_5R_4)}$$

The next filtering stage reduces the dominant transducer resonance within the loop and provides greater open loop gain at frequencies at which the occlusion effect is greatest. This is achieved by using a bi-quadratic filter 24, and placing a complex pair of zeros at the dominant transducer resonance frequency followed by a pair of real poles to provide low frequency emphasis in the open loop response.

In the arrangement of Fig. 2, if we allow $R_8 = R_{10}, C_4 = C_6$, $R_9 = R_{11}, C_5 = C_7$ and $R_{12} = R_{13}, C_8 = C_9$,then the biquadratic transfer function equation can be computed as follows

$$H_{bi-quad}(j\omega) = \frac{(j\omega)^2 C_4 R_9 C_5 + j\omega\left(C_4 + \frac{C_5 R_9}{R_8} - C_5\right) + \frac{1}{R_8}}{(j\omega)^2 C_5 R_9 C_8 + j\omega\left(\frac{C_5 R_9}{R_{12}} + C_8\right) + \frac{1}{R_{12}}}$$

To determine the pole zero placement, the biquadratic transfer function equation can be directly related to a well known second order transfer function equation.

$$K(j\omega) = \frac{(j\omega)^2 + 2\xi_z \omega_z j\omega + \omega_z^2}{(j\omega)^2 + 2\zeta_p \omega_p j\omega + \omega_p^2}$$

Where the ω_p and ω_z are the location of the pole and zero frequencies. Similarly ξ_z and ζ_p are the damping factors for the poles and zeros respectively. Thus, this relationship can be used to position the poles and zeros at the desired frequencies with the desired damping.

With appropriate phase compensation, amplification is added to the loop. The gain amplification is chosen in accordance to a well-known gain and phase margin criteria (e.g. Linear Control Systems Analysis and Designs, John J.D'Azzo, Constantine H.

Houpis, 2nd Edition, McGraw-Hill, 1981). A loop gain of less than or equal to –3 dB is chosen at frequencies likely to produce positive feedback. The filtering arrangement of **Fig. 1** shown in **Fig 2**, produces a gain greater than unity, for an open loop response between 80 Hz and 1 kHz and less than unity at other frequencies, where positive feedback may occur. The frequency band ranging from 80 Hz up to 1 kHz is an appropriated choice as the occlusion effect is subjectively more apparent at these frequencies, as described in literature (e.g. Hearing Aids, Harvey Dillon, Boomerang-Press, 2001).

The bi-quadratic filter 24 is followed up by a voltage controlled variable resistance 25, referred to as **VVR**. This control produces up to – 20 dB of gain around the loop, by controlling the voltage at the gate of the JFET. Thus, the gain across the VVR network is found by observing that the JFET is series with R_7 forms a voltage divider, with its gain given by:

$$Gain_{VVR} = \frac{R_{Q1}}{R_7 + R_{Q1}}$$

Where R_{Q1}, is the variable resistance across drain to source junction.

The VVR is followed by a bufferstage 26, that is subsequently followed by a variable resistor, R_{14}, 27. This latter resistor is used to fined tune the gain around the loop manually. The variable resistor 27 is followed by an amplifier and a combiner 9, combining a processed external signal 28 with the processed internal signal 12. Finally, this buffer functions as a voltage controlled voltage source to the receiver, optionally a **class D** amplifier may be used.

Referring now to **Fig. 3**, there is illustrated the precompensation circuit 10 of **Fig. 1** in more detail. The circuit may be used to pre-compensate an external signal 13 to produce a processed external signal 28. The external signal is pre-compensated with a

fixed high pass filter 32, a variable notch filter 33, and an adjustable gain control 34. Note that the notch and the gain are also controlled with voltage variable resistances, using JFET transistors.

If $C_{13} = C_{14}$, then the transfer function equation for the notch filter, positioned between U6 and U7 is shown below

$$H_{Notch}(j\omega) = \frac{1 + j\omega(2R_x C_{13}) + \left(R_x R_{19} C_{13}^{\ 2}\right)\cdot(j\omega)^2}{1 + j\omega(R_{19} + 2R_x)C_{13} + \left(R_x R_{19} C_{13}^{\ 2}\right)\cdot(j\omega)^2}$$

Where $R_x = R_{20} + R_{Q3} + R_{Q4}$ and $R_{Q3} + R_{Q4}$ is the combined resistance across drain to source junction of the two JFET transistors. Also note that the amplification at U7 is controlled by the source to drain resistance at Q5, and the low pass filter between U5 and U6 is essentially switched on and off by Q2.

The voltage variable resistances shown in **Fig. 2** and **3** are driven by the circuit 40 shown in **Fig. 4**. This circuit functions as a signal level estimator and threshold detector and produces a control voltage 41. In this circuit the receiver signal 4 is compared to a reference voltage 43, shown as v-Ref in the figure, at the negative input of U8 (44). If this voltage does not exceed the reference level, the current source, made up by BJ3 and BJ4 transistor pair pulls down the voltage across the RC tank towards the negative supply voltage, with a time constant equal to the release time. Note that the voltage across the RC tank feeds directly into the gate of the JFET control transistor in **Fig. 2** from U9 buffer (1), resulting in a VVR signal 25. Similarly from U10 and U11 buffer (2) and buffer (3), results is an inverted VVR signal 35, that is directly applied to the gates of all the JFET transistors shown in **Fig. 3**. As the voltage exceeds the threshold reference level, the current source, shown as BJ6 and BJ5 transistor pair, charges the RC tank, towards the base voltage at BJ6, with a time constant set by the attack time. The

attack and release time constants can be approximated by finding the appropriate ratio between resistors R_{31} and R_{30}.

The voltage across the capacitor C_{15} ranges from a voltage at the based of BJ7 , say 0.7V or fully charged to the voltage at the collector of BJ3, say -2.8V or fully discharged, then the change in voltage $\Delta V \approx 3.5V$, from which the current needed to produce the discharging rate can be evaluated as follows:

$$\text{Discharging } I = C_{15} \times \frac{\Delta V}{\text{Re}lease_Time} = 7uA$$

thus effectively $I_{charging} \approx 11 \times I_{discharging}$

Then $R_{31} = \frac{0.7}{77u} \approx 8.2k$ $\qquad$ $R_{30} = 11 \times R_{31} \approx 91k$

Digital Implementation

A digital implementation of the arrangement of **Fig. 1** typically requires the signal within the loop to be oversampled to reduce the delay introduced into the loop by sampling. The signal processing performed by electronic circuits A, B, C and D and the combiner 9 may be performed digitally. The digital processing optionally is performed by a digital signal processor which is instructed to perform the signal processing. Various techniques are available to those skilled in the art to perform these processes. Examples of these are performing the filtering operations using FIR or IIR filters or modifying the signals in the frequency domain using the short-time Fourier transform techniques. One implementation of the scheme described for **Fig 1** is shown in **Figs. 5-7.**

In **Fig. 5,** after A/D conversion 50, the internal signal is filtered with an IIR filter 51 in order to provide the required gain and phase compensation, with the same criteria applied in the description of **Fig. 2.**

In this digital implementation the level of the receiver signal 4 is directly estimated and the control signal *r(n)* is produced by the level estimator and control signal generator

8 which is shown in greater detailed in **Fig. 7.**. Referring now to **Fig. 7,** the receive signal level is estimated with a digital 1st order switchable time-constant envelope detector. The envelope signal is compared 71 to a threshold value and the maximum of either the ratio of its exceedance of this threshold or unity is produced. This maximum is inverted to produce the control signal. As the level of the envelope signal exceeds the threshold, the control signal shown as *r(n)* decreases at a rate determined by the attack time constant λ_{attack}. As the envelope signal decreases in level, the control signal increases at a rate determined by the release time constant $\lambda_{release}$. Alternative signal level compression strategies employing different envelope detector designs well known to those skilled in the art may be used.

The internal signal, after being filtered by the IIR filter 51, is scaled by the control signal *r(n)* to produce the processed internal signal. The processed external signal is added to the processed internal signal by the combiner 9 to produce the combined signal. The combined signal is scaled 2 to produce the receiver signal 4 which after D/A conversion is applied to the receiver 5.

As in the analog description, the negative feedback loop requires pre-compensation so that the gain response measured from the external signal to the receiver signal is not altered by the closed loop response. In **Fig. 5,** the pre-compensation filter 10 is realised as a cascaded IIR filter, with a structural realisation shown in **Fig. 6** . The first filter stage shown in **Fig. 6** is a high pass filter, comprising of a zero at 0 Hz and a pole at f_{HP}, the coefficient being a function of the sampling rate, Fs. The second stage of the filter shown in **Fig. 6** is adaptive, the locations of poles f_p and zeros f_z of the digital filter are varied in accordance with the output of a mapping function *p(n)* 61. Alternatively the damping factors for the poles and zeros can be controlled by two independent mapping functions derived from the control signal *r(n)*. **Fig. 5** shows *p(n)*

as a single output from a polynomial mapping function with input $r(n)$. The polynomial's coefficients are found using an autoregressive analysis of the required compensating response as a function of the control signal $r(n)$.

Any combination of analog and digital electronic circuits is possible in addition to the all analogue and the all digital implementations described with the appropriate conversions between analogue and digital formats. In particular, electronic circuits B, C and D may be implemented digitally with the combiner and electronic circuit A implemented in analog circuitry. Furthermore, the processed internal and processed external signals may be combined while both in a 1-bit format and applied directly to the receiver without electronic circuit A performing any function or with it simply providing the 1-bit drive current for the receiver.

Referring now to **Fig. 8** the simulated closed loop response in a Zwislocki coupler is shown. The scheme yields approximately 16 dB of occlusion reduction at 300 Hz, and 18 dB at 100 Hz. The occlusion reduction response is a measure of the level difference between the sound level in the coupler with the occlusion reduction system active and the sound level in the coupler without any occlusion reduction. Referring to **Fig. 9** occlusion reduction in a real ear is shown. This was calculated by taking the linear average of the energy in 1/12 octave bands recorded using an in-the-ear-canal microphone while a subject talked for 2 minutes. This signal was recorded while the feedback loop gain is maximum, and then again while the loop was open.

Referring now to **Fig. 10**, three responses measured in a Zwislocki coupler are shown. These are the transfer functions from an external signal to the coupler microphone for the compensated 93 and un-compensated responses 92. Also shown is the natural receiver response 94 employing a voltage controlled voltage source to the receiver. Note that the compensated response is not adversely affected by the occlusion

reduction scheme compared to that of the natural receiver response 94. Also similar responses are derived for minimally open vented cavities with the appropriate changes to the mappings, filtering and gain equalisation in electronic circuits A, B, and C.

Referring now to **Fig. 11**, there is shown one form of actual implementation of the present invention as an in-the-canal hearing aid device 100 placed in a user's ear 101 that substantially eliminates the discomfort associated with the occlusion effect. The device 100 includes a sealed or optionally vented 102 earmold that occludes or partially occludes the ear canal. The earmold encapsulates a hearing aid electronic circuit comprising of: a hearing aid processor 103 directly connected to an external microphone 104 and powered by small battery 105. The hearing aid processor includes occlusion reduction electronic circuits A, B, C, D and the combiner. A separate receiver 5 and an internal microphone 7 are also interconnected. These transducer elements are acoustically coupled to the inside of the ear canal with short tubes 108, 109; and protected from ear wax with wax-guarding devices 110, 111.

The forgoing describes preferred embodiments of the present invention. Modifications, obvious to those skilled in the art, can be made thereto without departing from the scope of the invention.

CLAIMS

1. An electro-acoustic system including:

an electro-acoustic circuit including a negative-feedback loop comprising of:

a microphone for generating an internal signal from an acoustical signal located within or closely coupled to an occluded or partially occluded ear;

a second electronic circuit (B) for modifying the internal signal to produce a processed internal signal;

a combiner for combining the processed internal signal with a processed external signal to produce a combined signal;

a first electronic circuit (A) for modifying the combined signal to produce a receiver signal;

and

a receiver for generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear;

a third electronic circuit (C) for modifying an external signal to produce a processed external signal;

a fourth electronic circuit (D) for estimating the level of the receiver signal either directly from the receiver signal or from the combined signal and producing a control signal from this estimate;

wherein the processing performed by the second electronic circuit (B) is controlled by the control signal.

2. A system as claimed in claim 1 wherein the negative-feedback loop includes filtering that alters the open loop response so that the real component of the response is large and negative at frequencies where the occlusion effect is most apparent.

3. A system as claimed in claim 2 wherein the third electronic circuit (C) includes filtering that provides compensation for the closed response of the negative-feedback loop.

4. A system as claimed in claim 3 wherein the filtering provided by the third electronic circuit (C) is adaptive and controlled by the control signal.

5. A system as claimed in any previous claim wherein the fourth electronic circuit (D) estimates the level of the internal signal or the level of the processed internal signal and uses this estimate with the estimate of the receiver signal to produce a control signal.

6. A system as claimed in any previous claim wherein the gain of the second electronic circuit (B) is controlled by the control signal.

7. A system as claimed in any previous claim wherein the ear is occluded or partially occluded by an earmold.

8. A system as claimed in claim 7 wherein the earmold contains a vent.

9. A system as claimed in claim 8 wherein the vent contains an acoustic damper

10. A system as claimed in any previous claim wherein the microphone for generating the internal signal is coupled to the occluded or partially occluded ear by a tube.

11. A system as claimed in any previous claim wherein the receiver is coupled to the occluded or partially occluded ear by a tube.

12. A system as claimed in any previous claim wherein the microphone and the receiver are jointly coupled to the occluded or partially occluded ear by a common tube.

13. A system as claimed in any previous claim wherein at least one of the electronic circuits is digital.

14. A system as claimed in any previous claim wherein at least one of the digital electronic circuits uses a sampling rate at least four times that of the bandwidth of the signal.

15. A system as claimed in claims 13 or claim 14 wherein the first electronic circuit (A) includes a digital to analogue converter.

16. A system as claimed in claim 13, claim 14 or claim 15 wherein the second electronic circuit (B) includes an analogue to digital converter.

17. A system as claimed in claim 16 wherein the second electronic circuit (B) includes a digital to analogue converter.

18. A system as claimed in claim 14 wherein at least one of the input signals to the combiner is a binary signal.

19. An electro-acoustic system including a negative-feedback loop comprising of:

a microphone for generating an internal signal from an acoustical signal located within or closely coupled to an occluded or partially occluded ear;

a second electronic circuit (B) for modifying the internal signal to produce a processed internal signal;

a combiner for combining the processed internal signal with a processed external signal to produce a combined signal;

a first electronic circuit (A) for modifying the combined signal to produce a receiver signal;

and

a receiver for generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear;

a third electronic circuit (C) for modifying an external signal such as from external microphone to produce a processed external signal;

a fourth electronic circuit (D) for estimating the level of the receiver signal and producing a control signal from this estimate;

wherein the control signal controls the processing performed by the second electronic circuit (B) and controls the processing performed by the third electronic circuit (C).

20. An electro-acoustic system including a negative-feedback loop comprising of:

a microphone for generating an internal signal from an acoustical signal located within or closely coupled to an occluded or partially occluded ear;

a second electronic circuit (B) for modifying the internal signal to produce a processed internal signal;

a combiner for combining the processed internal signal with a processed external signal to produce a combined signal;

a first electronic circuit (A) for modifying the combined signal to produce a receiver signal;

and

a receiver for generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear;

a third electronic circuit (C) for modifying an external signal to produce a processed external signal;

a fourth electronic circuit (D) for estimating the level of the receiver signal and producing a control signal from this estimate;

wherein the control signal controls the processing performed by first electronic circuit (A) and controls the processing performed by the third electronic circuit (C).

21. A method of providing a negative feedback loop for an electro-acoustic system, the method including the steps of:

(a) generating an internal signal representing an acoustical signal located within or closely coupled to an occluded or partially occluded ear;

(b) modifying the internal signal to produce a processed internal signal;

(c) combining the processed internal signal with a processed external signal to produce a combined signal;

(d) modifying the combined signal to produce a receiver signal;

(e) generating an acoustical signal from the receiver signal at a location within or closely coupled to the occluded or partially occluded ear;

(f) modifying an external signal to produce a processed external signal;

(g) estimating the level of the receiver signal either directly from the receiver signal or from the combined signal and producing a control signal from this estimate;

wherein the degree of modification in step (b) is controlled by the control signal.

22. A method as claimed in claim 21 wherein the control signal is utilised to control the amount of modification occurring in step (f).

23. A method substantially as herein described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings and/or examples.

24. A system substantially as herein described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings and/or examples.

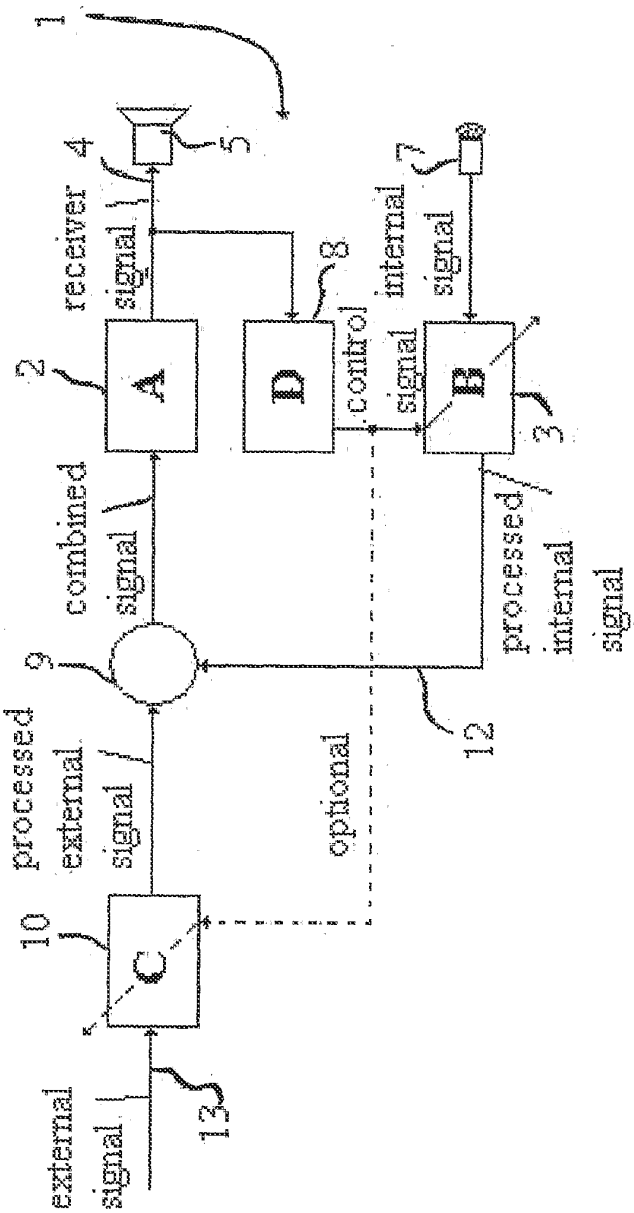

1
receiver
signal
4
5
2
A
combined
signal
9
processed
external
signal
10
C
external
signal
13
optional
D
8
control
signal
internal
signal
7
B
3
processed
internal
signal
12

Fig. 1

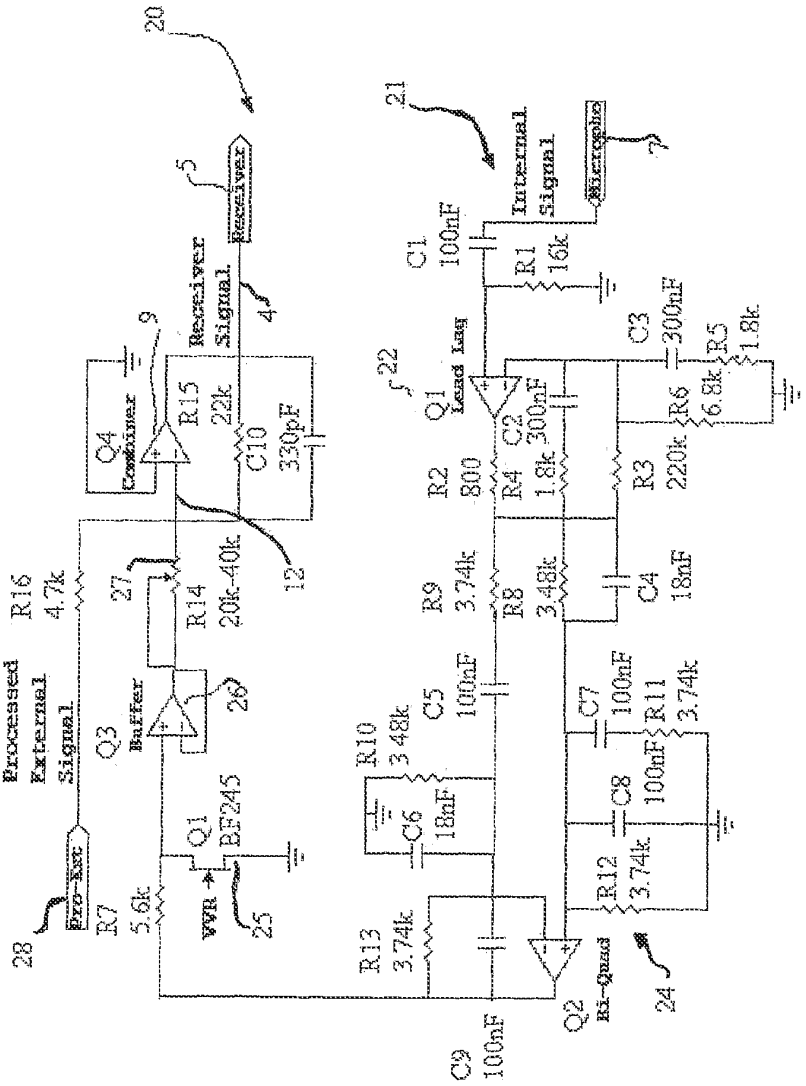

20
21
22
Processed External Signal
Pro-Ext
28
R7 5.6k
Q3 Buffer
Q1 BF245
VVR
25
26
27
R14 20k-40k
12
R16 4.7k
Q4 Combiner
9
R15 22k
C10 330pF
Receiver Signal
4
Receiver
5
C1 100nF
R1 16k
Internal Signal
Interrupts
7
Q1 Lead Lag
C2 300nF
R2 800
R4 1.8k
R3 220k
C3 300nF
R6 6.8k
R5 1.8k
R10 3.48k
C6 18nF
C5 100nF
R9 3.74k
R8 3.48k
C4 18nF
C7 100nF
C8 100nF
R11 3.74k
R12 3.74k
R13 3.74k
C9 100nF
Q2 Bi-Quad
24

