3-28-03 30400282.032703

JC520 U.S. PTO 03/27/03

PTO/SB/05 (03-01)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	ALPH.P020
First Inventor	Gregory C. Burnett
Title	Microphone and Voice Activity Detection Configurations for Use With Communication Systems
Express Mail Label No.	EV 235 875 739 US

jc887 U.S. PTO 10/400282 03/27/03

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. [X] Fee Transmittal Form (e.g., PTO/SB/17) *(Submit an original and a duplicate for fee processing)*
2. [X] Applicant claims small entity status. See 37 CFR 1.27.
3. [X] Specification [*Total Pages* 47] *(preferred arrangement set forth below)*
   - Descriptive title of the invention
   - Cross Reference to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to sequence listing, a table, or a computer program listing appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
4. [X] Drawing(s) *(35 U.S.C. 113)* [*Total Sheets* 29]
5. Oath or Declaration [*Total Pages*]
   a. [X] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 CFR 1.63 (d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [ ] Application Data Sheet. See 37 CFR 1.76
7. [ ] CD-ROM or CD-R in duplicate, large table or Computer Program *(Appendix)*
8. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] paper
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ACCOMPANYING APPLICATION PARTS

9. [X] Assignment Papers (cover sheet & document(s))
10. [X] 37 CFR 3.73(b) Statement *(when there is an assignee)* [X] Power of Attorney
11. [ ] English Translation Document *(if applicable)*
12. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
13. [ ] Preliminary Amendment
14. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
15. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. [ ] Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. [X] Other: Assertion of Small Entity Status

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: ____/____

Prior application information: *Examiner* ____ *Group Art Unit:* ____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

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Signature	RLGregory	*Date*	March 27, 2003

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LGE EXHIBIT NO. 1022
Amazon v. Jawbone
U.S. Patent 8,467,543
Amazon Ex. 1022

10400292 .032703

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FEE TRANSMITTAL for FY 2003

Effective 01/01/2003. Patent fees are subject to annual revision.

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 586.00

Complete if Known	
Application Number	To be assigned
Filing Date	Herewith
First Named Inventor	Gregory C. Burnett
Examiner Name	To be assigned
Art Unit	To be assigned
Attorney Docket No.	ALPH.P020

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	750	2001	375	Utility filing fee	375
1002	330	2002	165	Design filing fee	
1003	520	2003	260	Plant filing fee	
1004	750	2004	375	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below	Fee Paid
Total Claims	39	-20** =	19	X 9	= 171
Independent Claims	3	- 3** =	0	X	=
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	84	2201	42	Independent claims in excess of 3
1203	280	2203	140	Multiple dependent claim, if not paid
1204	84	2204	42	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 171

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	410	2252	205	Extension for reply within second month	
1253	930	2253	465	Extension for reply within third month	
1254	1,450	2254	725	Extension for reply within fourth month	
1255	1,970	2255	985	Extension for reply within fifth month	
1401	320	2401	160	Notice of Appeal	
1402	320	2402	160	Filing a brief in support of an appeal	
1403	280	2403	140	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,300	2453	650	Petition to revive - unintentional	
1501	1,300	2501	650	Utility issue fee (or reissue)	
1502	470	2502	235	Design issue fee	
1503	630	2503	315	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	40
1809	750	2809	375	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	750	2810	375	For each additional invention to be examined (37 CFR 1.129(b))	
1801	750	2801	375	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 40

SUBMITTED BY				(Complete *if applicable*)	
Name (Print/Type)	Richard L. Gregory, Jr.	*Registration No. (Attorney/Agent)*	42,607	*Telephone* 408-236-6646	
Signature	R. Gregory			*Date*	March 27, 2003

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Attorney Docket No. ALPH.P020

Attorney Docket No. ALPH.P020	Patent

Transmittal of Patent Application for Filing

Certification Under 37 C.F.R. §1.10 (if applicable)

EV 235 875 739 US	March 27, 2003
"Express Mail" Label Number	Date of Deposit

I hereby certify that this application, and any other documents referred to as enclosed herein are being deposited in an envelope with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

Richard L. Gregory, Jr.	R. Gregory
(Print Name of Person Mailing Application)	(Signature of Person Mailing Application)

Microphone and Voice Activity Detection (VAD) Configurations For Use With Communication Systems

INVENTORS:

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RELATED APPLICATIONS

This application claims priority from United States Patent Application Number 60/368,209, entitled MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH PORTABLE COMMUNICATION SYSTEMS, filed March 27, 2002, which is currently pending.