Fig. 2

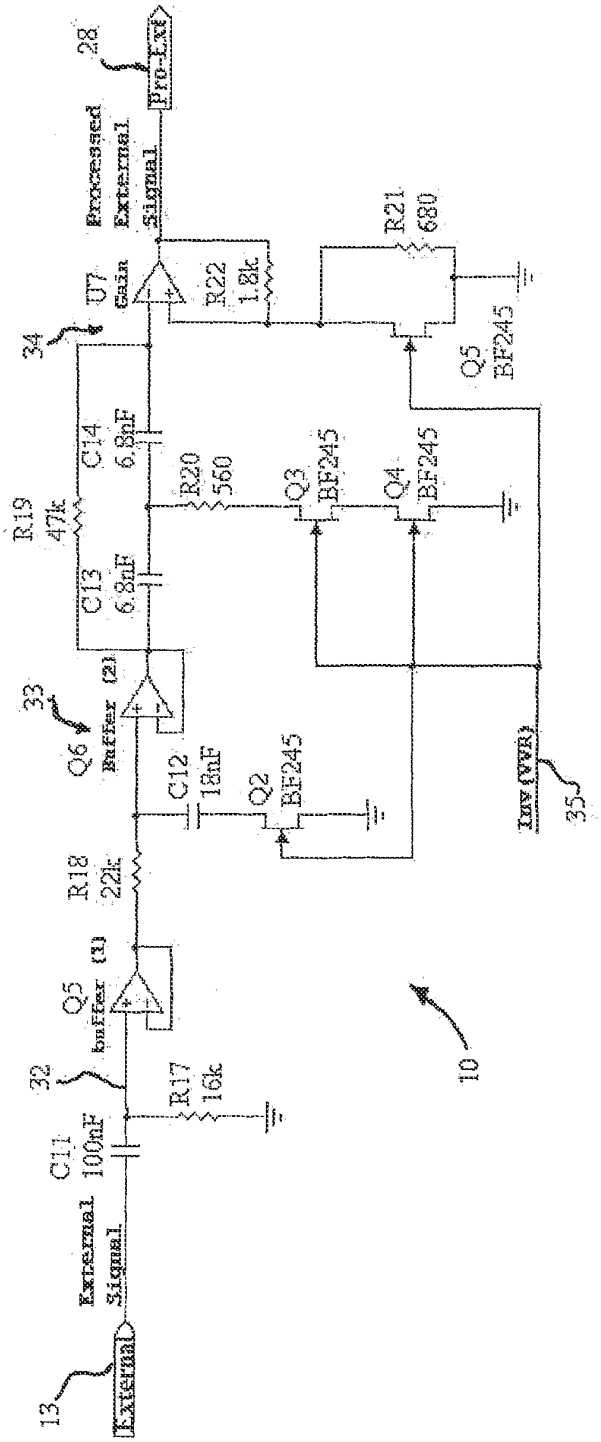

13
External
External Signal
C11 100nF
32
Q5 Buffer (1)
R18 22k
33
Q6 Buffer (2)
C13 6.8nF
R19 47k
C14 6.8nF
34
U7 Gain
R17 16k
C12 18nF
Q2 BF245
R20 560
Q3 BF245
Q4 BF245
R22 1.8k
R21 680
Q5 BF245
Inv (VVR)
35
Processed External Signal
Pre-Ext
28
10

Fig. 3

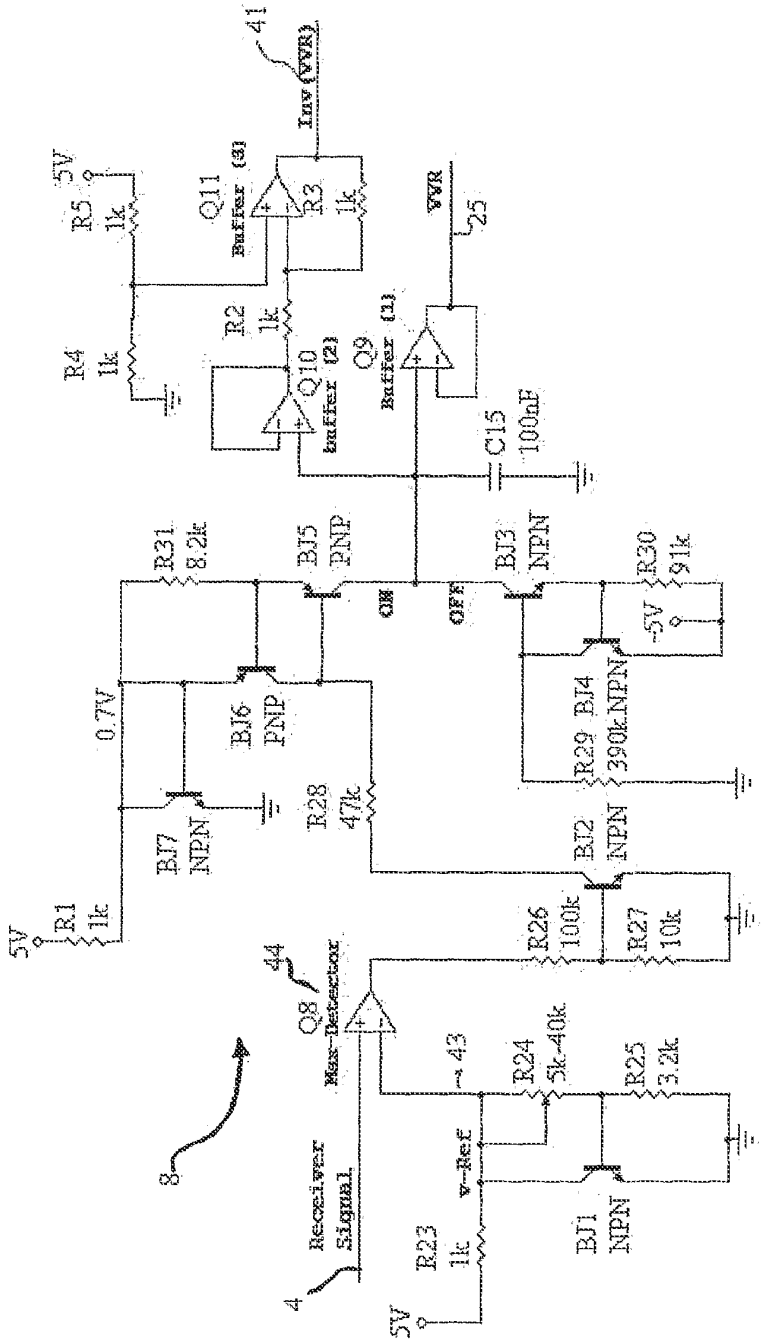

41
Inv (VVR)
5V
R5
1k
Q11
Buffer (3)
R3
1k
VVR
25
R4
1k
R2
1k
Q10
Buffer (2)
Q9
Buffer (1)
C15
100nF
R31
8.2k
BJ5
PNP
BJ3
NPN
R30
91k
ON
OFF
-5V
0.7V
BJ6
PNP
BJ4
NPN
R29
390k
BJ7
NPN
R28
47k
BJ2
NPN
5V
R1
1k
R26
100k
R27
10k
44
Q8
Max-Detector
43
R24
5k-40k
R25
3.2k
8
V-Ref
Receiver
Signal
4
R23
1k
5V
BJ1
NPN

Fig. 4

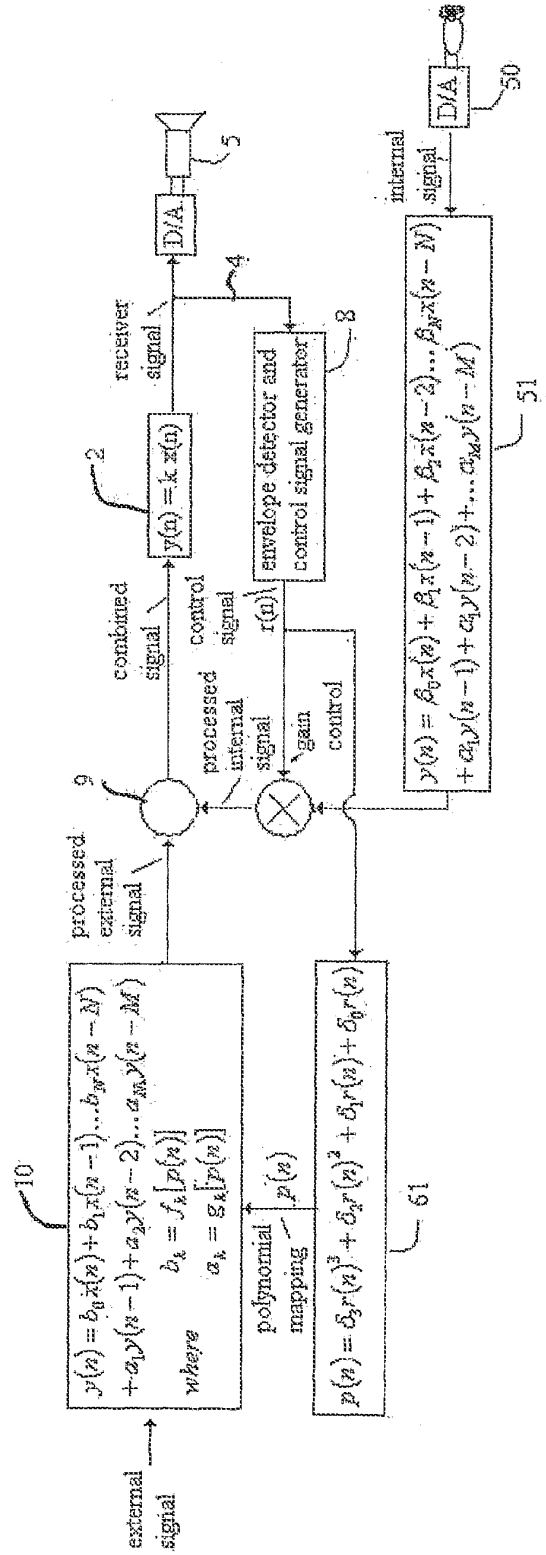

external signal
$y(n) = b_0x(n) + b_1x(n-1)...b_Nx(n-N)$
$+a_1y(n-1) + a_2y(n-2)...a_My(n-M)$
where $b_k = f_k[p(n)]$ $a_k = g_k[p(n)]$
10
polynomial mapping
$p(n)$
$p(n) = \delta_3r(n)^3 + \delta_2r(n)^2 + \delta_1r(n) + \delta_0r(n)$
61
processed external signal
9
processed internal signal
gain control
combined signal
control signal
r(n)
envelope detector and control signal generator
8
2
$y(n) = k \cdot x(n)$
receiver signal
4
D/A
5
$y(n) = \beta_0x(n) + \beta_1x(n-1) + \beta_2x(n-2)...\beta_Nx(n-N)$
$+\alpha_1y(n-1) + \alpha_2y(n-2)+...\alpha_My(n-M)$
51
internal signal
D/A
50

Fig. 5

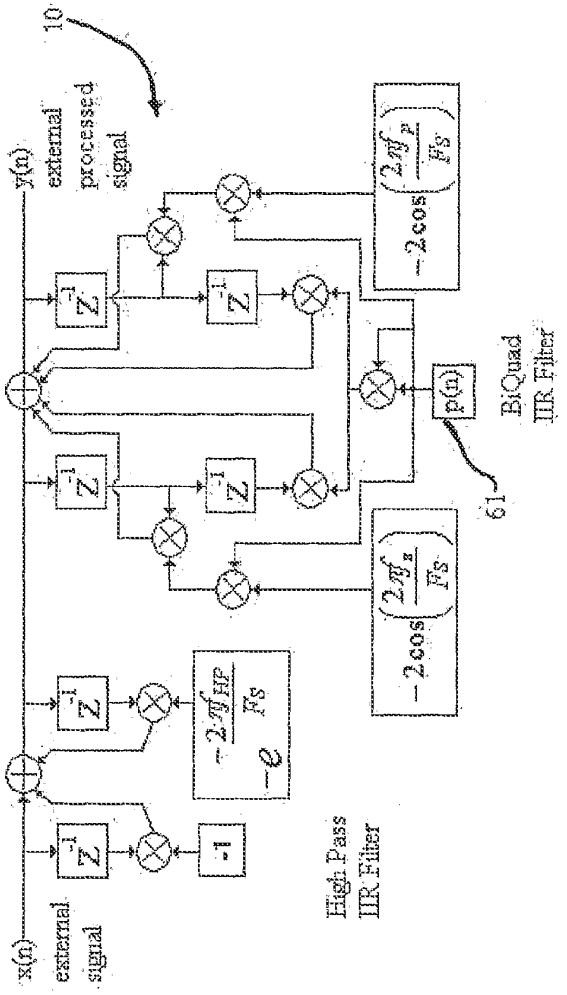

10
y(n)
external
processed
signal
x(n)
external
signal
High Pass
IIR Filter
BiQuad
IIR Filter
p(n)
61

Fig. 6

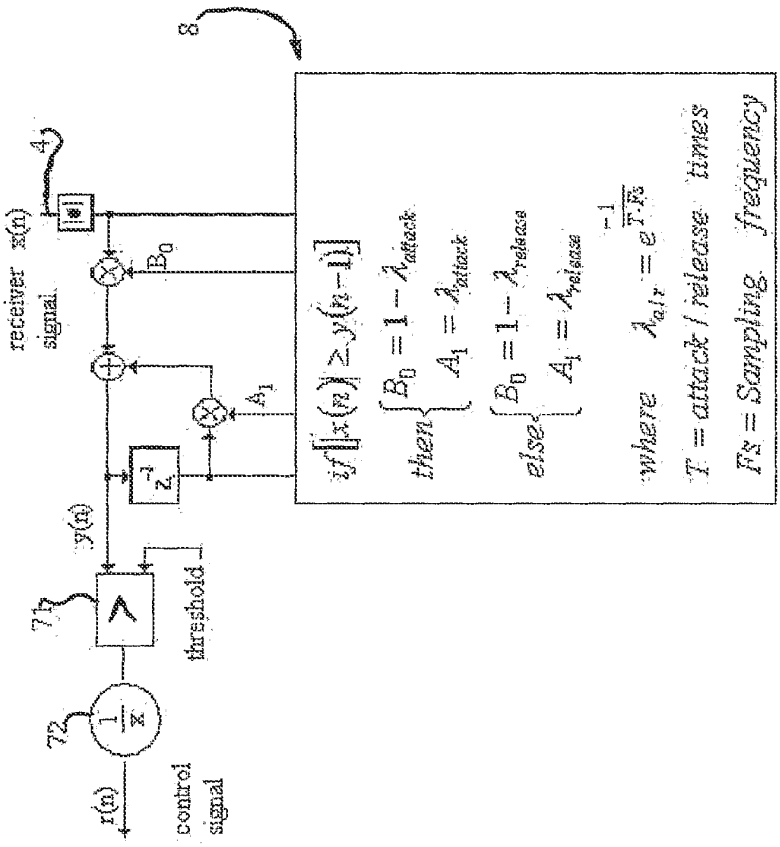

8
4
receiver signal
x(n)
B_0
A_1
z^{-1}
y(n)
71
threshold
72
$\frac{1}{x}$
r(n)
control signal
$if\left[|x(n)| \geq y(n-1)\right]$
$then\begin{cases} B_0 = 1-\lambda_{attack} \\ A_1 = \lambda_{attack} \end{cases}$
$else\begin{cases} B_0 = 1-\lambda_{release} \\ A_1 = \lambda_{release} \end{cases}$
$where \quad \lambda_{a/r} = e^{\frac{-1}{T \cdot Fs}}$
$T = attack\ /\ release\ \ times$
$Fs = Sampling\ \ frequency$

Fig. 7

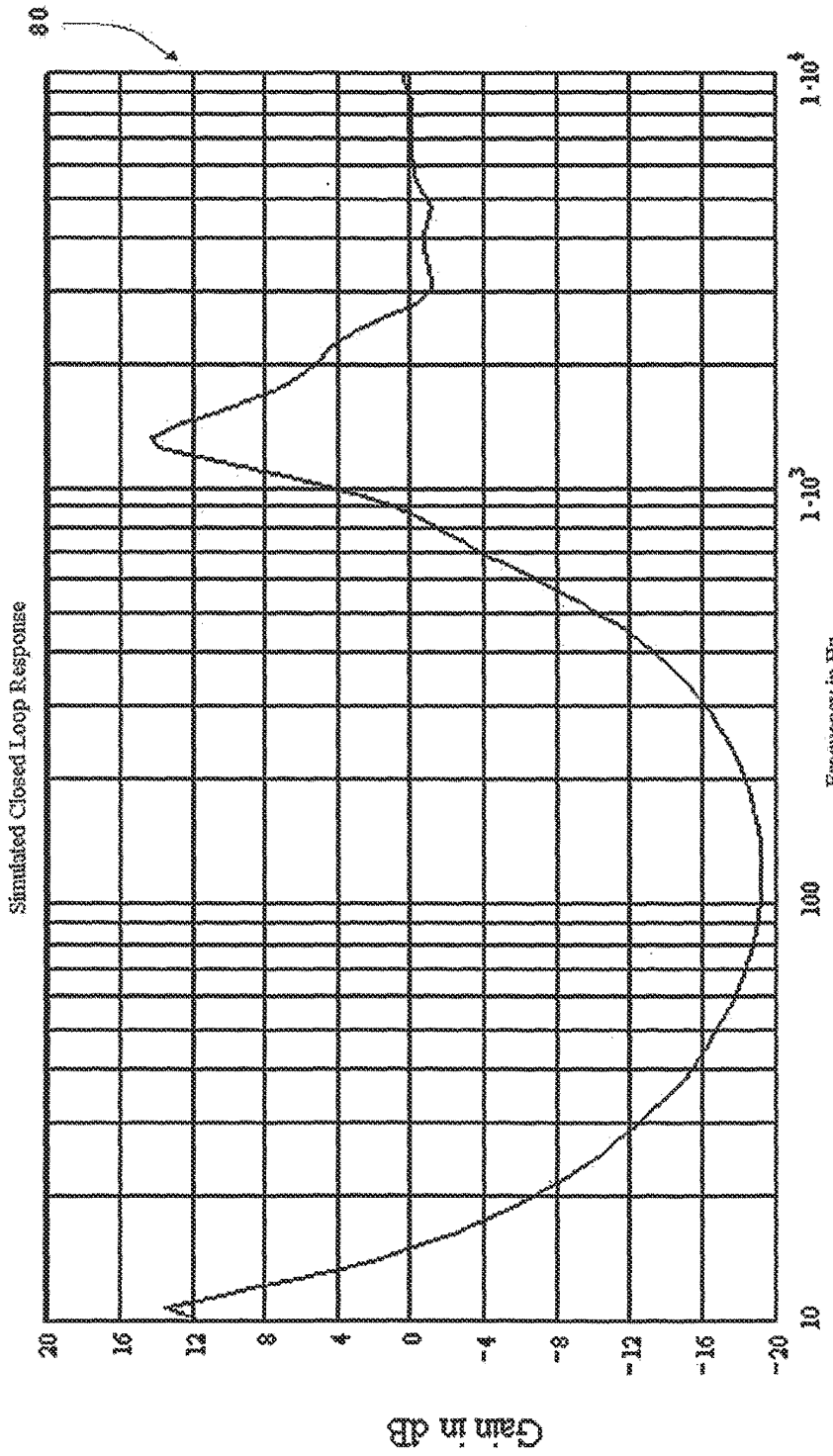

80
Simulated Closed Loop Response
Gain in dB
20
16
12
8
4
0
-4
-8
-12
-16
-20
10
100
1·10³
1·10⁴
Frequency in Hz

Fig. 8

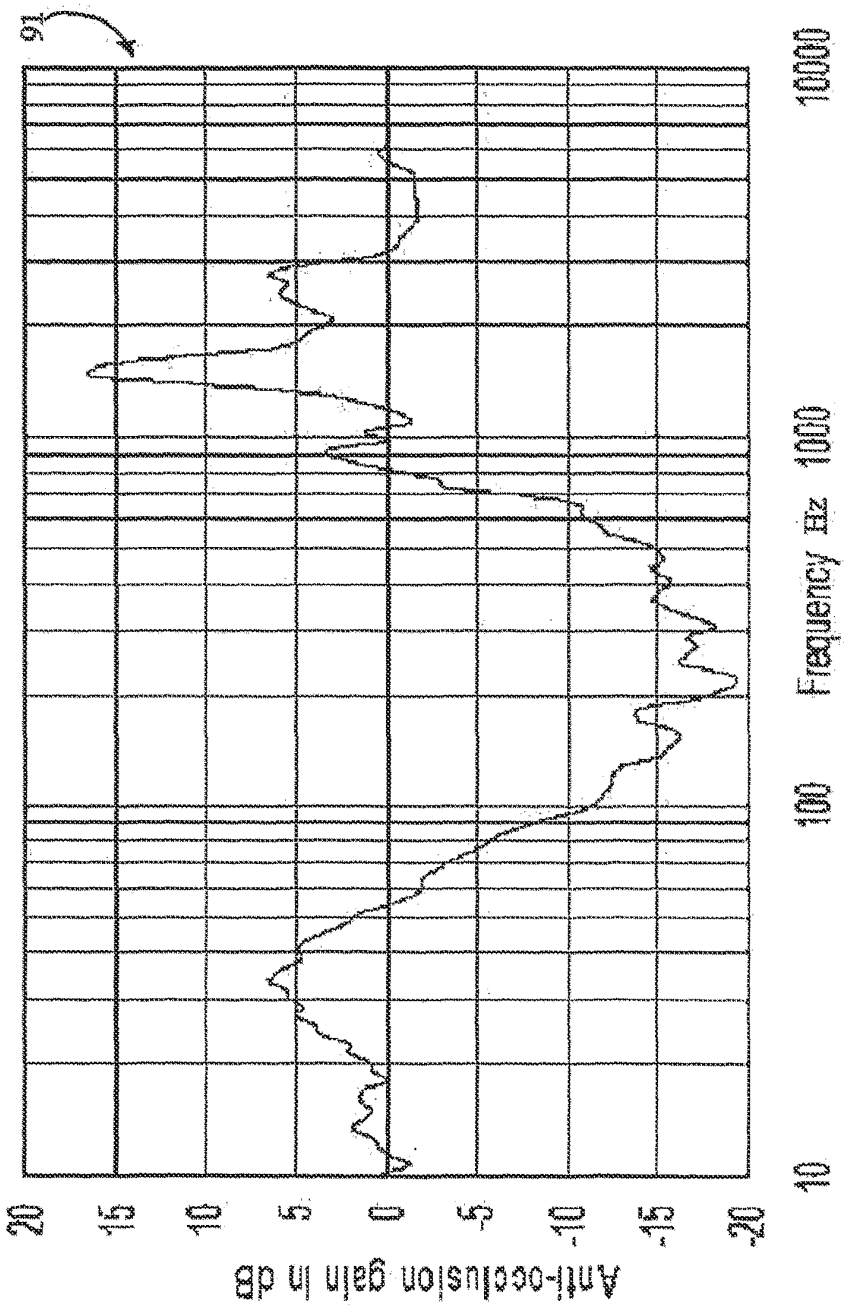

91
Anti-occlusion gain in dB
20
15
10
5
0
5
10
15
20
10
100
1000
10000
Frequency Hz

Fig. 9

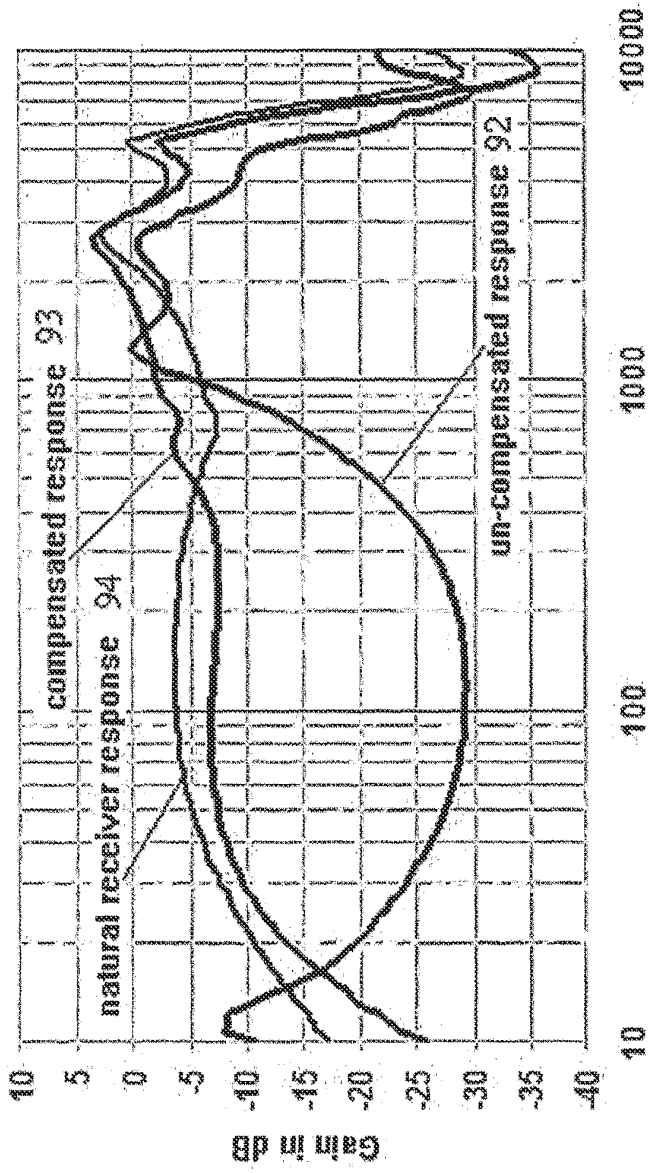

Gain in dB
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
10
100
1000
10000
Frequency Hz
compensated response 93
natural receiver response 94
un-compensated response 92

Fig. 10

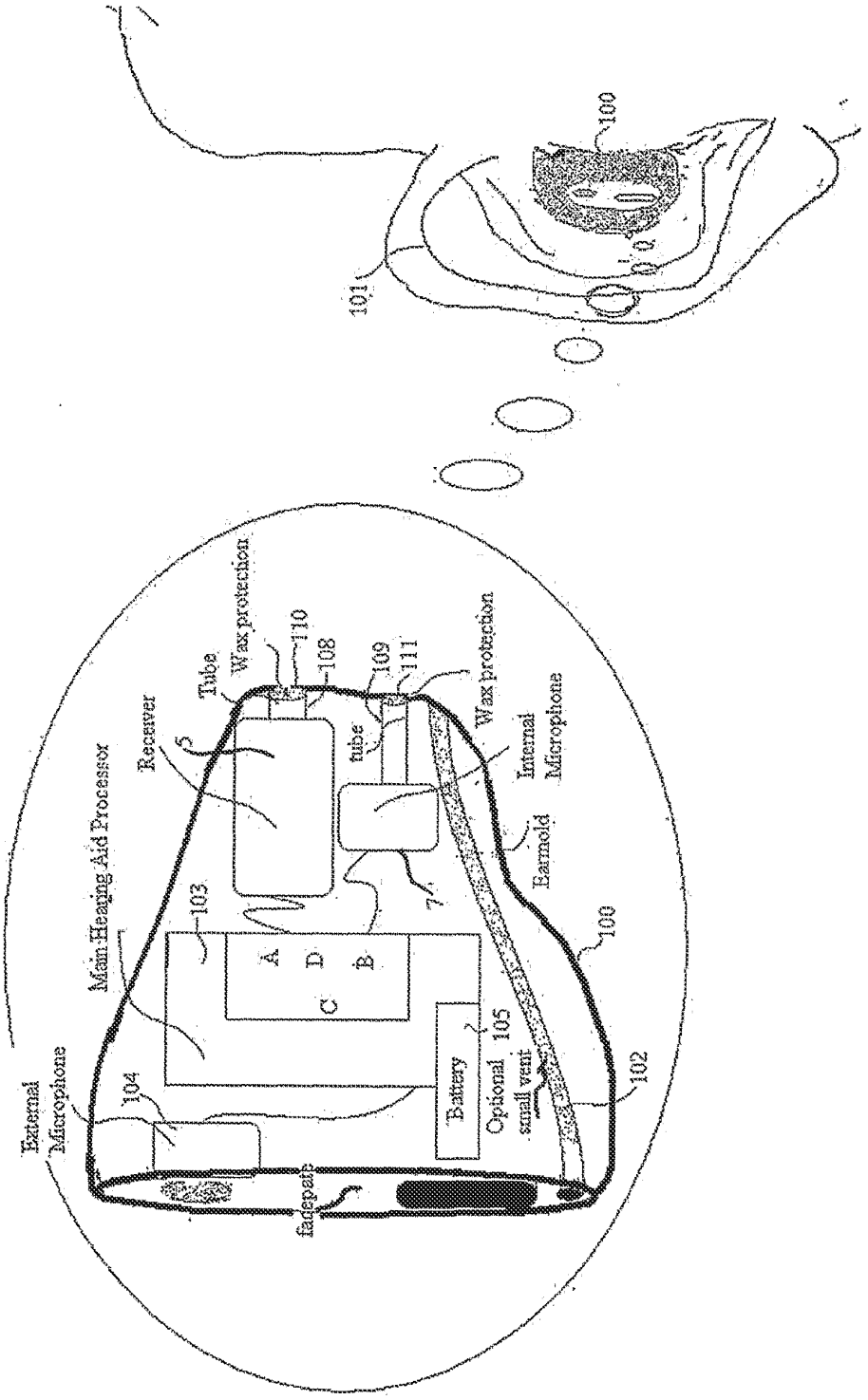

100
101
Wax protection
Tube
110
108
109
111
Wax protection
Receiver
tube
Internal Microphone
Barmold
Main Hearing Aid Processor
103
A
D
B
C
100
External Microphone
104
Battery
105
Optional small vent
102
faceplate

Fig. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001506

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: H04R 29/00; A61B 5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT: hearing aid, occlusion, gain, frequency range, sound level, signal strength and similar terms.
USPTO: hearing aid, occlusion, reduce

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6687377 B2 (VOIX et al.) 3 February 2004 Col. 3 line 33-Col. 6 line 22	1-24
A	WO 2002/085063 A2 (WIDEX A/S et al.) 24 October 2002 Page 4 line 14-Page 10 line 32	1-24
A	US 6766031 B1 (WESTERMANN) 20 July 2004 Col. 2 line 18-Col. 5 line 28	1-24
A	CA 2381516 A1 (GENNUM CORPORATION, CA) 12 October 2002 Page 1 line 20-Page 18 line 2	1-24

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 November 2005	9 NOV 2005

Name and mailing address of the ISA/AU	Authorized officer
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INTERNATIONAL SEARCH REPORT

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5195139 A (GAUTHIER) 16 March 1993 Col. 1 line 39-Col. 3 line 22	1-24

INTERNATIONAL SEARCH REPORT

International application No.
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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	6687377	AU	20394/02	CA	2477010	CN	1483298
		EP	1356255	US	2002076057	WO	0250499
		ZA	200305523				
WO	2002/085063	CA	2442538	EP	1250027	US	2002150269
US	6766031	AU	69189/98	CA	2286037	DK	42297
		EP	0980641	WO	9847318		
CA	2381516	N/A					
US	5195139	AU	20280/92	EP	0584259	WO	9221218

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

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(54) **External ear canal voice detection**

Sprachdetektion im Gehörgang

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Description

[0001] This document generally relates to ear-level communication systems and particularly, but not by way of limitation, to such systems communicating with remote devices via full duplex audio.

[0002] Ear-level communication systems are used for hearing impaired individuals to use a communication device such as a cellular phone or other devices transmitting audio signals. They also allow private, hand-free use of such a communication device by individuals with normal hearing.

[0003] An ear-level communication system generally includes tethered or wireless headsets with a microphone boom or a microphone within a cord of the headset to detect voice of the person wearing the headsets. An alternative way to detect voice is via bone connection. Examples include a "clam" shell device that couples to the helix and a custom carmold with a vibration detector on the outer shell. Voice is picked up by detecting bone vibration caused by, and representative of, the voice of the person wearing the device.

[0004] Bi-directional communication has been achieved by a simplex system including a device in the ear canal that both transmits sound to and picks up sound within the ear canal. The device is tethered to a push-to-talk (PIT) system such as a walkie talkie. It is not full duplex and therefore requires interaction by the user in order to switch from listen mode to talk mode.

[0005] Voice operated exchange (VOX) is used to conserve energy when voice is not being detected or transmitted. For example, a headset system includes two ear pieces - for full duplex communication with one earpiece for transmitting and the other for receiving voice - and uses ear canal voice detection to trigger a VOX circuit in a control unit wired to the headset. The system requires a headset with two headphones and wires connecting the headphone to a control unit such as a device clipped on belt. In another example, a full duplex system includes a single headphone to transmit and receiving voice, again with a VOX circuit in a control unit wired to the headphone.

[0006] Such ear-level communication systems are likely to be worn by a person for long periods of time. Users with hearing loss may use such a system on a regular basis, both as a conventional hearing aid allowing communication directly with a person and as a hearing aid allowing communicating through another device. Users with normal hearing may wear such a system to be communicatively connected to another person or facility without the need to hold a device at any time. For appearance or secrecy reasons, minimal visibility is generally desirable. Wired connection between a headset or earpiece and a controller makes the system easily visible and is cumbersome to users who need to communicate while being physically active.

[0007] Thus, there is a need for an ear-level communication system that is not easily visible. A need related to miniaturization is the longevity of the system between battery replacements or recharges.

[0008] WO 98/45937A discloses a communications apparatus comprising ear units, a control unit and a radio transceiver.

[0009] Ear level full duplex audio communication systems each include one or two ear attachments devices, such as in-the-ear (ITE) or behind-the-ear (BTE) devices, that wirelessly communicates to a remote device. Such a system allows a hearing impaired individual to communicate with or through the remote device, such as to talk to another person through a cellular phone. Such a system also functions as an ear piece wirelessly extended from the remote device that allows an individual to privately communicate with or through the remote device without the need of holding the device.

[0010] WO 03/073790A discloses a system adapted for use in at least one of a first ear having a first ear canal and a second ear having a second ear canal comprising: a first ear-level device configured to be one of an in-the-ear device and a behind-the-ear device, the first ear-level device including: a first microphone adapted for use in one of the first ear canal and the second ear canal, and adapted to receive an occluded sound within the one of the first ear canal and the second ear canal; and a wireless receiver, connected to a first processor, to receive a first wireless signal representing a remote sound; wherein the first processor, is connected to the first microphone, and is adapted to process the occluded sound and the remote sound; the first ear level device further including a speaker adapted for use in the one of the first ear canal and the second ear canal and adapted to transmit the processed remote sound to the one of the first ear canal and the second ear canal; a wireless transmitter, connected to the first processor; a first earmold housing at least the first microphone and the speaker, at least a portion of the first earmold configured for placement in the one of the first ear canal and the second ear canal; and a voice operated exchange (VOX) circuit connected to the first processor.

[0011] In the present invention, the wireless transmitter is adapted to receive the processed occluded sound from the first processor and transmit a second wireless signal representing the occluded sound; and the VOX circuit includes an occluded sound gating module adapted to gate the occluded sound on, and to gate the remote sound off, when the occluded sound is detected while the remote sound is not detected, and a remote sound gating module adapted to gate the remote sound on, and to gate the occluded sound off, when the incoming remote sound is detected while the occluded sound is not detected.

[0012] In a preferred embodiment, a system includes an ITE module and a BTE module attached to the ITE module. The ITE module includes a microphone for use in an ear canal. The microphone receives an occluded sound from within the ear canal. The BTE module includes a processor and a wireless transmitter. The processor processes the occluded sound. The wireless trans-

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mitter receives the processed occluded sound from the processor and transmits a wireless signal representing the occluded sound.

[0013] In a preferred embodiment, a system includes a first ear-level device and a second ear-level device for use in two opposite ears. The first ear-level device includes a microphone, a first processor, and a wireless transmitter. The microphone is for use in one ear canal to receive an occluded sound from within that ear canal. The first processor converts the occluded sound to an electrical signal. The wireless transmitter receives the electrical signal and transmits an outgoing wireless signal representing the occluded sound. The second ear-level device includes a wireless receiver, a second processor, and a speaker. The wireless receiver receives an incoming wireless signal representing a remote sound. The second processor converts the incoming wireless signal to the remote sound. The speaker is for use in the opposite ear canal to transmit the remote sound to that ear canal.

[0014] The present invention also relates to a method comprising: detecting an occluded sound using a first microphone adapted for use in an ear canal; detecting an incoming radio signal representing a remote sound from a remote device; starting a voice operated exchange (VOX) housed within an ear-level communication device when at least one of the occluded sound and the incoming radio signal is detected if the VOX is not already on, the ear-level communication device being one of an in-the-ear (ITE) device and a behind-the-ear (BTE) device; gating the occluded sound on, and gating the remote sound off, when the occluded sound is detected while the incoming radio signal is not detected; and gating the remote sound on, and gating the occluded sound off, when the incoming radio signal is detected while the occluded sound is not detected.

[0015] Preferred embodiments of the present invention will now be described by way of example only and with reference to the accompanying drawings, in which:

FIG. 1 is an illustration of an embodiment of an ear-level communication system and potions of an environment in which it is used. This ear-level communication system uses a single ear-level device.

FIG. 2 is an illustration of an embodiment of another ear-level communication system and portions of an environment in which it is used. This ear-level communication system uses a pair of ear-level devices.

FIG. 3A is an illustration of one exemplary exterior configuration of an in-the-ear (ITE) device used as the single ear-level device of FIG 1 or one of the pair of ear-level devices of FIG. 2.

FIG. 3B is an illustration of one exemplary exterior configuration of an in-the-canal (ITC) device used as the single ear-level device in FIG. 1 or one of the pair of ear-level devices of FIG. 2.

FIG. 3C is an illustration of one exemplary exterior configuration of a completely-in-the-canal (CIC) device used as the single-ear-level device of FIG. 1 or one of the pair of ear-level devices of FIG. 2.

FIG. 4A is a block diagram showing one embodiment of the circuit of ear-level device shown in FIGS. 3A, 3B, or 3C used as the single ear-level device of FIG. 1.

FIG. 4B is a block diagram showing one embodiment of portions of a voice operated exchange (VOX) circuit included in the single car-level device of FIG. 1.

FIG. 5 is a block diagram showing another embodiment of the circuit of ear-level device shown in FIGS. 3A, 3B, or 3C used as the pair of ear-level devices of FIG. 1B.

FIG. 6 is an illustration of one exemplary exterior configuration of an ear-level device including a behind-the-ear (BTE) device used as the single ear-level device of FIG. 1 or one of the pair of ear-level devices of FIG. 2.

FIG. 7 is a block diagram showing one embodiment of the circuit of the ear-level device shown in FIG. 6 used as the single ear-level device of FIG. 1.

FIG. 8 is a block diagram showing another embodiment of the circuit of ear-level device shown in FIG. 6 used as the pair of ear-level devices of FIG. 2.

FIG. 9 is a flow chart illustrating an embodiment of a method for audio communication between the single ear-level device or the pair of ear-level devices and a remote device.

FIG. 10 is a flow chart illustrating another embodiment of the method for audio communication between the single ear-level device and a remote device.

[0016] The following embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that the embodiments may be combined, or that other embodiments may be utilized and that structural, logical and electrical changes may be made without departing from the scope of the present invention, as defined by the appended claims.

[0017] It should be noted that references to "an", "one", or "various" embodiments in this disclosure are not necessarily to the same embodiment, and such references contemplate more than one embodiment.

[0018] This document discusses, among other things, ear-level full duplex audio communication systems for communicating with remote devices. These systems each include one or two ear-level devices each worn in or about an ear, such as in-the-ear (ITE) or behind-the-ear (BTE) devices, wirelessly coupled to a remote device such as a computer, a personal digital assistant (PDA), a cellular phone, a walkie talkie, or a language translator. When used as a hearing aid, such a system allows a hearing impaired individual to communicate with or through the remote device, such as to talk to another person through a cellular phone. When being used as an ear piece wirelessly extended from the remote device,

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such system allows an individual with normal hearing to privately communicate with or through the remote device without the need of holding the device or wearing any device wired to the remote device.

[0019] In this document, "voice" includes to the sound of speech made by a person, and sound generally includes an audible signal that includes voice and other signals that can be heard and/or detected by an audio detector. Unless particularly indicated, for example, when voice is distinguished from sound by speech recognition, "voice" and "sound" are used interchangeably throughout thus document because they are not practically separated. For example, detection of a sound refers to the same action as detection of a voice because, while the purpose is to detect the voice, other sounds are picked up as well.

[0020] FIG. 1 is an illustration of an embodiment of an ear-level communication system 100 and portions of an environment in which it is used. System 100 includes an ear-level device 110 attached to an ear 101A. Bar-level device 110 communicates with a remote device 190 through a wireless telemetry link 195. The other ear 101B is free of device attachment. Ear-level device 110 is a self-contained device including its own power source such as a replaceable or rechargeable battery. To maximize battery life or period between recharges, at least a portion of the circuit of ear-level device 110 is voice activated. That is, ear-level device 110 is activated only when it detects a need to transmit or receive a sound.