Further, this application relates to the following United States Patent Applications: Application Number 09/905,361, entitled METHOD AND APPARATUS FOR REMOVING NOISE FROM ELECTRONIC SIGNALS, filed July 12, 2001; Application Number 10/159,770, entitled DETECTING VOICED AND UNVOICED SPEECH USING BOTH ACOUSTIC AND NONACOUSTIC SENSORS, filed May 30, 2002; Application Number 10/301,237, entitled METHOD AND APPARATUS FOR REMOVING NOISE FROM ELECTRONIC SIGNALS, filed November 21, 2002; and Application number 10/383,162, entitled VOICE ACTIVITY DETECTION (VAD)

Attorney Docket No. ALPH.P020

DEVICES AND METHODS FOR USE WITH NOISE SUPPRESSION SYSTEMS, filed March 5, 2003.

TECHNICAL FIELD

The disclosed embodiments relate to systems and methods for detecting and processing a desired acoustic signal in the presence of acoustic noise.

BACKGROUND

Many noise suppression algorithms and techniques have been developed over the years. Most of the noise suppression systems in use today for speech communication systems are based on a single-microphone spectral subtraction technique first develop in the 1970's and described, for example, by S. F. Boll in "Suppression of Acoustic Noise in Speech using Spectral Subtraction," IEEE Trans. on ASSP, pp. 113-120, 1979. These techniques have been refined over the years, but the basic principles of operation have remained the same. See, for example, United States Patent Number 5,687,243 of McLaughlin, et al., and United States Patent Number 4,811,404 of Vilmur, et al. Generally, these techniques make use of a single-microphone Voice Activity Detector (VAD) to determine the background noise characteristics, where "voice" is generally understood to include human voiced speech, unvoiced speech, or a combination of voiced and unvoiced speech.

The VAD has also been used in digital cellular systems. As an example of such a use, see United States Patent Number 6,453,291 of Ashley, where a VAD configuration appropriate to the front-end of a digital cellular system is described. Further, some Code Division Multiple Access (CDMA) systems utilize a VAD to minimize the effective radio spectrum used, thereby allowing for more system capacity. Also, Global System for Mobile Communication (GSM) systems can include a VAD to reduce co-channel interference and to reduce battery consumption on the client or subscriber device.

These typical single-microphone VAD systems are significantly limited in capability as a result of the analysis of acoustic information received by the single microphone, wherein the analysis is performed using typical signal processing techniques. In particular, limitations in performance of these single-microphone VAD

systems are noted when processing signals having a low signal-to-noise ratio (SNR), and in settings where the background noise varies quickly. Thus, similar limitations are found in noise suppression systems using these single-microphone VADs.

Many limitations of these typical single-microphone VAD systems were overcome with the introduction of the Pathfinder noise suppression system by Aliph of San Francisco, California (http://www.aliph.com), described in detail in the Related Applications. The Pathfinder noise suppression system differs from typical noise cancellation systems in several important ways. For example, it uses an accurate voiced activity detection (VAD) signal along with two or more microphones, where the microphones detect a mix of both noise and speech signals. While the Pathfinder noise suppression system can be used with and integrated in a number of communication systems and signal processing systems, so can a variety of devices and/or methods be used to supply the VAD signal. Further, a number of microphone types and configurations can be used to provide acoustic signal information to the Pathfinder system.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 is a block diagram of a signal processing system including the Pathfinder noise removal or suppression system and a VAD system, under an embodiment.

Figure 1A is a block diagram of a noise suppression/communication system including hardware for use in receiving and processing signals relating to VAD, and utilizing specific microphone configurations, under the embodiment of Figure 1.

Figure 1B is a block diagram of a conventional adaptive noise cancellation system of the prior art.

Figure 2 is a table describing different types of microphones and the associated spatial responses in the prior art.

Figure 3A shows a microphone configuration using a unidirectional speech microphone and an omnidirectional noise microphone, under an embodiment.

Figure 3B shows a microphone configuration in a handset using a unidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 3A.

Figure 3C shows a microphone configuration in a headset using a unidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 3A.

Figure 4A shows a microphone configuration using an omnidirectional speech microphone and a unidirectional noise microphone, under an embodiment.

Figure 4B shows a microphone configuration in a handset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 4A.

Figure 4C shows a microphone configuration in a headset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 4A.

Figure 5A shows a microphone configuration using an omnidirectional speech microphone and a unidirectional noise microphone, under an alternative embodiment.