[0021] Ear-level device 110 is a full duplex audio device that allows two-way simultaneous conversation between ear 101A and remote device 190. In one embodiment, when being worn by a person having ear 101A, ear-level device 110 picks up sound from the ear canal of ear 101A and delivers sound to the same ear canal. It detects the occluded sound from the ear canal when the person speaks and transmits to the same ear canal a sound received from remote device 190 and/or a sound picked up from the environment surrounding the person. In one embodiment, as illustrated in FIG. 1, ear-level device 110 is configured for right ear attachment. In an alternative embodiment, ear-level device 110 is configured for left ear attachment.

[0022] FIG. 2 is an illustration of an embodiment of an ear-level communication system 200 and portions of an environment in which it is used. System 200 includes a pair of ear-level devices 210A, attached to an ear 101 A, and 210B, attached to ear 101B. Ear-level devices 210A and 210B communicate with a remote device 290 through a wireless telemetry link 295. Ear-level devices 210A and 210B are each a self-contained device including its own power source such as a replaceable or rechargeable battery. To maximize battery life or period between recharges, at least a portion of the circuit of each of ear-level devices 210A and 210B is voice activated. That is, ear-level devices 210A and 210B are each activated only when a need to transmit or receive a sound is detected by the device itself.

[0023] In one embodiment, ear-level device 210A is an audio transmitter that picks up sound from the ear canal of ear 101A, and ear-level device 210B is an audio receiver that delivers sound to the same ear canal. Ear-level device 210A is activated when it detects a sound from the ear canal. Ear-level device 210B is activated when it detects a signal from remote device 290. When both are being worn by a person, ear-level devices 210A and 210B supports full duplex audio allowing two-way simultaneous conversation between the person and remote device 290. In one embodiment, as illustrated in FIG. 2, ear-level device 210A is configured for right ear attachment, and ear-level device 210B is configured for left ear attachment. In an alternative embodiment, ear-level device 210A is configured for left ear attachment, and ear-level device 210B is configured for right ear attachment.

[0024] FIGS. 3A, 3B, and 3C are illustrations of exemplary exterior configuration of ear-level device 110 or one of ear-level devices 210A and 210B. For the purpose of this document, only a device attached to a right ear is shown for each exemplary exterior configuration. It is to be understood that each of ear-level devices 110, 210A, and 210B can be either a device configured for right ear attachment or a device configured for left ear attachment. Generally, a device configured for right car attachment has an exterior configuration that is substantially symmetrical to that of a device of the same type configured for left ear attachment. In system 100, a single ear-level device 110 is a device configured either for right ear attachment or for left ear attachment. In system 200, either one of car-level device 210A and 210B is a device configured for right ear attachment, while the other is a device configured for left ear attachment.

[0025] An occluded sound 305, an ambient sound 306, and a remote sound 307 are illustrated in each of FIGS. 3A, 3B, and 3C. Remote sound 307 is represented by a wireless radio signal transmitted to ear-level device 110. In this document, "occluded sound" includes occluded sound 305, "ambient sound" includes ambient sound 306, and "remote sound" includes remote sound 307.

[0026] FIG. 3A is an illustration of an exemplary exterior configuration of an in-the-ear (ITE) device 310A used as ear-level device 110 or one of ear-level devices 210A and 210B. As shown in FIG. 3A, ITE device 310A is attached to an ear 101 with a pinna 302 and an ear canal 303. ITE device 310A includes a portion inserted into ear canal 303 and another portion fit into the cavity formed by pinna 302.

[0027] FIG. 3B is an illustration of an exemplary exterior configuration of an in-the-canal (ITC) device 310B used as ear-level device 110 or one of ear-level devices 210A and 210B. As shown in FIG. 3B, ITC device 310B is attached to ear 101 with pinna 302 and ear canal 303. ITC device 310B is a form of ITE device that also includes a portion inserted in ear canal 303 and another portion fit into the cavity formed by pinna 302, but the latter portion is smaller than that of ITE device 310A. Its overall

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size is therefore generally smaller than that of ITE deviee 310A.

[0028] FIG. 3C is an illustration of an exemplary exterior configuration of a completely-in-the-canal (CIC) device 310C used as ear-level device 110 or one of ear-level devices 210A and 210B. As shown in FIG. 3C, CIC device 310C is attached to ear 101 with pinna 302 and ear canal 303. CIC device 310C is a form of ITC device but includes only a portion that is completed inserted into ear canal 303. Its overall size is therefore generally smaller than that of ITC device 310B.

[0029] In one embodiment, each of ITE device 310A, ITC device 310B, and CIC device 310C includes a custom earmold. In another embodiment, each of ITE device 310A, ITC device 310B, and CIC device 310C includes a modular earmold. In one embodiment, the earmold is fully occluded to maximize audio efficiency. In another embodiment, the earmold is vented to remove undesirable low frequency sound.

[0030] The choice of a device type, such as from the types shown in FIGS. 3A, 3B, and 3C, depends on the need of individual users. For example, ITE device 310A has a relatively large size to accommodate a relatively large amplifier to serve the need of individuals suffering severe hearing loss. The relatively large size can also be utilized to house a relatively large size battery. On the other hand, CIC device 310C is almost invisible, while the room for the circuit and the battery is very limited. Generally, the selection of the device type is a compromise among considerations such as the user's degree of hearing loss (if applicable), ear canal size, desire of invisibility, desired longevity between battery replacements or recharges, and cost.

[0031] FIG. 4A is a block diagram showing one embodiment of the circuit of ear-level device shown in FIGS. 3A, 3B, or 3C used as the single ear-level device 110. The circuit is housed in an earmold configured for use as one of the device types illustrated as ear-level devices 310A, 310B, or 310C.

[0032] Ear-level device 110 includes an external microphone 420, an ear canal microphone 440, an car canal speaker 470, a processor 460, a wireless transceiver 450, an antenna 455, a voice operated exchange (VOX) circuit 430, and a battery 480. External microphone 420 picks up ambient sound such that a hearing impaired person wearing ear-level device 110 is not "isolated" when communicating to remote device 190. Thus, ear-level device enables the hearing impaired person to talk to another person either directly (if the other person is nearby) or through a device such as a cell phone. Ear canal microphone 440 detects sound from the ear canal. The sound includes primarily speech of the person wearing ear-level device 110. Ear canal speaker 470 transmits sound received from remote device 190 and/or external microphone 420 to the same ear canal. In one embodiment, ear canal microphone 440 and ear canal speaker 470 are implemented as one physical device. Processor 460 converts the sound picked up from the ear canal to an electrical signal to be transmitted to remote device 190, and converts the signals received from remote device 190 and/or external microphone 420 to a sound audible to the person wearing ear-level device 110. In one embodiment, processor 460 includes one or more of amplification circuitry, filtering circuitry, acoustic feedback reduction circuitry, noise reduction circuitry, and tone control circuitry, among other circuits performing signal processing functions as known in the art In one embodiment, processor 460 includes a speech recognition module to enhance the audio signal received by and/or transmitted from ear-level device 110. Wireless transceiver 450 and antenna 455 form a telemetry interface supporting telemetry link 195 between ear-level device 110 and remote device 190. Wireless transceiver 450 includes a wireless transmitter and a wireless receiver. The wireless transmitter receives the electrical signal representing the sound picked up from the ear canal from processor 460 and transmits an outgoing wireless signal representing the same sound to remote device 190. The wireless receiver receives an incoming wireless signal representing a remote sound from remote device 190 and transmits an electrical signal representing the remote sound to processor 460. Telemetry link 195 provides for bi-directional communication allowing simultaneous signal transmission, in both directions, between ear-level device 110 and remote device 190. VOX circuit 430 activates a major portion of ear-level device 110 only when sound is detected by at least one of external microphone 420, ear canal microphone 440, end wireless transceiver 450. In one embodiment, VOX circuit 430 includes a voice-controlled switch connecting between battery 480 and the portions of ear-level device 110 that are voice activated. The switch is driven by the sound detected by at least one of external microphone 420, ear canal microphone 440, and wireless transceiver 450. It is turned on when sound detected by external microphone 420 exceeds a predetermined threshold, when sound detected by ear canal microphone 440 exceeds another predetermined threshold, and/or when wireless transceiver 450 receives the incoming wireless signal representing the remote sound. In one embodiment, as discussed with respect to FIG. 4B below, VOX circuit 430 gates or attenuates one or more sounds detected by external microphone 420, ear canal microphone 440, and wireless transceiver 450, to eliminate or reduce echo and ringing caused by the loop formed by ear canal speaker 470 and ear canal microphone 440. Battery 480 supplies the power needed for the operation of ear-level device 110. In one embodiment, battery 480 is a rechargeable battery that can be recharged without being taken out from ear-level device 110.

[0033] FIG. 4B is a block diagram showing one embodiment of portions of VOX circuit 430. In this embodiment, VOX circuit 430 includes an ambient sound gating module 421 that blanks or attenuates the sound detected by external microphone 420, an occluded sound gating module 441 that blanks or attenuates the sound detected

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by ear canal microphone 440, a remote sound gating module 451 that blanks or attenuates the sound detected by wireless transceiver 450, and controller 431 to coordinate the states of the gating modules. Because ear canal microphone 440 is capable of detecting the sound delivered to the ear canal from ear canal speaker 470, there is a need to avoid echo and/or ringing. For example, a remote sound from remote device 190 delivered to the ear canal may be detected as an occluded sound and transmitted back to remote device 190, causing echo. The gating modules function in a coordinated manner to eliminate or reduce such echo and/or ringing caused by breaking, or applying resistance into, the audio loop formed by ear canal speaker 470 and ear canal microphone 440.

[0034] For the purpose of description, each of the gating modules is "on" when sound is "gated on" and "off' when the sound is "gated off" A sound is "gated on" when it is allowed to pass and be processed, and is "gated off' when it is blanked or substantially attenuated. Blanking refers to a substantially complete blockage of a sound, or in other words, that a detected sound is practically ignored by processor 460 such that it does not cause any echo or ringing that is audible by an ear. Substantial attenuation refers to an attenuation after which the attenuated sound does not cause any echo or tinging having an intolerable intensity.

[0035] Ambient sound gating module 421 includes a voice-driven switch or attenuator driven by the output of a comparator that compares the amplitude of a detected ambient sound with a predetermined threshold for the ambient sound. When the amplitude of the detected ambient sound exceeds the threshold for the ambient sound, and when controller 431 permits, ambient sound gating module 421 is turned on. When the amplitude of the detected ambient sound drops below the threshold for the ambient sound, ambient sound gating module 421 is turned off. In one embodiment, after the amplitude of the detected ambient sound drops below the threshold for the ambient sound, ambient sound gating module 421 is turned off after a predetermined delay.

[0036] Occluded sound gating module 441 includes a voice-driven switch or attenuator driven by the output of a comparator that compares the amplitude of a detected occluded sound with a predetermined threshold for the occluded sound. When the amplitude of the detected occluded sound exceeds the threshold for the occluded sound, and when controller 431 permits, occluded sound gating module 441 is turned on. When the amplitude of the detected occluded sound drops below the threshold for the occluded sound, occluded sound gating module 441 is turned off. In one embodiment, after the amplitude of the detected occluded sound drops below the threshold for the occluded sound, occluded sound gating module 441 is turned off after a predetermined delay.

[0037] In one embodiment, remote sound gating module 451 includes a voice-driven switch or attenuator driven by the output of a comparator that compares the amplitude of a remote sound with a predetermined threshold for the remote sound. When the amplitude of the detected remote sound exceeds the threshold for the remote sound, and when controller 431 permits, remote sound gating module 451 is turned on. When the amplitude of the detected remote sound drops below the threshold for the remote sound, remote sound gating module 451 is turned off. In one embodiment, after the amplitude of the detected remote sound drops below the threshold for the remote sound, remote sound gating module 451 is turned off after a predetermined delay.

[0038] In another embodiment, remote sound gating module 451 includes a switch or attenuator driven by the detection of the incoming wireless signal representing the remote sound. Remote sound gating module 451 is turned on upon detection of the incoming wireless signal when controller 431 permits, and turned off when the incoming wireless signal is no longer detected. In one embodiment, remote sound gating module 451 is turned off after the incoming wireless signal is absent for a predetermined period.

[0039] Controller 431 coordinates the on/off states of all the gating modules so the sounds are processed in an orderly fashion. Even if a sound is detected, the gating module corresponding to that sound is turned on only when controller 431 permits. In one embodiment, assuming that sounds A and B are gated by gating modules A and B, respectively, if both sounds A and B are detected, whichever sound is detected earlier is gated on. That is, if sound A exceeds its threshold first, gating module A is turned on and remain on until sound A drops below threshold A. Then, gating module B is turned only if sound B exceeds its threshold after gating module A has been turn off.

[0040] In one embodiment, controller 431 coordinates the on/off states of all the gating modules according to predetermined or programmed gating coordination rules. According to one exemplary rule, ambient sound gating module 421 is off, occluded sound gating module 441 is off, and remote sound gating module 451 is on. This rule allows only the transmission of the remote sound to ear canal 303, and prevents the remote sound from being detected by ear canal microphone 440 and echoed back to remote device 190. According to another exemplary rule, ambient sound gating module 421 is on, occluded sound gating module 441 is off, and remote sound gating module 451 is on. This rule allows the transmission of both the remote sound and the ambient sound to ear canal 303, and prevents the remote sound from being detected by ear canal microphone 440 and echoed back to remote device 190. This also prevents the ambient sound from being transmitted to remote device 190. According to yet another exemplary rule, ambient sound gating module 421 is off, occluded sound gating module 441 is on, and remote sound gating module 451 is off. When the person wearing ear-level device 110 speaks, both external microphone 420 and ear canal microphone 440 detect the voice. The voice as detected by ear-level

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device 110 is first transmitted to remote device 190. Without the gating modules (or when ambient sound gating module 421 and occluded sound gating module 441 are both on), the same voice as detected by external microphone 420 is transmitted to ear canal 303, and therefore again detected by ear canal microphone 440, and again be transmitted to remote device 190. This rule allows only the transmission of the occluded sound to remote device 190, and prevents the same sound from being transmitted to remote device 190 twice. Other rules are applied as a person skilled in the art should see fit based on an understanding after reading this entire document.

[0041] FIG. 5 is a block diagram showing another embodiment of the circuit of ear-level device shown in FIGS. 3A, 3B, or 3C used as each of ear-level devices 210A and 210B. The circuit of each of ear-level devices 210A and 210B is housed in an earmold configured for use as of one of the device types illustrated as ear-level devices 310A, 310B, or 310C.

[0042] Ear-level device 210A is an audio transmitter that includes an ear canal microphone 540, a processor 560A, a wireless transmitter 550A, an antenna 555A, a transmitter VOX circuit 530A, and a battery 580A. Ear canal microphone 540 detects sound from the ear canal. The sound includes primarily speech of the person wearing ear-level device 210A. Processor 560A converts the sound picked up from the ear canal to an electrical signal to be transmitted to remote device 290. In one embodiment, processor 560A includes one or more of amplification circuitry, filtering circuitry, acoustic feedback reduction circuitry, noise reduction circuitry, and tone control circuitry, among other circuits performing signal processing functions as known in the art. In one embodiment, processor 560A includes a speech recognition module used to enhance the sound transmitted from ear-level device 210A. Wireless transmitter 550A and antenna 555A form a telemetry interface supporting signal transmission from ear-level device 210A to remote device 290. Wireless transmitter 550A receives the electrical signal representing the sound picked up from the ear canal from processor 560A and transmits an outgoing wireless signal representing the same sound to remote device 290. VOX circuit 530A activates a major portion of ear-level device 210A only when sound is detected by ear canal microphone 540. In one embodiment, VOX circuit 530A includes a voice-controlled switch connecting between battery 580A and the portions of ear-level device 210A that are voice activated. The switch is driven by the sound detected by ear canal microphone 540. It is turned on when sound detected by ear canal microphone 540 exceeds a predetermined threshold. In one embodiment, VOX circuit 530A activates processor 560A when the sound is detected. In one further embodiment, VOX circuit 530A also activates wireless transmitter 550A when the sound is detected. Battery 580A supplies the power needed for the operation of ear-level device 210A. In one embodiment, battery 580A is a rechargeable battery that can be recharged without being taken out from ear-level device 210A.

[0043] Ear-level device 210B is an audio receiver that includes an external microphone 520, an ear canal speaker 570, a processor 560B, a wireless receiver 550B, an antenna 555B, a receiver VOX circuit 530B, and a battery 580B. External microphone 520 picks up ambient sound such that the person wearing ear-level devices 210A and 210B is not "isolated" when communicating to remote device 290. It allows that person to talk to a nearby person directly, without the need to take off ear-level devices 210A and/or 210B. Bar canal speaker 570 transmits sound received from remote device 290 and/or external microphone 520 to the same ear canal. Processor 560B converts the signals received from remote device 290 and/or external microphone 520 to a sound audible to the person wearing ear-level device 210B. In one embodiment, processor 560B includes one or more of amplification circuitry, filtering circuitry, acoustic feedback reduction circuitry, noise reduction circuitry, and tone control circuitry, among other circuits performing signal processing functions as known in the art. In one embodiment, processor 560B includes a speech recognition module used to enhance the audio signals received by ear-level device 210B. Wireless receiver 550B and antenna 555B form a telemetry interface supporting signal transmission from remote device 290 to ear-level device 210B. Wireless receiver 550B receives an incoming wireless signal representing a remote sound from remote device 290 and transmits an electrical signal representing the remote sound to processor 560B. VOX circuit 530B activates a major portion of ear-level device 110 only when sound is detected by at least one of external microphone 520 and wireless receiver 550B. In one embodiment, VOX circuit 530B includes a voice-controlled switch connecting between battery 580B and the portions of ear-level device 210B that are voice activated. The switch is driven by the sound detected by at least one of external microphone 520 and wireless receiver 550B. It is turned on when sound detected by external microphone 520 exceeds a predetermined threshold and/or when wireless transceiver 550B receives the incoming wireless signal representing the remote sound. In one embodiment, VOX circuit 530B activates processor 560B when the sound is detected. In one further embodiment, VOX circuit 530B also activates ear-level speaker 570 when the sound is detected. Battery 580B supplies the power needed for the operation of ear-level device 210B. In one embodiment, battery 580B is a rechargeable battery that can be recharged without being taken out from ear-level device 210B.

[0044] System 200 accommodates a larger overall circuit size without necessarily increasing the size of each ITE device. While two separate ear-level devices are required, because system 200 includes separate audio transmitter (ear-level device 210A) and receiver (ear-level device 210B) disposed in the ear canals of opposite ears, ear canal speaker 570 and ear canal microphone 540 do not form a loop causing echo and ringing.

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[0045] FIG. 6 is an illustration of an exemplary exterior configuration of an ear-level device including a behind-the-ear (BTE) device 610 used as ear-level device 110 or one of ear-level devices 210A and 210B. BTE device 610 is attached to ear 101 with pinna 302 and ear canal 303. In one embodiment, BTE device 610 is used when none of ITE device 310A, PTC device 310B, and CIC device 310C provides sufficient space accommodating the required circuit and battery sizes. For the purpose of this document, only a device attached to a right ear is shown for each exterior structure. It is to be understood that each of ear-level devices 110, 210A, and 210B can be either a BTE device configured for right ear attachment or a BTE device configured for left ear attachment. Generally, a BTE device configured for right ear attachment has a substantially symmetrical appearance to a device of the same type configured for left ear attachment In system 100, ear-level device 110 is a device configured either for right ear attachment or for left ear attachment. In system 200, either one of ear-level device 210A and 210B is a device structured for right ear attachment, while the other is a device structured for left ear attachment.

[0046] BTE device 610 includes a behind-the-earmodule (BTE module) 611 and an in-the-ear module (ITE module) 612. ITE module 612 includes a custom or modular earmold. In one embodiment, the earmold is fully occluded to maximize audio efficiency. In another embodiment, the earmold is vented to remove undesirable low frequency sound.

[0047] FIG. 7 is a block diagram showing one embodiment of the circuit of ear-level device shown in FIG. 6 used as ear-level device 110. The exterior configuration of ear-level device 110 is of the type illustrated as BTE device 610.

[0048] Ear-level device 110 configured as BTE device 610 differs from ear-level device 110 configured as ITE/ITC/CIC devices 310A/310B/310C primarily in the physical arrangement of device components. By way of example, but not by way of limitation, FIG. 7 illustrates one embodiment in which BTE module 611 includes external microphone 420, processor 460, wireless transceiver 450, antenna 455, VOX circuit 430, and battery 480, and ITE module 612 includes ear canal microphone 440 and ear canal speaker 470. Other possible embodiments depend on size and other considerations that are known to those skilled in the art. In one embodiment, behind-ear portion 611 includes only battery 480 to maximize the duration of use of ear-level device 110 between battery replacements or recharges.

[0049] FIG. 8 is a block diagram showing another embodiment of the circuit of ear-level device shown in FIG. 6 used as each of ear-level devices 210A and 210B. The exterior configuration of each of ear-level devices 210A and 210B is of the type illustrated as BTE device 610.

[0050] Ear-level devices 210A/210B configured as BTE device 610 differ from ear-level devices 210A/210B configured as ITE/ITC/CIC devices 310A/310B/310C primarily in the physical arrangement of device components. By way of example, but not by way of limitation, FIG. 8 illustrates one embodiment of ear-level device 210A including a BTE module 611A and an ITE module 612A, and ear-level device 210B including a BTE module 611B and an ITE module 612B. BTE module 611A includes processor 560A, wireless transmitter 550A, antenna 555A, transmitter VOX circuit 530A, and battery 580A. ITE module 612A includes ear canal microphone 540. Behind-the-ear portion 611B includes external microphone 520, processor 560B, wireless receiver 550B, antenna 555B, receiver VOX circuit 530B, and battery 580B. ITE module 612B includes ear canal speaker 570. Other possible embodiments depend on size and other considerations that are known to those skilled in the art. In one embodiment, BTE modules 611A and 611B include only batteries 580A and 580B, respectively, to maximize the duration of use of ear-level devices 210A and 210B, respectively, between battery replacements or recharges.

[0051] FIG. 9 is a flow chart illustrating an embodiment of a method for audio communication using system 100 or system 200. The method provides for private, simultaneous two-way communication between a person and a remote device such as a computer, a personal digital assistant (PDA), a cellular phone, a walkie talkie, or a language translator. In this embodiment. VOX is used for power management. A VOX circuit includes a power switch connecting a battery to the portions of the circuit of system 100 or system 200 that are voice activated. The VOX is "on" when the voice-activated portions of the circuit are activated, i.e., when the power switch remains on. It is "started" by turning on the power switch, and "stopped" by turning off the power switch.

[0052] Steps 910-918 illustrate the process of detecting a sound from an ear canal and transmitting it to a remote device. A microphone disposed in an ear canal detects an occluded sound within the ear canal at 910. If the occluded sound is detected at 911, the VOX of the system is started at 912 if it is not already on. The occluded sound is enhanced at 914 with a voice recognition system that improves the signal-to-noise ratio, where the signal is the voice of a speech, and the noise is any sound other than the voice of the speech. The occluded sound is then converted to an outgoing radio signal at 916. The outgoing radio signal representing the occluded sound is transmitted to the remote device at 918.

[0053] Steps 920-928 illustrate the process of detecting a sound sent from the remote device and transmitting it to the ear canal. A radio receiver detects an incoming radio signal representing a remote sound from the remote device at 920. If the incoming radio signal is detected at 921, the VOX of the system is started at 922 if it is not already on. The incoming radio signal is converted to a first incoming audio signal (the remote sound) at 924. The first incoming audio signal is enhanced at 926 with a voice recognition system that improves the signal-to-noise ratio, where the signal is the voice from the remote device, and the noise is any sound other than the voice.

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A speaker disposed in the ear canal transmits the first incoming audio signal representing the sound from the remote device to the ear canal at 928.

[0054] Steps 930-938 illustrate the process of detecting a sound from the environment and transmit it to the ear canal. A microphone outside the ear canal detects an ambient sound at 930. If the ambient sound is detected at 931, the VOX of the system is started at 932 if it is not already on. The ambient sound is converted to a second incoming audio signal at 934. The second incoming audio signal is enhanced at 936 with a voice recognition system that improves the signal-to-noise ratio, where the signal is any voice included in the ambient sound, and the noise is any sound other than the voice. A speaker disposed in the ear canal transmits the second incoming audio signal representing to the ear canal at 928.

[0055] If no signal (sound or radio signal) is detected at 911, 921, and 931, the VOX is stopped at 940. In other words, if no sound is to be processed, the communication system is inactivated except for the portions that must be active for sound detection at all times. In one embodiment, the VOX is stopped after a predetermined period of time to avoid frequent activation/deactivation during a conversation.

[0056] Systems 100 and 200 are each a full duplex system capable of performing steps 910-918, 920-928, and 930-938 are performed in parallel and simultaneously. In an embodiment in which system 100 performs the method, ear-level device 110 performs steps 910-918, 924-928, and 930-938. If a signal is detected at 911, 921, or 931, VOX 430 activates at least portions of device 110 performing steps 914-918, 924-928, or 934-938, respectively. If no signal is detected at 911, 921, or 931, VOX 430 deactivates at least the portions of device 110 performing steps 914-918, 924-928, or 934-938, respectively.

[0057] In an embodiment in which system 200 performs the method, ear-level device 210A performs steps 910-918, and ear-level device 210B performs steps 920-928 and 930-930. If a signal is detected at 911, transmitter VOX 530A activates at least portions of device 210A performing steps 914-918. If a signal is detected at 921 or 931, receiver VOX 530B activates at least portions of device 210B performing steps 924-928 or 934-938, respectively. If no signal is detected at 911, transmitter VOX 530A deactivates at least the portions of device 210A performing steps 914-918. If no signal is detected at 921 or 931, receiver VOX 530B deactivates at least the portions of device 210B performing steps 924-928 or 934-938, respectively.

[0058] FIG. 10 is a flow chart illustrating another embodiment of the method for audio communication using system 100. In this embodiment, in addition to power management, the VOX is also used for gating, i.e., blanking or attenuating, sounds. The VOX circuit includes a power switch connecting a battery to the portions of the circuit of system 100 that are voice activated and gating modules capable of blanking or attenuating the occluded sound, the remote sound, and the ambient sound. Examples of such gating modules include occluded sound gating module 441, remote sound gating module 451, and ambient sound gating module 421, designated for the occluded sound, the remote sound, and the ambient sound, respectively.

[0059] Steps 1010-1019 illustrate the process of detecting the occluded sound from the ear canal and transmitting it to the remote device. The microphone disposed in the ear canal detects the occluded sound within the ear canal at 1010. If the occluded sound is detected at 1011, the VOX of the system is started to power the voice-activated portions of the circuit of system 100 at 1012 if they are not already powered. The VOX determines whether to start gating the occluded sound on at 1013. In one embodiment, the occluded sound is gated on when its amplitude exceeds a predetermined threshold and when the effective gating coordination rule permits. Examples of gating coordination rules are described above with respect to FIG. 4B. If the occluded sound is gated on at 1013, it is processed at 1014 by following steps that are identical or similar to steps 914-916-918. The occluded sound is gated off at 1019 if it has been gated on but is no longer detected. In one embodiment, the occluded sound is gated off after it is not detected for a predetermined period.

[0060] Steps 1020-1028 illustrate the process of detecting the remote sound sent from the remote device and transmitting it to the ear canal. A radio receiver detects the incoming radio signal representing the remote sound from the remote device at 1020. If the remote sound is detected at 1021, the VOX of the system is started to power the voice-activated portions of the circuit of system 100 at 1022 if they are not already powered. The VOX determines whether to start gating the remote sound on at 1023. In one embodiment, the remote sound is gated on when its amplitude exceeds a predetermined threshold and when the effective gating coordination rule permits. In another embodiment, the remote sound is gated on when the incoming radio signal is detected and when the effective gating coordination rules permits. If the remote sound is gated on at 1023, it is processed at 1024 by following steps that are identical or similar to steps 924-926-928. The remote sound is gated off at 1029 if it has been gated on but is no longer detected. In one embodiment, the remote sound is gated off after it is not detected for a predetermined period.

[0061] Steps 1030-1038 illustrate the process of detecting the ambient sound and transmit it to the ear canal. A microphone outside the ear canal detects the ambient sound at 1030. If the ambient sound is detected at 1031, the VOX of the system is started to power the voice-activated portions of the circuit of system 100 at 1032 if they are not already powered. The VOX determines whether to start gating the ambient sound on at 1033. In one embodiment, the ambient sound is gated on when its amplitude exceeds a predetermined threshold and when the effective gating coordination rule permits. If the

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ambient sound is gated on at 1033, it is processed at 1034 by following steps that are identical or similar to steps 934-936-938. The ambient sound is gated off at 1039 if it has been gated on but is no longer detected. In one embodiment, the ambient sound is gated off after it is not detected for a predetermined period.

[0062] If no signal (sound or radio signal) is detected at 1011,1021, and 1031, the VOX is stopped at 1040. In other words, if no sound is to be processed, the communication system is inactivated except for the portions that must be active for sound detection at all times, In one embodiment, the VOX is stopped after a predetermined period of time to avoid Sequent activation/deactivation during a conversation.

[0063] It is to be understood that the above detailed description is intended to be illustrative, and not restrictive. Other embodiments will be apparent to those of skill in the art upon reading and understanding the above description. For example, two ear-level devices 110, or a pair of devices each being similar to ear-level device 110, can be used to deliver a stereo sound. The scope of the invention should, therefore, be determined with reference to the appended claims.

Claims

1. A system adapted for use in at least one of a first ear (101A) having a first ear canal (303) and a second ear (101B) having a second ear canal (303) comprising:

a first ear-level device (110, 210A) configured to be one of an in-the-ear (ITE) device and a behind-the-ear (BTE) device, the first ear-level device including:

a first microphone (440) adapted for use in one of the first ear canal and the second ear canal, and adapted to receive an occluded sound (305) within the one of the first ear canal (303) and the second ear canal (303); and

a wireless receiver, connected to a first processor (460), to receive a first wireless signal representing a remote sound;

wherein the first processor (460) is connected to the first microphone (440) and is adapted to process the occluded sound (305) and the remote sound; the first ear level device further including:

a speaker adapted for use in the one of the first ear canal (303) and the second ear canal (303) and adapted to transmit the processed remote sound to the one of the first ear canal (303) and the second ear canal (303);

a wireless transmitter, connected to the first processor (460) and adapted to receive the processed occluded sound from the first processor (460) and transmit a second wireless signal representing the occluded sound;

a first earmold housing at least the first microphone (440) and the speaker (470), at least a portion of the first earmold configured for placement in the one of the first ear canal (303) and the second ear canal (303); and

a first voice operated exchange (VOX) circuit (430) connected to the first processor (460);

the first VOX circuit (430) including:

an occluded sound gating module (441) adapted to gate the occluded sound on, and to gate the remote sound off, when the occluded sound is detected while the remote sound is not detected; and

a remote sound gating module (451) adapted to gate the remote sound on, and to gate the occluded sound off, when the incoming remote sound is detected while the occluded sound is not detected.

2. A system according to claim 1, wherein the first earmold houses the first microphone (440), the first processor (460) and the wireless transmitter, and wherein the first earmold is configured for use as the ITE device (310A).

3. A system according to claim 1, wherein the first ear level device (110,210A) comprises an ITE module including the first microphone (440) and a BTE module attached to the ITE module, the BTE module including the first processor and the wireless transmitter.

4. A system according to claim 1, wherein the first microphone (440) and the speaker (470) are implemented as one common device receiving the occluded sound and transmitting the processed remote sound.

5. A system according to claim 4, further comprising a second microphone (420) connected to the first processor (460), the second microphone (420) adapted to receive an ambient sound from outside the one of the first ear canal (303) and the second ear canal (303), and wherein:

the first processor (460) further processes the ambient sound; and

the speaker (470) is configured to transmit the processed remote and ambient sounds to the one of the first ear canal (303) and the second ear canal (303).

6. A system according to claim 5, wherein the first VOX

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circuit (430) comprises an ambient sound gating module (421), coupled to the first microphone (420), to blank or substantially attenuate the ambient sound.

7. A system according to any of the preceding claims, wherein the first processor (460) comprises a speech recognition module.

8. A system according to any of claims 4 - 7, wherein the first earmold houses the first microphone (440), the first processor (460), the wireless transmitter, the wireless receiver, and the speaker (470), and wherein the first earmold is configured for use as the ITE device.

9. A system according to claim 8, wherein the first earmold is configured for use as an in-the-canal (ITC) device (310B).

10. A system according to claim 9, wherein the first earmold is configured for use as a completely-in-the-canal (CIC) device (310C).

11. A system according to any of claims 4 - 7, wherein the first ear level device (110,210A) comprises an ITE module including the first microphone (440) and the speaker (470) and a BTE module attached to the ITE module and including the second microphone (420), the first processor (460), the wireless transmitter and the wireless receiver.

12. A system according to claim 11, wherein the BTE module comprises the first voice operated exchange (VOX) circuit (430).

13. A system according to claim 11, wherein the BTE module comprises a rechargeable battery (480).

14. A system according to any of claims 7 - 13, further comprising a remote device (190, 290) communicatively coupled to the wireless transmitter and the wireless receiver via a telemetry link (195, 295) providing for simultaneous bidirectional communication between the first ear-level device (110, 210A) and the remote device (190, 290).

15. A system according to claim 14, wherein the remote device (190, 290) comprises at least one of a computer, a personal digital assistant (PDA), a cellular phone, a walkie talkie, or a language translator.

16. A system according to claim 1, wherein the first microphone (440) is adapted for use in the first ear canal (303) and receives the occluded sound within the first ear canal (303), wherein the at least the portion of the first earmold is configured for placement in the first ear canal (303), and further comprising a second ear-level device (210B) including:

a wireless receiver to receive a first wireless signal representing a remote sound;
a second processor (260), connected to the wireless receiver, to convert the first wireless signal to the remote sound;
a speaker (470) connected to the second processor, the speaker adapted for use in the second ear canal (303) to transmit the remote sound to the second ear canal (303); and
a second earmold housing at least the speaker, at least a portion of the second earmold configured for placement in the second ear canal (303).

17. A system according to claim 16, wherein the second ear-level device (210B) further comprises a second microphone (420) connected to the second processor (460), the second microphone (420) adapted to receive an ambient sound from outside the second ear canal (303), and wherein:

the second processor (460) further processes the ambient sound; and
the speaker (470) is configured to transmit the remote sound and the processed ambient sound to the second ear canal (303).

18. A system according to any of claims 16 and 17, wherein the first ear-level device (110,210A) comprises the first voice operated exchange (VOX) circuit (430) connected to the first processor (460), and the second ear-level device (210B) further comprises a second VOX circuit (430) connected to the second processor.

19. A system according to any of claims 16 - 18, wherein the first processor and the second processor each comprise a speech recognition module.

20. A system according to any of claims 16 - 19, wherein the first and second ear-level devices are each the BTE device.

21. A system according to any of claims 16 - 19, wherein the first and second ear-level devices are each the ITE device.

22. A system according to claim 21, wherein the first and second ear-level devices are each an in-the-canal (ITC) device (310B).

23. A system according to claim 22, wherein the first and second ear-level devices are each a completely-in-the-canal (CIC) device (310C).

24. A system according to any of claims 16 - 23, further

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comprising a remote device (190,290) communicatively coupled to the first and second ear-level devices.

25. A system according to claim 24, wherein the remote device (190, 290) comprises at least one of a computer, a personal digital assistant (PDA), a cellular phone, a walkie talkie, or a language translator.

26. A method, comprising:

detecting an occluded sound using a first microphone adapted for use in an ear canal (303);
detecting an incoming radio signal representing a remote sound from a remote device (190, 290);
starting a voice operated exchange (VOX) housed within an ear-level communication device when at least one of the occluded sound and the incoming radio signal is detected if the VOX is not already on, the ear level communication device being one of an in-the-ear (ITE) device and a behind-the-ear (BTE) device;
gating the occluded sound on, and gating the remote sound off, when the occluded sound is detected while the incoming radio signal is not detected; and
gating the remote sound on, and gating the occluded sound off, when the incoming radio signal is detected while the occluded sound is not detected.

27. A method according to claim 26, wherein detecting the occluded sound comprises comparing an amplitude of the occluded sound to an occluded sound threshold, wherein the occluded sound is detected when the amplitude of the occluded sound exceeds the occluded sound threshold.

28. A method according to any of claims 26 and 27, wherein detecting the incoming radio signal comprises comparing an amplitude of the remote sound to a remote sound threshold, wherein the incoming radio signal is detected when the amplitude of the remote sound exceeds the remote sound threshold.

29. A method according to any of claims 26 - 28, further comprising detecting an ambient sound using a second microphone, and wherein starting the VOX comprises starting the VOX when at least one of the occluded sound, the incoming radio signal, and the ambient sound is detected if the VOX is not already on.

30. A method according to claim 29, further comprising gating the occluded sound off, gating the remote sound on, and gating the ambient sound off, when the incoming radio signal is detected while the occluded sound is not detected.

31. A method according to claim 29, further comprising gating the occluded sound off, gating the remote sound on, and gating the ambient sound on, when the incoming radio signal is detected while the occluded sound is not detected.

32. A method according to claim 29, further comprising gating the occluded sound on, gating the remote sound off, and gating the ambient sound off, when the occluded sound is detected while the incoming radio signal is not detected.

Patentansprüche

1. System, das zur Verwendung in einem ersten Ohr (101A) mit einem ersten Gehörgang (303) und/oder einem zweiten Ohr (101B) mit einem zweiten Gehörgang (303) eingerichtet ist, mit:

einer ersten ohrebenen- bzw. ohrseitigen Vorrichtung (110, 210A), die dafür eingerichtet ist, eine In-Ohr-Vorrichtung (ITE) oder eine Hinter-Ohr-Vorrichtung (BTE) zu sein, wobei die erste ohrseitige Vorrichtung beinhaltet:

ein erstes Mikrofon (440), das zur Verwendung in dem ersten Gehörgang oder dem zweiten Gehörgang eingerichtet ist, und das dafür eingerichtet ist, einen verdeckten Ton (305) in jeweils dem ersten Gehörgang (303) oder dem zweiten Gehörgang (303) zu empfangen; und
einen Drahtlosempfänger, der mit einem ersten Prozessor (460) verbunden ist, um ein erstes Drahtlossignal zu empfangen, welches einen Fernton darstellt;

wobei der erste Prozessor (460) mit dem ersten Mikrofon (440) verbunden und dafür eingerichtet ist, den verdeckten Ton (305) und den Fernton zu verarbeiten;
wobei die erste ohrseitige Vorrichtung ferner beinhaltet:

einen Lautsprecher, der zur Verwendung in dem jeweiligen ersten Gehörgang (303) oder dem zweiten Gehörgang (303) eingerichtet ist, und der dafür eingerichtet ist, den verarbeiteten Fernton an den jeweiligen ersten Gehörgang (303) oder den zweiten Gehörgang (303) zu übertragen;
einen Drahtlossender, der mit dem ersten Prozessor (460) verbunden und dafür eingerichtet ist, den verarbeiteten verdeckten Ton von dem ersten Prozessor (460) zu empfangen und ein zweites Drahtlossignal, das den verdeckten Ton darstellt, zu senden;

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ein erstes Ohrformgehäuse wenigstens bei dem ersten Mikrofon (440) und dem Lautsprecher (470), wobei wenigstens ein Teil der ersten Ohrform dafür eingerichtet ist, in dem ersten Gehörgang (303) oder dem zweiten Gehörgang (303) platziert zu werden; und
eine erste stimmbetriebene Austauschschaltung (VOX) (430), die mit dem ersten Prozessor (460) verbunden ist;

wobei die erste VOX-Schaltung (430) beinhaltet:

ein Ausblendmodul (441) für einen verdeckten Ton, das dafür eingerichtet ist, den verdeckten Ton einzublenden und den Fernton auszublenden, wenn der verdeckte Ton bestimmt wird, während der Fernton nicht bestimmt wird; und
ein Ausblendmodul (441) für einen Fernton, das dafür eingerichtet ist, den Fernton einzublenden und den verdeckten Ton auszublenden, wenn der eingehende Fernton bestimmt wird, während der verdeckte Ton nicht bestimmt wird.

2. System nach Anspruch 1, bei dem eine erste Ohrform das erste Mikrofon (440), den ersten Prozessor (460) und den Drahtlossender einschließt, und bei dem die erste Ohrform zur Verwendung als ITE-Vorrichtung (310) eingerichtet ist.

3. System nach Anspruch 1, bei dem die erste ohrseitige Vorrichtung (110, 210A) ein ITE-Modul, das das erste Mikrofon (440) beinhaltet, und ein zweites BTE-Modul, das an das ITE-Modul angebracht ist, beinhaltet, wobei das ITE-Modul den ersten Prozessor und den Drahtlossender beinhaltet.

4. System nach Anspruch 1, bei dem das erste Mikrofon (440) und der Lautsprecher (470) als eine gemeinsame Vorrichtung implementiert sind, die den verdeckten Ton empfängt und den verarbeiteten Fernton sendet.

5. System nach Anspruch 4, ferner mit einem zweiten Mikrofon (420), das mit dem ersten Prozessor (460) verbunden ist, wobei das zweite Mikrofon (420) dafür eingerichtet ist, einen ümgebungston von außerhalb das jeweiligen ersten Gehörgangs (303) oder des zweiten Gehörgangs (303) zu empfangen, und wobei:

der erste Prozessor (460) den Umgebungston ferner bzw. weiterverarbeitet; und
der Lautsprecher (470) dafür eingerichtet ist, den verarbeiteten Fern- und Umgebungston an den jeweiligen ersten Gehörgang (303) und zweiten Gehörgang (303) zu senden.

6. System nach Anspruch 5, bei dem die erste VOX-Schaltung (430) ein Umgebungstonausblendmodul (421) aufweist, das mit dem ersten Mikrofon (420) verbunden ist, um den Umgebungston auf Null zu setzen oder ihn wesentlich zu dämpfen.

7. System nach einem der vorstehenden Ansprüche, bei dem der erste Prozessor (460) ein Spracherkennungsmodul aufweist.

8. System nach einem der Ansprüche 4 bis 7, bei dem die erste Ohrform, das erste Mikrofon (440), den ersten Prozessor (460), den Drahtlossender, den Drahtlosempfänger und den Lautsprecher (470) einschließt, und bei dem die erste Ohrform dafür eingerichtet ist, als die ITE-Vorrichtung verwendet zu werden.

9. System nach Anspruch 8, bei dem die erste Ohrform zur Verwendung als In-Kanal-Vorrichtung (ITC) (310B) verwendet zu werden.