Figure 5B shows a microphone configuration in a handset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 5A.

Figure 5C shows a microphone configuration in a headset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 5A.

Figure 6A shows a microphone configuration using a unidirectional speech microphone and a unidirectional noise microphone, under an embodiment.

Figure 6B shows a microphone configuration in a handset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 6A.

Figure 6C shows a microphone configuration in a headset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 6A.

Figure 7A shows a microphone configuration using a unidirectional speech microphone and a unidirectional noise microphone, under an alternative embodiment.

Figure 7B shows a microphone configuration in a handset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 7A.

Figure 7C shows a microphone configuration in a headset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 7A.

Figure 8A shows a microphone configuration using a unidirectional speech microphone and a unidirectional noise microphone, under an embodiment.

Figure 8B shows a microphone configuration in a handset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 8A.

Figure 8C shows a microphone configuration in a headset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 8A.

Figure 9A shows a microphone configuration using an omnidirectional speech microphone and an omnidirectional noise microphone, under an embodiment.

[redacted]

Figure 9B shows a microphone configuration in a handset using an omnidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 9A.

Figure 9C shows a microphone configuration in a headset using an omnidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 9A.

Figure 10A shows an area of sensitivity on the human head appropriate for receiving a GEMS sensor, under an embodiment.

Figure 10B shows GEMS antenna placement on a generic handset or headset device, under an embodiment.

Figure 11A shows areas of sensitivity on the human head appropriate for placement of an accelerometer/SSM, under an embodiment.

Figure 11B shows accelerometer/SSM placement on a generic handset or headset device, under an embodiment.

In the drawings, the same reference numbers identify identical or substantially similar elements or acts. To easily identify the discussion of any particular element or act, the most significant digit or digits in a reference number refer to the Figure number in which that element is first introduced (e.g., element 105 is first introduced and discussed with respect to Figure 1).

The headings provided herein are for convenience only and do not necessarily affect the scope or meaning of the claimed invention. The following description provides specific details for a thorough understanding of, and enabling description for, embodiments of the invention. However, one skilled in the art will understand that the invention may be practiced without these details. In other instances, well-known structures and functions have not been shown or described in detail to avoid unnecessarily obscuring the description of the embodiments of the invention.

DETAILED DESCRIPTION

Numerous communication systems are described below, including both handset and headset devices, which use a variety of microphone configurations to receive acoustic signals of an environment. The microphone configurations include, for example, a two-microphone array including two unidirectional microphones, and a two-microphone array including one unidirectional microphone and one omnidirectional microphone, but are not so limited. The communication systems can also include Voice Activity Detection (VAD) devices to provide voice activity signals that include information of human voicing activity. Components of the communications systems receive the acoustic signals and voice activity signals and, in response, automatically generate control signals from data of the voice activity signals. Components of the communication systems use the control signals to automatically select a denoising method appropriate to data of frequency subbands of the acoustic signals. The selected denoising method is applied to the acoustic signals to generate denoised acoustic signals when the acoustic signals include speech and noise.

Numerous microphone configurations are described below for use with the Pathfinder noise suppression system. As such, each configuration is described in detail along with a method of use to reduce noise transmission in communication devices, in the context of the Pathfinder system. When the Pathfinder noise suppression system is referred to, it should be kept in mind that noise suppression systems that estimate the noise waveform and subtract it from a signal and that use or are capable of using the disclosed microphone configurations and VAD information for reliable operation are included in that reference. Pathfinder is simply a convenient referenced implementation for a system that operates on signals comprising desired speech signals along with noise. Thus, the use of these physical microphone configurations includes but is not limited to applications such as communications, speech recognition, and voice-feature control of applications and/or devices.

The terms "speech" or "voice" as used herein generally refer to voiced, unvoiced, or mixed voiced and unvoiced human speech. Unvoiced speech or voiced speech is distinguished where necessary. However, the term "speech signal" or "speech", when used as a converse to noise, simply refers to any desired portion of a signal and does not

necessarily have to be human speech. It could, as an example, be music or some other type of desired acoustic information. As used in the Figures, "speech" is meant to mean any signal of interest, whether human speech, music, or anything other signal that it is desired to hear.

In the same manner, "noise" refers to unwanted acoustic information that distorts a desired speech signal or makes it more difficult to comprehend. "Noise suppression" generally describes any method by which noise is reduced or eliminated in an electronic signal.