10. System nach Anspruch 9, bei dem die erste Ohrform zur Verwendung als vollständig-In-Kanal-Vorrichtung (CIC) (310C) verwendet zu werden.

11. System nach einem der Ansprüche 4 bis 7, bei dem die erste ohrseitige Vorrichtung (110, 210A) ein ITE-Modul aufweist, das das erste Mikrofon (440) und den Lautsprecher (470) und ein BTE-Modul, das an das ITE-Modul angebracht ist, und das das zweite Mikrofon (420), den ersten Prozessor (460), den drahtlos Sender und den drahtlos Empfänger beinhaltet, beinhaltet.

12. System nach Anspruch 11, bei dem das BTE-Modul die erste sprachbetriebene Austauschschaltung (VOX) (340) aufweist.

13. System nach Anspruch 11, bei dem das BTE-Modul eine widerauflädbare Batterie (480) aufweist.

14. System nach einem der Ansprüche 7 bis 13, das ferner eine entfernte Vorrichtung (190, 290) aufweist, die mit dem Drahtlossender und dem Drahtlosempfänger über eine Telemetrieverbindung (195, 295) in Kommunikationsverbindung steht, um eine gleichzeitige bi-direktionale Kommunikation zwischen der ersten ohrseitigen Vorrichtung (110, 210A) und der entfernten Vorrichtung (190, 290) bereitzustellen.

15. System nach Anspruch 14, bei dem die entfernte Vorrichtung (190, 290) wenigstens einen Computer, einen Personal Digital Assistant (PDA), ein Mobiltelefon, ein Walkie Talkie und/oder einen Sprachübersetzer aufweist.

16. System nach Anspruch 1, bei dem das erste Mikro-

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fon (440) dafür eingerichtet ist, in dem ersten Gehörgang (303) verwendet zu werden, und dieses den verdeckten Ton in dem ersten Gehörgang (303) empfängt, wobei der wenigstens eine Abschnitt der ersten Ohrform zur Anordnung in dem ersten Gehörgang (303) eingerichtet ist, und ferner mit einer zweiten ohrseitigen Vorrichtung (210B), die beinhaltet:

einen Drahtlosempfänger, um ein erstes Drahtlossignal zu empfangen, das einen Fernton darstellt;
einen zweiten Prozessor (260), der mit dem Drahtlosempfänger verbunden ist, um das erste Drahtlossignal in den Fernton umzuwandeln;
einen Lautsprecher (470), der mit dem zweiten Prozessor verbunden ist, wobei der Lautsprecher zur Verwendung in dem zweiten Gehörgang (303) eingerichtet ist, um den Fernton an den zweiten Gehörgang (303) zu übertragen; und
einer zweiten Ohrform, die wenigstens den Lautsprecher einschließt, wobei wenigstens ein Teil der zweiten Ohrform zur Anordnung in dem zweiten Gehörgang (303) eingerichtet ist.

17. System nach Anspruch 16, bei dem die zweite ohrseitige Vorrichtung (210B) ferner ein zweites Mikrofon (420) aufweist, das mit dem zweiten Prozessor (460) verbunden ist, wobei das zweite Mikrofon (420) dafür eingerichtet ist, einen Umgebungston von außerhalb des zweiten Gehörgangs (303) zu empfangen, und bei dem:

der zweite Prozessor (460) den Umgebungston weiterverarbeitet; und
der Lautsprecher (470) dafür eingerichtet ist, den Fernton und den verarbeiteten Umgebungston an den zweiten Gehörgang (303) zu senden.

18. System nach einem der Ansprüche 16 oder 17, bei dem die erste ohrseitige Vorrichtung (110, 210A) die erste sprachbetriebene Austauschschaltung (VOX) (430) mit dem ersten Prozessor (460) verbunden aufweist, und wobei die zweite ohrseitige Vorrichtung (210B) ferner eine zweite VOX-Schaltung (430) aufweist, die mit dem zweiten Prozessor verbunden ist.

19. System nach einem der Ansprüche 16 bis 18, bei dem der erste Prozessor und der zweite Prozessor jeweils ein Spracherkennungsmodul aufweisen.

20. System nach einem der Anspruch 16 bis 19, bei dem die ersten und zweiten ohrseitigen Vorrichtungen jeweils die BTE-vorrichtungen darstellen.

21. System nach einem der Ansprüche 16 bis 19, bei dem die ersten und zweiten ohrseitigen Vorrichtungen jeweils die ITE-Vorrichtungen darstellen.

22. System nach Anspruch 21, bei dem die ersten und zweiten ohrseitigen Vorrichtungen jeweils eine In-Gehörgangs-Vorrichtung (ITC) (310B) darstellen.

23. System nach Anspruch 22, bei dem die ersten und zweiten ohrseitigen Vorrichtungen jeweils Vollständig-In-Gehörgangs-Vorrichtungen (CIC) (310C) darstellen.

24. System nach einem der Ansprüche 16 bis 23, das ferner eine entfernte Vorrichtung (190, 290) aufweist, die kommunikativ mit den ersten und zweiten ohrseitigen Vorrichtungen verbunden ist.

25. System nach Anspruch 24, bei dem die entfernte Vorrichtung (190, 290) wenigstens einen Computer, einen Personal Digital Assistant (PDA), ein Mobiltelefon, ein Walkie Talkie und/oder einen Sprachübersetzer aufweist.

26. Verfahren, das beinhaltet:

Bestimmen eines verdeckten Tons unter Verwendung eines ersten Mikrofons, das zur Verwendung in einem Gehörgang (303) eingerichtet ist;
Bestimmen eines eingehenden Funksignals, das einen Fernton von einer entfernten Vorrichtung (190, 290) darstellt;
Starten einer sprachbetriebenen Austauscheinrichtung (VOX), die in einer ohrseitigen Kommunikationsvorrichtung eingeschlossen ist, wenn der verdeckte Ton und/oder das eingehende Funksignal bestimmt wird, wenn die VOX nicht bereits an ist, wobei die ohrseitige Kommunikationsvorrichtung eine In-Ohr-Vorrichtung (ITE) oder eine Hinter-Ohr-Vorrichtung (BTE) darstellt;
Einblenden des verdeckten Tons und Ausblenden des Ferntons, wenn der verdeckte Ton bestimmt wird, während das eingehende Funksignal nicht bestimmt wird; und
Einblenden des Ferntons und Ausblenden des verdeckten Tons, wenn das eingehende Funksignal bestimmt wird, während der verdeckte Ton nicht bestimmt wird.

27. Verfahren nach Anspruch 26, bei dem das Bestimmen des verdeckten Tons, das Vergleichen einer Amplitude des verdeckten Tons mit einem Schwellwert für einen verdeckten Ton beinhaltet, wobei der verdeckte Ton bestimmt wird, wenn die Amplitude des verdeckten Tones den Schwellwert für den verdeckten Ton überschreitet.

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28. Verfahren nach einem der Ansprüche 26 oder 27, bei dem das Bestimmen des eingehenden Funksignals das Vergleichen einer Amplitude des Ferntons mit einem Ferntonschwellwert beinhaltet, wobei das eingehende Funksignal bestimmt wird, wenn die Amplitude des Ferntons den Ferntonschwellwert überschreitet.

29. Verfahren nach einem der Ansprüche 26 bis 28, das ferner das Bestimmen eines Umgebungstons unter Verwendung eines zweiten Mikrofons beinhaltet, und wobei das Starten der VOX das Starten der VOX beinhaltet, wenn wenigstens der verdeckte Ton, das eingehende Funksignal und/oder der Umgebungston bestimmt wird, während die VOX noch nicht bereits an ist.

30. Verfahren nach Anspruch 29, das ferner das Ausblenden des verdeckten Tons, das Einblenden des Ferntons und das Ausblenden des Umgebungstons beinhaltet, wenn das eingehende Funksignal bestimmt wird, während der verdeckte Ton nicht bestimmt wird.

31. Verfahren nach Anspruch 29, das ferner das Ausblenden des verdeckten Tons, das Einblenden des Ferntons und das Einblenden des Umgebungstons beinhaltet, wenn das eingehende Funksignal bestimmt wird, während der verdeckte Ton nicht bestimmt wird.

32. Verfahren nach Anspruch 29, das ferner das Einblenden des verdeckten Tones, das Ausblenden des Ferntons und das Ausblenden des Umgebungstons beinhaltet, wenn der verdeckte Ton bestimmt wird, während das eingehende Funksignal nicht bestimmt wird.

Revendications

1. Un système adapté en vue d'une utilisation dans au moins une parmi une première oreille (101A) ayant un premier conduit auditif (303) et une seconde oreille (101B) ayant un second conduit auditif (303), comprenant:

un premier dispositif d'oreille (110, 210A) configuré pour être un parmi un dispositif placé à l'intérieur de l'oreille (ITE) et un dispositif contour d'oreille (BTE), le premier dispositif d'oreille comprenant :

un premier microphone (440) adapté en vue d'une utilisation dans un parmi le premier conduit auditif et le second conduit auditif, et adapté pour recevoir un son occlus (305) à l'intérieur de celui parmi le premier conduit auditif (303) et le second conduit auditif (303) ; et
un récepteur sans fil, connecté à un premier processeur (460), pour recevoir un premier signal sans fil représentant un son distant ;

dans lequel le premier processeur (460) est connecté au premier microphone (440) et est adapté pour traiter le son occlus (305) et le son distant; le premier dispositif d'oreille comprenant en outre :

un haut-parleur adapté en vue d'une utilisation dans celui parmi le premier conduit auditif (303) et le second conduit auditif (303) et adapté pour transmettre le son distant traité à celui parmi le premier conduit auditif (303) et le second conduit auditif (303) ; un émetteur sans fil, connecté au premier processeur (460) et adapté pour recevoir le son occlus traité du premier processeur (460) et émettre un second signal sans fil représentant le son occlus ;
un premier embout auriculaire logeant au moins le premier microphone (440) et le haut-parleur (470), au moins une portion du premier embout auriculaire étant configurée en vue d'être placée dans celui parmi le premier conduit auditif (303) et le second conduit auditif (303) ; et
un premier circuit d'échange à commande vocale (VOX) (430) connecté au premier processeur (460) ;
le premier circuit VOX (430) comprenant :

un module de contrôle de son occlus (441) adapté pour laisser passer le son occlus et pour bloquer le son distant lorsque le son occlus est détecté alors que le son distant n'est pas détecté ; et
un module de contrôle de son distant (451) adapté pour laisser passer le son distant et pour bloquer le son occlus lorsque le son distant entrant est détecté alors que le son occlus n'est pas détecté.

2. Système selon la revendication 1, dans lequel le premier embout auriculaire loge le premier microphone (440), le premier processeur et l'émetteur sans fil, et dans lequel le premier embout auriculaire est configuré pour être utilisé comme dispositif ITE (310 A).

3. Système selon la revendications 1, dans lequel le premier dispositif d'oreille (110, 210A) comprend un module ITE comprenant le premier microphone (440) et un module BTE fixé au module ITE, le module BTE comprenant le premier processeur et l'émetteur sans fil.

4. Système selon la revendication 1, dans lequel le premier microphone (440) et le haut-parleur (470) sont

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mis en oeuvre sous la forme d'un dispositif commun recevant le son occlus et émettant le son distant traité.

5. Système selon la revendication 4, comprenant en outre un second microphone (420) connecté au premier processeur (460), le second microphone (420) étant adapté pour recevoir un son ambiant de l'extérieur de celui parmi le premier conduit auditif (303) et le second conduit auditif (303), et dans lequel :

le premier processeur (460) traite en outre le son ambiant ; et
le haut-parleur (470) est configuré pour transmettre les sons distant et ambiant traités à celui parmi le premier conduit auditif (303) et le second conduit auditif (303).

6. Système selon la revendication 5, dans lequel le premier circuit VOX (430) comprend un module de contrôle de son ambiant (421), couplé au premier microphone (420), pour occulter ou atténuer sensiblement le son ambiant.

7. Système selon l'une quelconque des revendications précédentes, dans lequel le premier processeur (460) comprend un module de reconnaissance vocale.

8. Système selon l'une quelconque des revendications 4 à 7, dans lequel le premier embout auriculaire loge le premier microphone (440), le premier processeur (460), l'émetteur sans fil, le récepteur sans fil, et le haut-parleur (470), et dans lequel le premier embout auriculaire est configuré pour être utilisé comme dispositif ITE.

9. Système selon la revendication 8, dans lequel le premier embout auriculaire est configuré pour être utilisé comme dispositif intra-conduit (ITC) (310B).

10. Système selon la revendication 9, dans lequel le premier embout auriculaire est configuré pour être utilisé comme dispositif complètement intra-conduit (CIC) (310C).

11. Système selon l'une quelconque des revendications 4 à 7, dans lequel le premier dispositif d'oreille (110, 210A) comprend un module ITE comprenant le premier microphone (440) et le haut-parleur (470) et un module BTE fixé au module ITE et comprenant le second microphone (420), le premier processeur (460), l'émetteur sans fil et le récepteur sans fil.

12. Système selon la revendication 11, dans lequel le module BTE comprend le premier circuit d'échange à commande vocale (VOX) (430).

13. Système selon la revendication 11, dans lequel le module BTE comprend une batterie rechargeable (480).

14. Système selon l'une quelconque des revendications 7 à 13, comprenant en outre un dispositif distant (190, 290) couplé en communication à l'émetteur sans fil et au récepteur sans fil via une liaison de télémesure (195, 295) assurant une communication bidirectionnelle simultanée entre le premier dispositif d'oreille (110, 210A) et le dispositif distant (190, 290).

15. Système selon la revendication 14, dans lequel le dispositif distant (190, 290) comprend au moins un parmi un ordinateur, un assistant numérique personnel (PDA), un téléphone cellulaire, un talkie-walkie, ou un traducteur de langue.

16. Système selon la revendication 1, dans lequel le premier microphone (440) est adapté en vue d'une utilisation dans le premier conduit auditif (303) et reçoit le son occlus à l'intérieur du premier conduit auditif (303), ans lequel au moins la portion du premier embout auriculaire est configurée en vue d'être placée dans le premier conduit auditif (303), et comprenant en outre un second dispositif d'oreille (210B) comprenant :

un récepteur sans fil pour recevoir un premier signal sans fil représentant un son distant ;
un second processeur (260), connecté au récepteur sans fil, pour convertir le premier signal sans fil dans le son distant ;
un haut-parleur (470) connecté au second processeur, le haut-parleur étant adapté en vue d'une utilisation dans le second conduit auditif (303) pour transmettre le son distant au second conduit auditif (303) ; et
un second embout auriculaire logeant au moins le haut-parleur, au moins une portion du second embout auriculaire étant configurée en vue d'être placée dans le second conduit auditif (303).

17. Système selon la revendication 16, dans lequel le second dispositif d'oreille (210B) comprend en outre un second microphone (420) connecté au second processeur (460), le second microphone (420) étant adapté pour recevoir un son ambiant de l'extérieur du second conduit auditif (303), et dans lequel :

le second processeur (460) traite en outre le son ambiant ; et le haut-parleur (470) est configuré pour transmettre le son distant et le son ambiant traité au second conduit auditif (303).

18. Système selon l'une quelconque des revendications 16 et 17, dans lequel le premier dispositif d'oreille

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(110, 210) comprend le premier circuit d'échange à commande vocale (VOX) (430) connecté au premier processeur (460), et le second dispositif d'oreille (210B) comprend en outre un second circuit VOX (430) connecté au second processeur.

19. Système selon l'une quelconque des revendications 16 à 18, dans lequel le premier processeur et le second processeur comprennent chacun un module de reconnaissance vocale.

20. Système selon l'une quelconque des revendications 16 à 19, dans lequel les premier et second dispositifs d'oreille sont respectivement le dispositif BTE.

21. Système selon l'une quelconque des revendications 16 à 19, dans lequel les premier et second dispositifs d'oreille sont respectivement le dispositif ITE.

22. Système selon la revendication dans lequel les premier et second dispositifs d'oreille sont respectivement un dispositif intra-conduit (ITC) (310B).

23. Système selon la revendication 22, dans lequel les premier et second dispositifs d'oreille sont respectivement un dispositif complètement intra-conduit (CIC) (310C).

24. Système selon l'une quelconque des revendications 16 à 23, comprenant en outre un dispositif distant (190, 290) couplé en communication aux premier et second dispositifs d'oreille.

25. Système selon la revendication 24, dans lequel le dispositif distant (190, 290) comprend au moins un parmi un ordinateur, un assistant numérique personnel (PDA), un téléphone cellulaire, un talkie walkie, ou un traducteur de langue.

26. Un procédé comprenant les étapes consistant à :

détecter un son occlus au moyen d'un premier microphone adapté en vue d'une utilisation dans un conduit auditif (303) ;
détecter un signal radio entrant représentant un son distant provenant d'un dispositif distant (190, 290) ;
lancer un échange à commande vocale (VOX) logé à l'intérieur d'un dispositif de communication d'oreille lorsqu'au moins un parmi le son occlus et le signal radio entrant est détecté si le VOX n'est pas déjà en marche, le dispositif de communication d'oreille étant un parmi un dispositif placé à l'intérieur de l'oreille (ITE) et un dispositif contour d'oreille (BTE) ;
laisser passer le son occlus, et bloquer le son distant lorsque le son distant occlus est détecté alors que le signal radio entrant n'est pas détecté ; et
laisser passer le son distant, et bloquer le son occlus lorsque le signal radio entrant est détecté alors que le son occlus n'est pas détecté.

27. Procédé selon la revendication 26, dans lequel la détection du son occlus comprend la comparaison d'une amplitude du son occlus avec un seuil de son occlus, dans lequel le son occlus est détecté lorsque l'amplitude du son occlus dépasse le seuil du son occlus.

28. Procédé selon l'une quelconque des revendications 26 et 27, dans lequel la détection du signal radio entrant comprend la comparaison d'une amplitude du son distant avec un seuil de son distant, dans lequel le signal radio entrant est détecté lorsque l'amplitude du son distant dépasse le seuil du son distant.

29. Procédé selon l'une quelconque des revendications 26 à 28, comprenant en outre la détection d'un son ambiant au moyen d'un second microphone, et dans lequel le lancement du VOX comprend le lancement du VOX lorsqu'au moins un parmi le son occlus, le signal radio entrant et le son ambiant est détecté si le VOX n'est pas déjà en marche.

30. Procédé selon la revendications 29, comprenant en outre l'étape consistant à bloquer le son occlus, laisser passer le son distant et bloquer le son ambiant lorsque le signal radio entrant est détecté alors que le son occlus n'est pas détecté.

31. Procédé selon la revendication 29, comprenant en outre l'étape consistant à bloquer le son occlus, laisser passer le son distant et laisser passer le son ambiant lorsque le signal radio entrant est détecté alors que le son occlus n'est pas détecté.

32. Procédé selon la revendication 29, comprenant en outre l'étape consistant à laisser passer le son occlus, bloquer le son distant, et bloquer le son ambiant lorsque le son occlus est détecté alors que le signal radio entrant n'est pas détecté.

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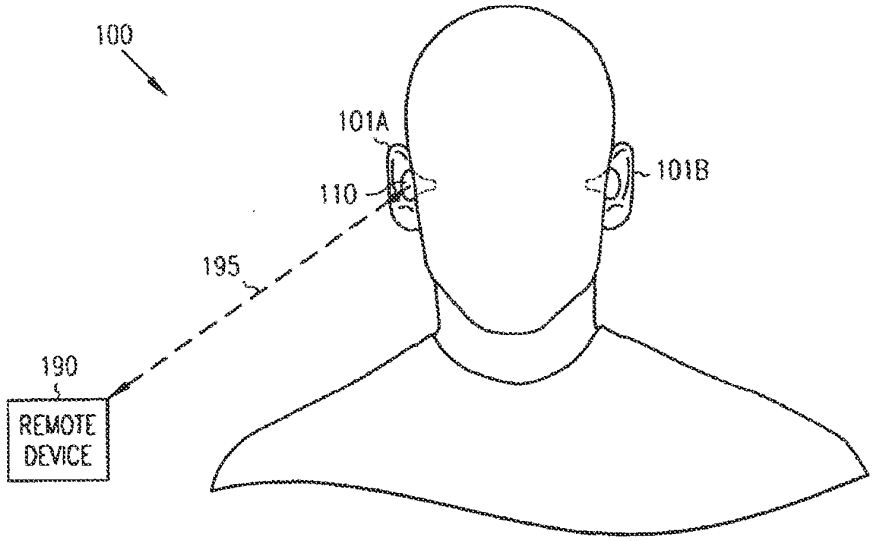


FIG. 1

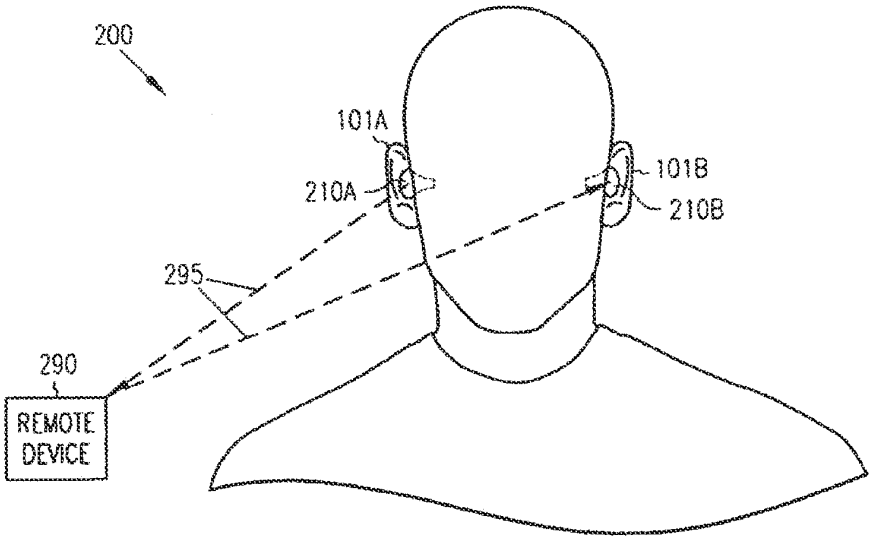


FIG. 2

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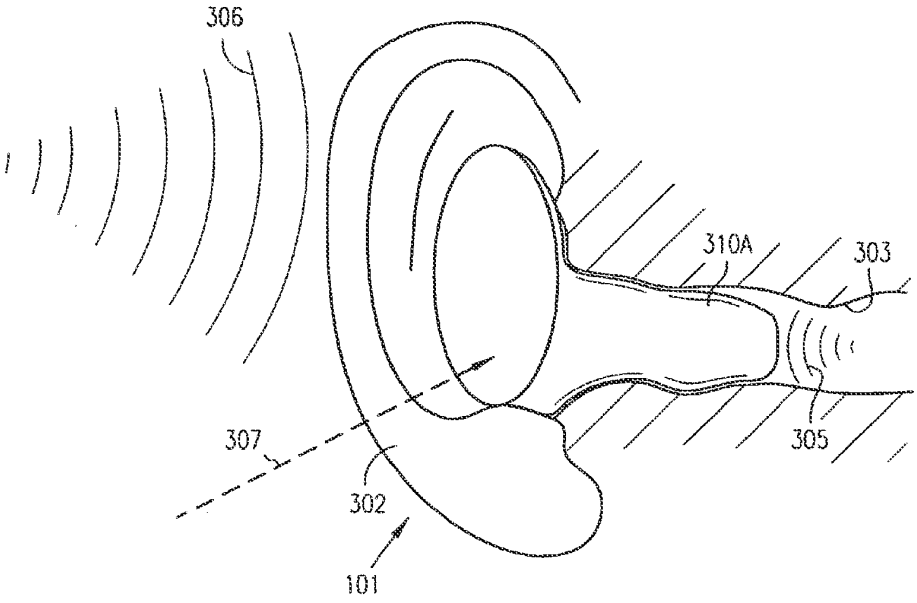


FIG. 3A

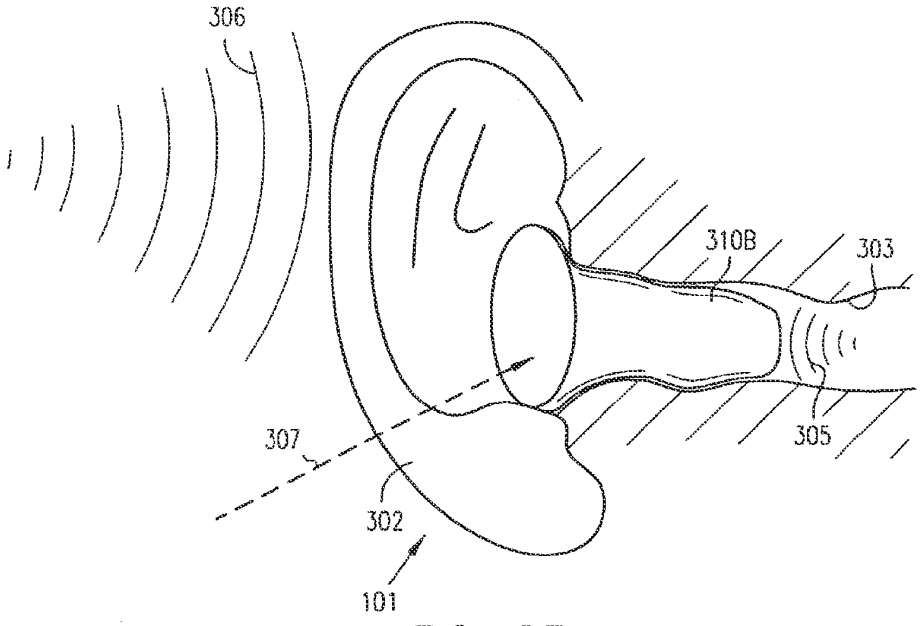


FIG. 3B

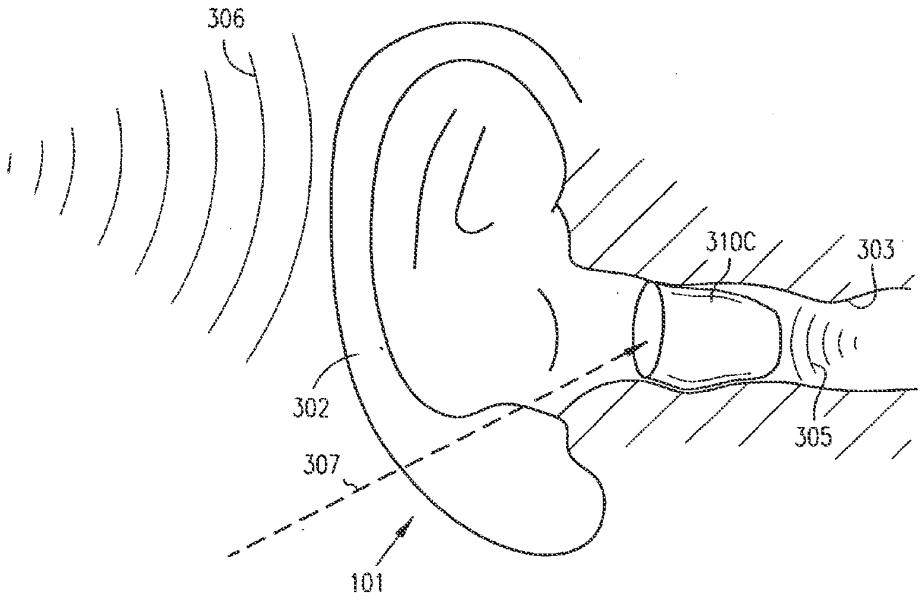


FIG. 3C

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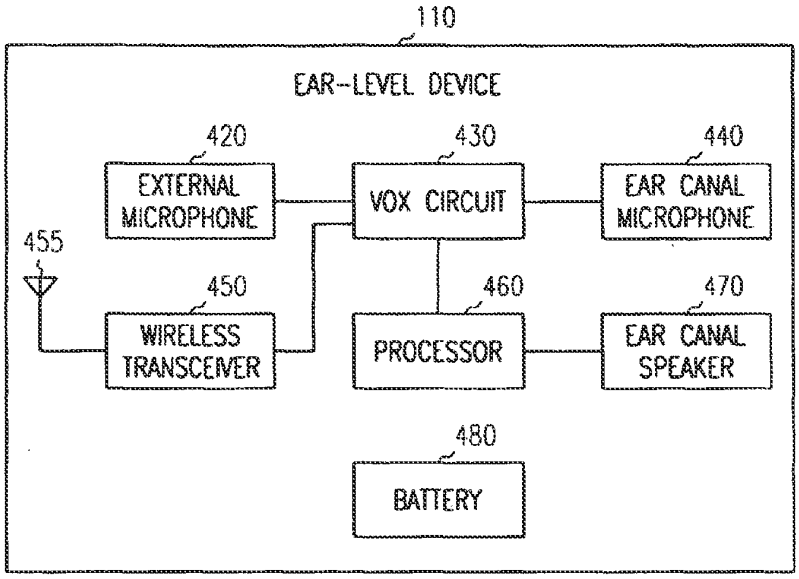

110
EAR-LEVEL DEVICE
420
EXTERNAL MICROPHONE
430
VOX CIRCUIT
440
EAR CANAL MICROPHONE
455
450
WIRELESS TRANSCEIVER
460
PROCESSOR
470
EAR CANAL SPEAKER
480
BATTERY

FIG. 4A

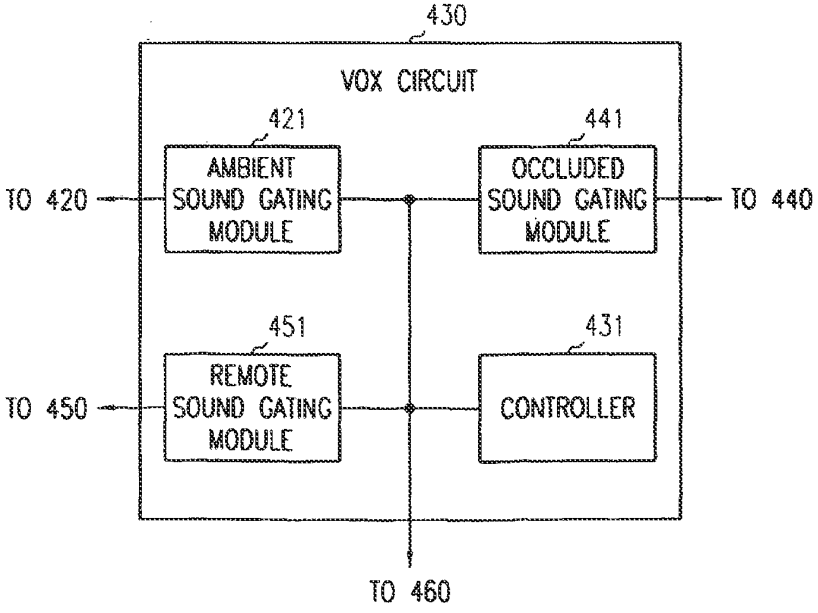

430
VOX CIRCUIT
421
AMBIENT SOUND GATING MODULE
441
OCCLUDED SOUND GATING MODULE
TO 420
TO 440
451
REMOTE SOUND GATING MODULE
431
CONTROLLER
TO 450
TO 460

FIG. 4B

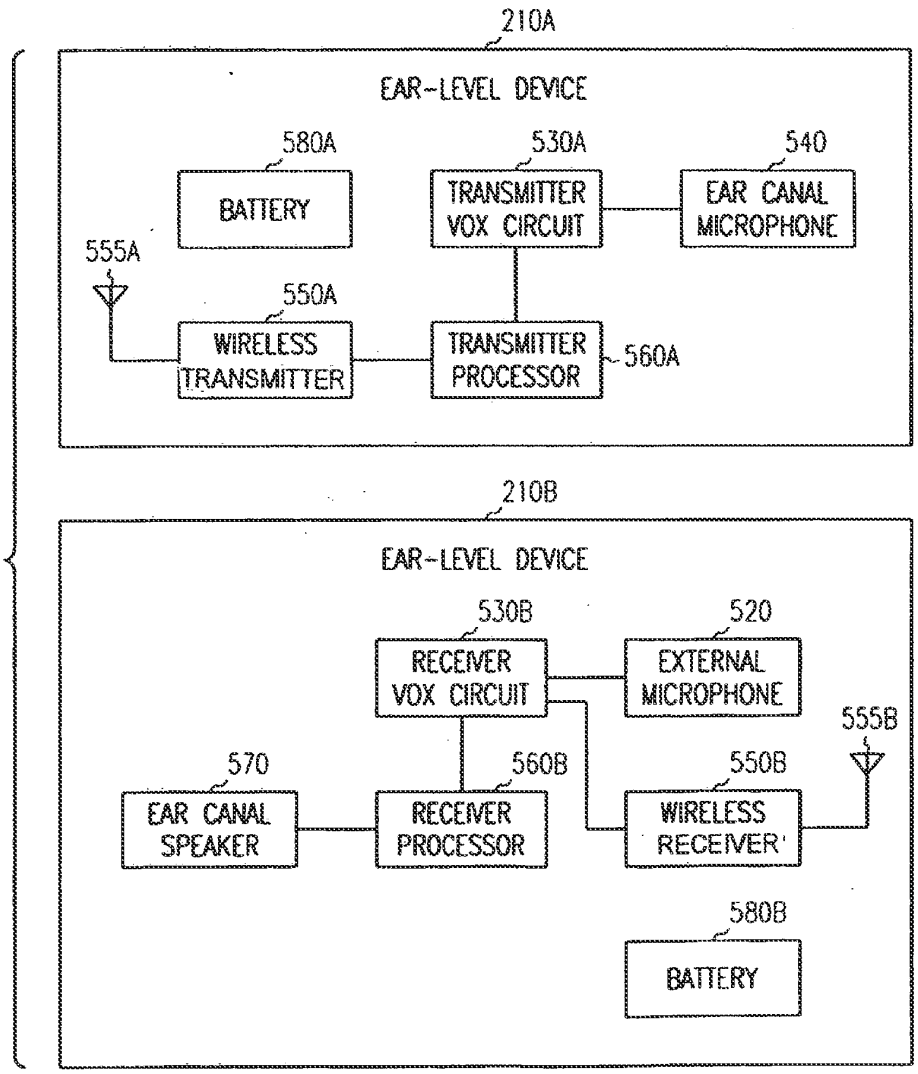


FIG. 5

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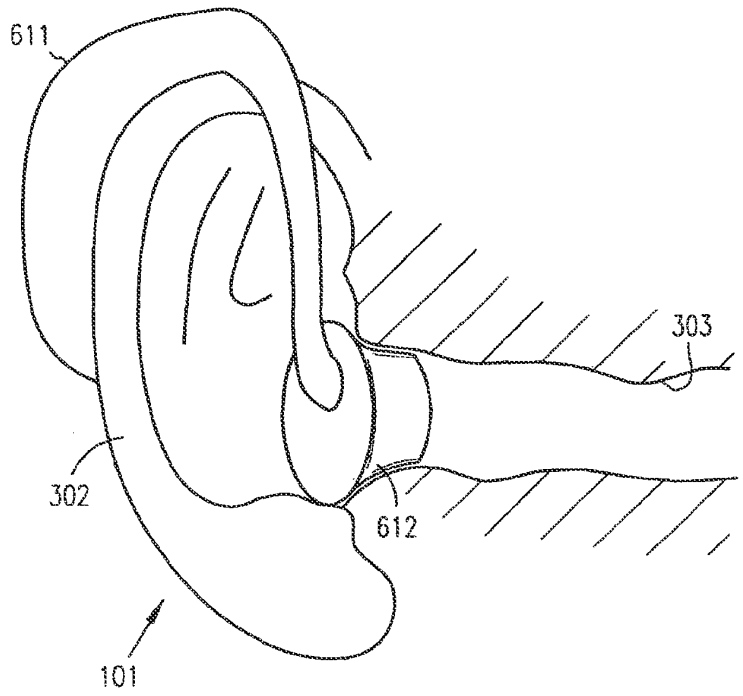


FIG. 6

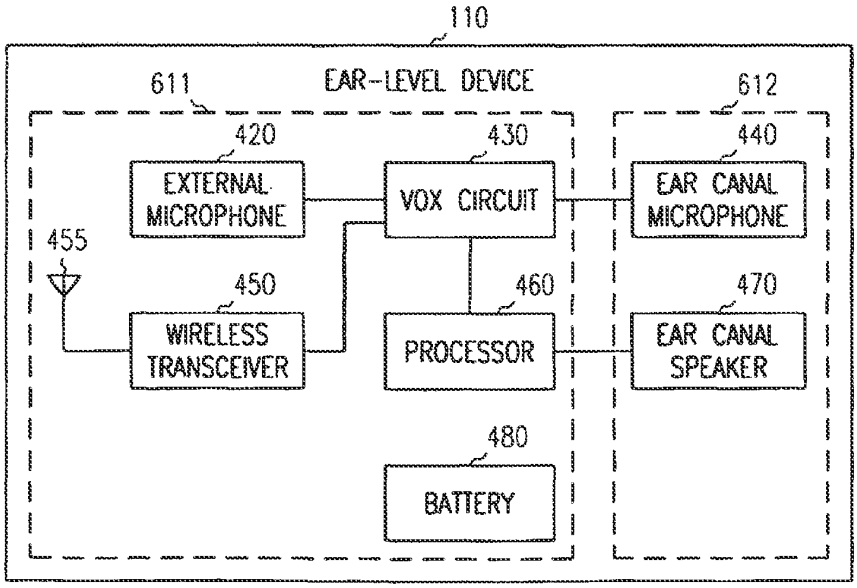


FIG. 7

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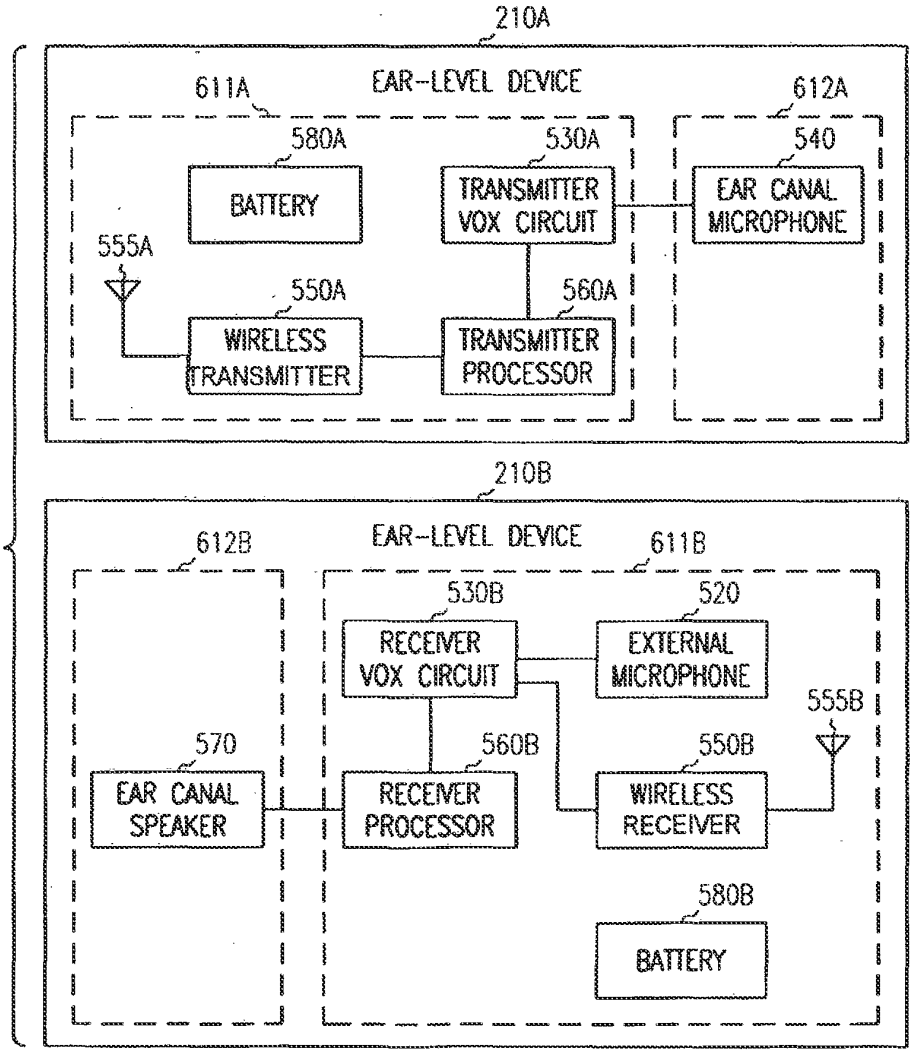


FIG. 8

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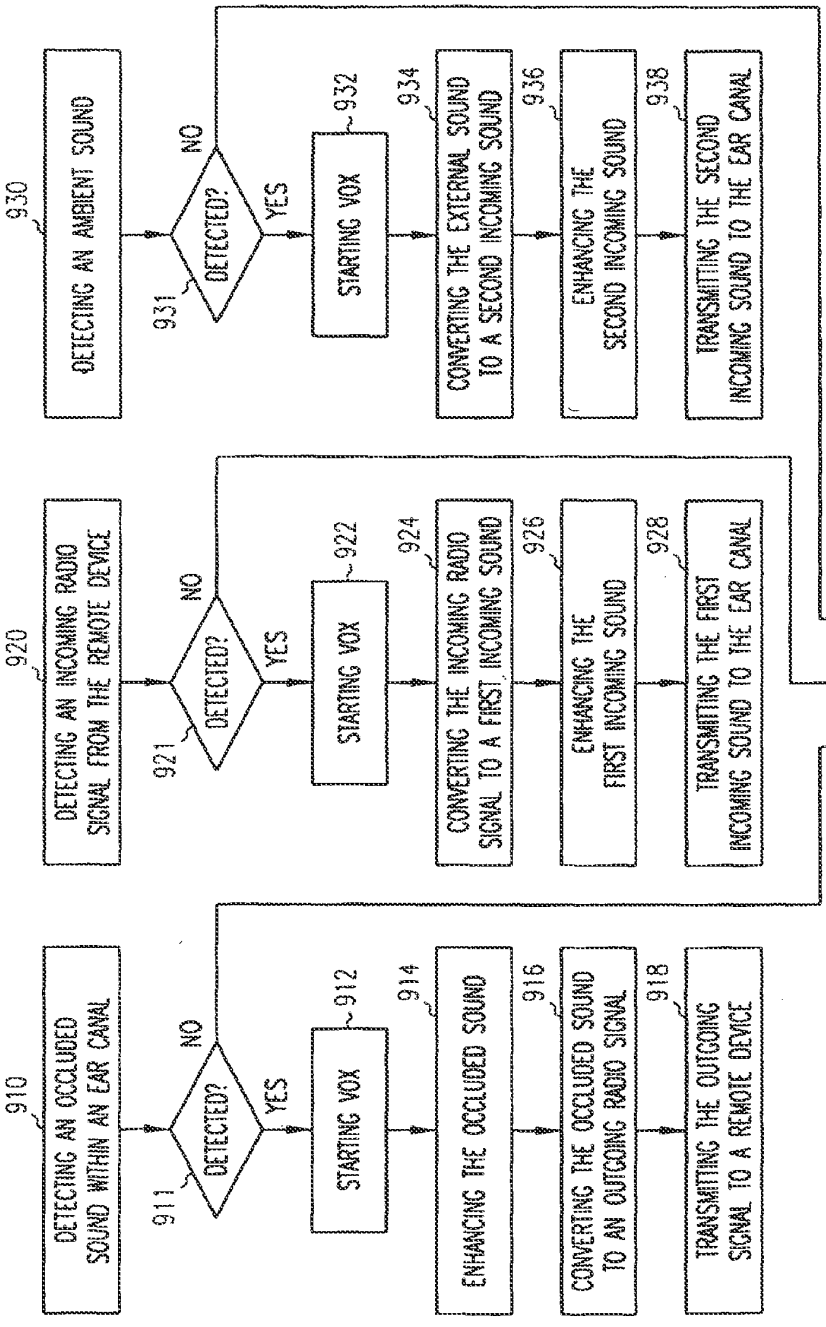