Moreover, the term "VAD" is generally defined as a vector or array signal, data, or information that in some manner represents the occurrence of speech in the digital or analog domain. A common representation of VAD information is a one-bit digital signal sampled at the same rate as the corresponding acoustic signals, with a zero value representing that no speech has occurred during the corresponding time sample, and a unity value indicating that speech has occurred during the corresponding time sample. While the embodiments described herein are generally described in the digital domain, the descriptions are also valid for the analog domain.

The term "Pathfinder", unless otherwise specified, denotes any denoising system using two or more microphones, a VAD device and algorithm, and which estimates the noise in a signal and subtracts it from that signal. The Aliph Pathfinder system is simply a convenient reference for this type of denoising system, although it is more capable than the above definition. In some cases (such as the microphone arrays described in **Figures 8 and 9**), the "full capabilities" or "full version" of the Aliph Pathfinder system are used (as there is a significant amount of speech energy in the noise microphone), and these cases will be enumerated in the text. "Full capabilities" indicates the use of both $H_1(z)$ and $H_2(z)$ by the Pathfinder system in denoising the signal. Unless otherwise specified, it is assumed that only $H_1(z)$ is used to denoise the signal.

The Pathfinder system is a digital signal processing- (DSP) based acoustic noise suppression and echo-cancellation system. The Pathfinder system, which can couple to the front-end of speech processing systems, uses VAD information and received acoustic information to reduce or eliminate noise in desired acoustic signals by estimating the

noise waveform and subtracting it from a signal including both speech and noise. The Pathfinder system is described further below and in the Related Applications.

Figure 1 is a block diagram of a signal processing system 100 including the Pathfinder noise removal or suppression system 105 and a VAD system 106, under an embodiment. The signal processing system 100 includes two microphones MIC 1 103 and MIC 2 104 that receive signals or information from at least one speech signal source 101 and at least one noise source 102. The path s(n) from the speech signal source 101 to MIC 1 and the path n(n) from the noise source 102 to MIC 2 are considered to be unity. Further, $H_1(z)$ represents the path from the noise source 102 to MIC 1, and $H_2(z)$ represents the path from the speech signal source 101 to MIC 2.

Components of the signal processing system 100, for example the noise removal system 105, couple to the microphones MIC 1 and MIC 2 via wireless couplings, wired couplings, and/or a combination of wireless and wired couplings. Likewise, the VAD system 106 couples to components of the signal processing system 100, like the noise removal system 105, via wireless couplings, wired couplings, and/or a combination of wireless and wired couplings. As an example, the VAD devices and microphones described below as components of the VAD system 106 can comply with the Bluetooth wireless specification for wireless communication with other components of the signal processing system, but are not so limited.

Figure 1A is a block diagram of a noise suppression/communication system including hardware for use in receiving and processing signals relating to VAD, and utilizing specific microphone configurations, under an embodiment. Referring to **Figure 1A**, each of the embodiments described below includes at least two microphones in a specific configuration 110 and one voiced activity detection (VAD) system 130, which includes both a VAD device 140 and a VAD algorithm 150, as described in the Related Applications. Note that in some embodiments the microphone configuration 110 and the VAD device 140 incorporate the same physical hardware, but they are not so limited. Both the microphones 110 and the VAD 130 input information into the Pathfinder noise suppression system 120 which uses the received information to denoise the information in the microphones and output denoised speech 160 into a communications device 170.

The communications device 170 includes both handset and headset communication devices, but is not so limited. Handsets or handset communication devices include, but are not limited to, portable communication devices that include microphones, speakers, communications electronics and electronic transceivers, such as cellular telephones, portable or mobile telephones, satellite telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

Headset or headset communication devices include, but are not limited to, self-contained devices including microphones and speakers generally attached to and/or worn on the body. Headsets often function with handsets via couplings with the handsets, where the couplings can be wired, wireless, or a combination of wired and wireless connections. However, the headsets can communicate independently with components of a communications network.

The VAD device 140 includes, but is not limited to, accelerometers, skin surface microphones (SSMs), and electromagnetic devices, along with the associated software or algorithms. Further, the VAD device 140 includes acoustic microphones along with the associated software. The VAD devices and associated software are described in United States Patent Application number 10/383,162, entitled VOICE ACTIVITY DETECTION (VAD) DEVICES AND METHODS FOR USE WITH NOISE SUPPRESSION SYSTEMS, filed March 5, 2003.