FIG. 9

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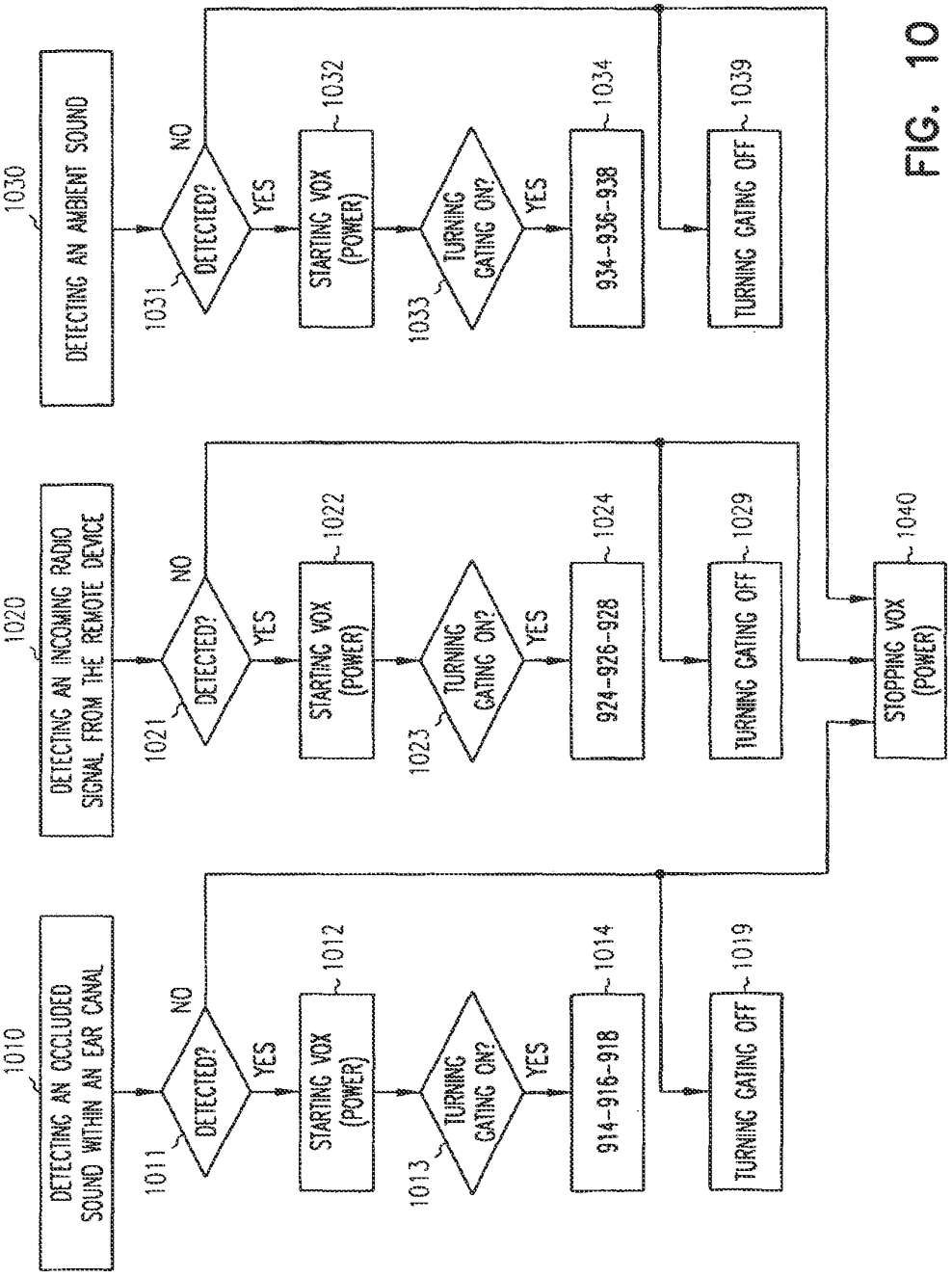


FIG. 10

IPR2024-01303 Page 00332

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 9845937 A **[0008]**
- WO 03073790 A **[0010]**

IPR2024-01303 Page 00333

Electronic Acknowledgement Receipt

EFS ID:	46258834
Application Number:	16785822
International Application Number:	
Confirmation Number:	3813
Title of Invention:	PERSONAL AUDIO ASSISTANT DEVICE AND METHOD
First Named Inventor/Applicant Name:	Steven Wayne Goldstein
Customer Number:	150139
Filer:	Peter Allen Chiabotti
Filer Authorized By:	
Attorney Docket Number:	11472-40-10_CONT_14148749
Receipt Date:	25-JUL-2022
Filing Date:	10-FEB-2020
Time Stamp:	10:15:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	WO2006037156A1.PDF	4248568 b8e02df95f5f0bd2e5857e63f332217a979eebac	no	37

Warnings:

Information:					
2	Foreign Reference	EP1519625B1.PDF	841969 271db1b36e01471fb66ad505c89786d2b1e016b5	no	27
Warnings:					
Information:					
			Total Files Size (in bytes):	5090537	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

150139 7590 08/03/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

EXAMINER
EASON, MATTHEW A

ART UNIT	PAPER NUMBER
2651	

DATE MAILED: 08/03/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

TITLE OF INVENTION: PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	11/03/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

150139 7590 08/03/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

TITLE OF INVENTION: PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	11/03/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
EASON, MATTHEW A	2651	381-312000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

150139 7590 08/03/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

EXAMINER	
EASON, MATTHEW A	
ART UNIT	**PAPER NUMBER**
2651	

DATE MAILED: 08/03/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/785,822	Applicant(s) Goldstein, Steven Wayne	
	Examiner MATTHEW A EASON	Art Unit 2651	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to IDS filed 7/15/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1 and 3-18 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MATTHEW A EASON/
Primary Examiner, Art Unit 2651

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	**Art Unit**
	MATTHEW A EASON	2651

CPC						
Symbol					**Type**	**Version**
G10L	/	21	/	00	F	2013-01-01
H04W	/	4	/	80	I	2018-02-01
G06F	/	16	/	60	I	2019-01-01
H04M	/	1	/	05	I	2013-01-01
H04R	/	1	/	1016	I	2013-01-01
G10L	/	21	/	06	I	2013-01-01
H04R	/	3	/	00	I	2013-01-01
G10L	/	13	/	00	I	2013-01-01
G10L	/	15	/	26	I	2013-01-01
G06F	/	3	/	165	I	2013-01-01
G06F	/	3	/	167	I	2013-01-01
G10L	/	25	/	48	I	2013-01-01
H04M	/	1	/	2471	I	2013-01-01
H04M	/	1	/	6066	A	2013-01-01
H04M	/	1	/	72442	A	2021-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	25 July 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office — Part of Paper No.: 20220725

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	**Art Unit**
	MATTHEW A EASON	2651

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04R	/	1	/	00	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	25 July 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office — Part of Paper No.: 20220725

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	**Art Unit**
	MATTHEW A EASON	2651

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10												
	2	10	11												
2	3	11	12												
3	4	12	13												
4	5	13	14												
5	6	14	15												
6	7	15	16												
7	8	16	17												
8	9	17	18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	17	
/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	25 July 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5

U.S. Patent and Trademark Office Part of Paper No.: 20220725

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	Art Unit
	MATTHEW A EASON	2651

CPC - Searched*		
Symbol	**Date**	**Examiner**
G10L21/00	04/22/2022	ME
G06F3/165	04/22/2022	ME
G06F3/167	04/22/2022	ME
G06F16/60	04/22/2022	ME
G10L13/00	04/22/2022	ME
G10L15/26	04/22/2022	ME
G10L21/06	04/22/2022	ME
G10L25/48	04/22/2022	ME
H04M1/05	04/22/2022	ME
H04M1/2471	04/22/2022	ME
H04R1/1016	04/22/2022	ME
H04R3/00	04/22/2022	ME
H04W4/80	04/22/2022	ME
H04M1/6066	04/22/2022	ME
H04M1/72442	04/22/2022	ME

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/785,822	Goldstein, Steven Wayne
	Examiner	Art Unit
	MATTHEW A EASON	2651

Search Notes		
Search Notes	**Date**	**Examiner**
Text/picture. Inventor.	01/14/2022	ME
Updated text/picture. Inventor.	07/25/2022	ME
Considered IDS 7/15/2022	07/25/2022	ME

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	See above.	04/22/2022	ME

/MATTHEW A EASON/ Primary Examiner, Art Unit 2651	

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	79	("7533061"|"4539439"|"20060086236"|"7031437"|"20020007315"|"7558529"|"20030069854"|"20060031257"|"3865998"|"6661901"|"7133924"|"6965770"|"20040224723"|"20060193450"|"6636953"|"5694475"|"5751820"|"20070079692"|"7546144"|"20050125354"|"6379314"|"6840908"|"7206429"|"20050078843"|"20070025194"|"6587822").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2020/04/17 10:08 AM
L2	3	L1 and voice adj control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2020/04/17 10:08 AM
L3	4	L1 and voice near control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2020/04/17 10:08 AM
L4	2	"20200227062"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:53 AM
L5	541	((("GOLDSTEIN") near3 ("Steven"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/01/07 08:54 AM
L6	53	L5 and voice near control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:54 AM
L7	47	L5 and user near interaction	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:56 AM
L8	33	L5 and user near interaction same headphone	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 08:56 AM
L9	257433	(G10L21/00 or G06F3/165 or G06F3/167 or G06F16/60 or G10L13/00 or G10L15/26 or G10L21/06 or G10L25/48 or	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 09:05 AM

		H04M1/05 or H04M1/2471 or H04R1/1016 or H04R3/00 or H04W4/80 or H04M1/6066 or H04M1/72442).cpc.					
L10	4	("20030130852"|"20070165875").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 09:10 AM
L11	87	("7533061"|"4539439"|"20060086236"|"7031437"|"20020007315"|"7558529"|"20030069854"|"20060031257"|"3865998"|"6661901"|"7133924"|"6965770"|"20040224723"|"20060193450"|"6636953"|"5694475"|"5751820"|"20070079692"|"7546144"|"20050125354"|"6379314"|"6840908"|"7206429"|"20050078843"|"20070025194"|"6587822").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 09:47 AM
L12	257433	(G10L21/00 or G06F3/165 or G06F3/167 or G06F16/60 or G10L13/00 or G10L15/26 or G10L21/06 or G10L25/48 or H04M1/05 or H04M1/2471 or H04R1/1016 or H04R3/00 or H04W4/80 or H04M1/6066 or H04M1/72442).cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 10:41 AM
L13	17954	L12 and voice near command	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 10:41 AM
L14	151	L13 and (ear$1phone ear$1bud).ab.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/07 10:41 AM
L15	2	"20200227062"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 10:29 AM
L16	542	((("GOLDSTEIN") near3 ("Steven"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/01/14 11:21 AM
L17	3	L16 and (content near	(US-PGPUB; USPAT;	OR	ON	ON	2022/01/14

		wish).clm.	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)				11:21 AM
L18	2	"20060173563"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 12:13 PM
L19	4	"20090286515"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 12:23 PM
L20	4	"20050058313"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 12:30 PM
L21	185	("20010046304"|"20020106091"|"20020118798"|"20030161097"|"20030165246"|"20040042103"|"20040109668"|"20040125965"|"20040190737"|"20040196992"|"20040203351"|"20050123146"|"20050288057"|"20060067551"|"20060083395"|"20060092043"|"20060195322"|"20070043563"|"20070086600"|"20070189544"|"20070291953"|"20080165988"|"20090010456"|"20090024234"|"20100061564"|"20100296668"|"20110096939"|"20110264447"|"20110293103"|"20160104452"|"3876843"|"4054749"|"4947440"|"5208867"|"5903868"|"6021325"|"6163338"|"6163508"|"6226389"|"6298323"|"6400652"|"6567524"|"6661901"|"6748238"|"6804638"|"6804643"|"7107109"|"7430299"|"7433714"|"7562020"|"7756285"|"7920557"|"8493204"|"8750295"|"9037458"|"9123343"|"9135797").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/01/14 12:48 PM
L22	2	"20200227062"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:00 AM
L23	55	L5 and voice near control	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/04/22 08:00 AM

			IBM_TDB)				
L24	33	L5 and user near interaction same headphone	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:00 AM
L25	4	("20030130852"|"20070165875").PN.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:00 AM
L26	3	L16 and (content near wish).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:01 AM
L27	3	L16 and (content near wish).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:01 AM
L28	555	((("GOLDSTEIN") near3 ("Steven"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/04/22 08:01 AM
L29	78	L28 AND sealing.clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:09 AM
L30	14	L28 AND sealing.clm. AND (voice ADJ command).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/22 08:10 AM
L31	17	L28 AND sealing.clm. AND (voice ADJ command).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/25 01:09 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16785822
Filing Date	2020-02-10
First Named Inventor	Steven Wayne Goldstein
Art Unit	2651
Examiner Name	Matthew A. Eason
Attorney Docket Number	11472-40-10_Cont_1414874

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	1	1519625	EP		2005-03-30	Victorian		
	2	2000037156	WO		2006-04-13	Mejia et al.		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	Matthew A. Eason
	Attorney Docket Number	11472-40-10_Cont_1414874

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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EXAMINER SIGNATURE

Examiner Signature	/MATTHEW A EASON/	Date Considered	07/25/2022

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16785822
	Filing Date	2020-02-10
	First Named Inventor	Steven Wayne Goldstein
	Art Unit	2651
	Examiner Name	Matthew A. Eason
	Attorney Docket Number	11472-40-10_Cont_1414874

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Peter A. Chiabotti	Date (YYYY-MM-DD)	2022-07-15
Name/Print	Peter A. Chiabotti	Registration Number	54603

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

Courtesy Reminder for
Application Serial No: 16/785,822

Attorney Docket No:
11472-40-10_CONT_14148749
Customer Number: 150139
Date of Electronic Notification: 08/04/2022

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

personics_docketing@cardinal-ip.com
jp.keady@techiya.co
ip@akerman.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://ppair-my.uspto.gov/pair/PrivatePair.**
If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

Doc Code: MFEE.C.AD
Document Description: Maintenance Fee Address Change

PTO/AIA/47 (12-20)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INSTRUCTIONS: The issue fee must have been paid for the application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application.

When to check the first box below: If you have a Customer Number to represent the fee address.

When to check the second box below: If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☑ Customer Number: 154598

OR

☐ The attached Request for Customer Number form (PTO/SB/125)

PATENT NUMBER (if known)	APPLICATION NUMBER
	16/785,822

Completed by (check one):

☐ Applicant/Inventor

☑ Attorney or Agent of record 54603 (Reg. No.)

☐ Assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) is enclosed or was filed on _____ (Date)

/Peter A. Chiabotti/
Signature

Peter A. Chiabotti
Typed or printed name

561-653-5000
Requester's telephone number

November 3, 2022
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. If the assignee is a juristic entity, this form must be signed by a patent practitioner (attorney or agent) of record. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted

This collection of information is required by 37 CFR 1.363. The information is required to obtain or retain a benefit by the public, which is to indicate (and for the USPTO to process) a fee address. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 5 minutes to complete, including gathering, preparing, and submitting the completed form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND COMPLETED FORMS TO THE PREVIOUS ADDRESS. **SEND COMPLETED FORMS TO: Mail Stop Maintenance Fee, Director of the United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/785,822	11/03/2022 12:53:29 PM ET	11472-40-10_CONT_14148749

Title of Invention

PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3813	FILED BY	Peter Chiabotti
PATENT CENTER #	61138178	AUTHORIZED BY	-
CUSTOMER #	150139	FILING DATE	02/10/2020
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Steven Wayne Goldstein

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 500951	E2022A3C54011553	Peter Chiabotti

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2501	UTILITY ISSUE FEE	600.00	1	600.00
			TOTAL AMOUNT:	$600.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage

submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 150139

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 150139

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

Staton Techiya LLC. 16193 Bridlewood Circle, Delray Beach, FL 33445

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	[signature]	Date	8-14-17
Name	DANIEL C - STATON	Telephone	561-404-0099
Title	MANAGING MEMBER		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

150139 7590 08/03/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749	3813

TITLE OF INVENTION: PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	11/03/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
EASON, MATTHEW A	2651	381-312000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☒ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Akerman LLP
2 Peter A. Chiabotti
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: STATON TECHIYA, LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY): DELRAY BEACH, FLORIDA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 500951

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Peter A. Chiabotti/ Date November 3, 2022

Typed or printed name Peter A. Chiabotti Registration No. 54,603

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Staton Techiya, LLC

Application No./Patent No.: 16785822 Filed/Issue Date: 02/10/2020

Titled: PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

Staton Techiya, LLC, a limited liability company

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Steven Wayne Goldstein To: PERSONICS HOLDINGS, INC.

   The document was recorded in the United States Patent and Trademark Office at
   Reel 057618, Frame 0905, or for which a copy thereof is attached.

2. From: PERSONICS HOLDINGS, INC. To: PERSONICS HOLDINGS, LLC

   The document was recorded in the United States Patent and Trademark Office at
   Reel 057618, Frame 0925, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: PERSONICS HOLDINGS, INC. and PERSONICS HOLDINGS, LLC To: DM STATON FAMILY LIMITED PARTNERSHIP

The document was recorded in the United States Patent and Trademark Office at
Reel 057618, Frame 0943, or for which a copy thereof is attached.

4. From: DM STATON FAMILY LIMITED PARTNERSHIP To: STATON TECHIYA, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 057618, Frame 0962, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Peter A. Chiabotti/	November 3, 2022
Signature	Date
Peter A. Chiabotti	54,603
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/785,822	**11/03/2022 12:53:29 PM ET**	**11472-40-10_CONT_14148749**

Title of Invention

PERSONAL AUDIO ASSISTANT DEVICE AND METHOD

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3813	FILED BY	Peter Chiabotti
PATENT CENTER #	61138178	FILING DATE	02/10/2020
CUSTOMER #	150139	FIRST NAMED INVENTOR	Steven Wayne Goldstein
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
11472-40-10 POA Executed.pdf	1	List-up to 10 attys appointed in a POA	70 KB
11472-40-10 CFR Statement.pdf	3	Assignee showing of ownership per 37 CFR 3.73	144 KB
11472-40-10 Fee Address Transmittal.pdf	2	Maintenance Fee Address Change	224 KB
11472-40-10 Issue Fee - Copy.pdf	1	Issue Fee Payment (PTO-85B)	136 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
11472-40-10 POA Executed.pdf	C105E2E64082C914A3B16D35DCE538DFBF017108503E0F3A42F02AF28EEBA5A03013D21B51A8ADEAA834DF54A87258E082A82FE94D5418AF2E6D8AD2E2A4F2EC
11472-40-10 CFR Statement.pdf	50734A45740F77B69C942158936B7FC990D447B1846520ED1AB0E50BF3E84866DFA968B9CF8DECB688FB463B8BC1A9471AB9F40243E6B4C90A3DEB49466A0550
11472-40-10 Fee Address Transmittal.pdf	0AF8E1E0E42DEBE1945DD2B401A48FEC31B8CBD67A40EBAA6222FA20C8548E2D264C32D80D4ABEA4CD5318A1EC4C2098947CE44D57879B2A3E1F13ED9AB906FC
11472-40-10 Issue Fee - Copy.pdf	BB23BF6EC92ABF4473F0B116EF56DBDD1DD0A4F6395C851061142CC25CAD8863B95BAD0FA93766FDD259C36FE61D5789B7CC61F1178618E7330DBCB94710D55F

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/785,822	02/10/2020	Steven Wayne Goldstein	11472-40-10_CONT_14148749

CONFIRMATION NO. 3813

150139
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

POA ACCEPTANCE LETTER

OC00000136770780

Date Mailed: 11/07/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/03/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/cbowen/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/785,822	12/06/2022	11521632	11472-40-10_CONT_14148749	3813

150139 7590 11/16/2022

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 180 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Steven Wayne Goldstein, Delray Beach, FL;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Staton Techiya LLC, Delray Beach, FL

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.