The configurations described below of each handset/headset design include the location and orientation of the microphones and the method used to obtain a reliable VAD signal. All other components (including the speaker and mounting hardware for headsets and the speaker, buttons, plugs, physical hardware, etc. for the handsets) are inconsequential for the operation of the Pathfinder noise suppression algorithm and will not be discussed in great detail, with the exception of the mounting of unidirectional microphones in the handset or headset. The mounting is described to provide information for the proper ventilation of the directional microphones. Those familiar with the state of the art will not have difficulty mounting the unidirectional microphones correctly given the placement and orientation information in this application.

Furthermore, the method of coupling (either physical or electromagnetic or otherwise) of the headsets described below is inconsequential. The headsets described work with any type of coupling, so they are not specified in this disclosure. Finally, the microphone configuration 110 and the VAD 130 are independent, so that any microphone configuration can work with any VAD device/method, unless it is desired to use the same microphones for both the VAD and the microphone configuration. In this case the VAD can place certain requirements on the microphone configuration. These exceptions are noted in the text.

MICROPHONE CONFIGURATIONS

The Pathfinder system, although using particular microphone types (omnidirectional or unidirectional, including the amount of unidirectionality) and microphone orientations, is not sensitive to the typical distribution of responses of individual microphones of a given type. Thus the microphones do not need to be matched in terms of frequency response nor do they need to be especially sensitive or expensive. In fact, configurations described herein have been constructed using inexpensive off-the-shelf microphones, which have proven to be very effective. As an aid to review, the Pathfinder setup is shown in **Figure 1** and is explained in detail below and in the Related Applications. The relative placement and orientation of the microphones in the Pathfinder system is described herein. Unlike classical adaptive noise cancellation (ANC), which specifies that there can be no speech signal in the noise microphone, Pathfinder allows speech signal to be present in both microphones which means the microphones can be placed very close together, as long as the configurations in the following section are used. Following is a description of the microphone configurations used to implement the Pathfinder noise suppression system.

There are many different types of microphones in use today, but generally speaking, there are two main categories: omnidirectional (referred to herein as "OMNI microphones" or "OMNI") and unidirectional (referred to herein as "UNI microphones" or "UNI"). The OMNI microphones are characterized by relatively consistent spatial response with respect to relative acoustic signal location, and UNI microphones are characterized by responses that vary with respect to the relative orientation of the

[redacted]

acoustic source and the microphone. Specifically, the UNI microphones are normally designed to be less responsive behind and to the sides of the microphone so that signals from the front of the microphone are emphasized relative to those from the sides and rear.

There are several types of UNI microphones (although really only one type of OMNI) and the types are differentiated by the microphone's spatial response. **Figure 2** is a table describing different types of microphones and the associated spatial responses (from the Shure microphone company website at http://www.shure.com). It has been found that both cardioid and super-cardioid unidirectional microphones work well in the embodiments described herein, but hyper-cardioid and bi-directional microphones may also be used. Also, "close-talk" (or gradient) microphones (which de-emphasize acoustic sources more than a few centimeters away from the microphone) can be used as the speech microphone, and for this reason the close-talk microphone is considered in this disclosure as a UNI microphone.

Microphone Arrays Including Mixed OMNI And UNI Microphones

In an embodiment, an OMNI and UNI microphone are mixed to form a two-microphone array for use with the Pathfinder system. The two-microphone array includes combinations where the UNI microphone is the speech microphone and combinations in which the OMNI microphone is the speech microphone, but is not so limited.

UNI Microphone As Speech Microphone

With reference to **Figure 1**, in this configuration the UNI microphone is used as the speech microphone 103 and an OMNI is used as the noise microphone 104. They are normally used within a few centimeters of each other, but can be located 15 or more centimeters apart and still function adequately. **Figure 3A** shows a general configuration 300 using a unidirectional speech microphone and an omnidirectional noise microphone, under an embodiment. The relative angle *f* between a vector normal to the face of the microphones is approximately in the range of 60 to 135 degrees. The distances d_1 and d_2 are each approximately in the range of zero (0) to 15 centimeters. **Figure 3B** shows a general configuration 310 in a handset using a unidirectional speech microphone and an

omnidirectional noise microphone, under the embodiment of Figure 3A. **Figure 3C** shows a general configuration 320 in a headset using a unidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 3A.

The general configurations 310 and 320 show how the microphones can be oriented in a general fashion as well as a possible implementation of this setup for a handset and a headset, respectively. The UNI microphone, as the speech microphone, points toward the user's mouth. The OMNI has no specific orientation, but its location in this embodiment physically shields it from speech signals as much as possible. This setup works well for the Pathfinder system since the speech microphone contains mostly speech and the noise microphone mainly noise. Thus, the speech microphone has a high signal-to-noise ratio (SNR) and the noise microphone has a lower SNR. This enables the Pathfinder algorithm to be effective.

OMNI Microphone As Speech Microphone

In this embodiment, and referring to **Figure 1**, the OMNI microphone is the speech microphone 103 and a UNI microphone is positioned as the noise microphone 104. The reason for this is to keep the amount of speech in the noise microphone small so that the Pathfinder algorithm can be simplified and de-signaling (the undesired removal of speech) can be kept to a minimum. This configuration has the most promise for simple add-ons to existing handsets, which already use an OMNI microphone to capture speech. Again, the two microphones can be located quite close together (within a few centimeters) or 15 centimeters or more away. The best performance is seen when the two microphones are quite close (less than approximately 5 cm), and the UNI is far enough away from the user's mouth (approximately in the range of 10 to 15 centimeters depending on the microphone) so that the UNI directionality functions effectively.

In this configuration where the speech microphone is an OMNI, the UNI is oriented in such a way as to keep the amount of speech in the UNI microphone small compared to the amount of speech in the OMNI. This means that the UNI will be oriented away from the speaker's mouth, and the amount it is oriented away from the speaker is denoted by f, which can vary between 0 and 180 degrees, where f describes the angle between the direction of one microphone and the direction of another microphone in any plane.

Figure 4A shows a configuration 400 using an omnidirectional speech microphone and a unidirectional noise microphone, under an embodiment. The relative angle *f* between vectors normal to the faces of the microphones is approximately 180 degrees. The distance *d* is approximately in the range of zero (0) to 15 centimeters. **Figure 4B** shows a general configuration 410 in a handset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 4A. **Figure 4C** shows a general configuration 420 in a headset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 4A.

Figure 5A shows a configuration 500 using an omnidirectional speech microphone and a unidirectional noise microphone, under an alternative embodiment. The relative angle *f* between vectors normal to the faces of the microphones is approximately in a range between 60 and 135 degrees. The distances d_1 and d_2 are each approximately in the range of zero (0) to 15 centimeters. **Figure 5B** shows a general configuration 510 in a handset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 5A. **Figure 5C** shows a general configuration 520 in a headset using an omnidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 5A.

The embodiments of Figures 4 and 5 are such that the SNR of MIC 1 is generally greater than the SNR of MIC 2. For large values of *f* (around 180 degrees), the noise originating in front of the speaker may not be significantly captured, leading to slightly reduced denoising performance. In addition, if *f* gets too small, a significant amount of speech can be captured by the noise microphone, increasing the denoised signal distortion and/or computational expense. Therefore it is recommended for maximum performance that the angle of orientation for the UNI microphone in this configuration to be approximately 60-135 degrees, as shown in **Figure 5**. This allows the noise originating from the front of the user to be captured more easily, improving the denoising performance. It also keeps the amount of speech signal captured by the noise microphone small so that the full capabilities of Pathfinder are not required. One skilled in the art will be able to quickly determine efficient angles for numerous other UNI/OMNI combinations through simple experimentation.

Microphone Arrays Including Two UNI Microphones

The microphone array of an embodiment includes two UNI microphones, where a first UNI microphone is the speech microphone and a second UNI microphone is the noise microphone. In the following description the maximum of the spatial response of the speech UNI is assumed oriented toward the user's mouth.

Noise UNI Microphone Oriented Away From Speaker

Similar to the configurations described above with reference to **Figures 4A, 4B, and 4C** and **Figures 5A, 5B, and 5C**, orienting the noise UNI away from the speaker can reduce the amount of speech captured by the noise microphone, allowing for the use of the simpler version of Pathfinder that only uses the calculation of $H_1(z)$ (as described below). Once again the angle of orientation with respect to the speaker's mouth can vary between approximately zero (0) and 180 degrees. At or near 180 degrees noise generated from in front of the user may not be captured well enough by the noise microphone to allow optimal suppression of the noise. Therefore if this configuration is used, it will work best if a cardioid is used as the speech microphone and a super-cardioid as the noise microphone. This will allow limited capture of noise to the front of the user, increasing the noise suppression. However, more speech may be captured as well and can result in de-signaling unless the full capabilities of Pathfinder are used in the signal processing. A compromise is sought between noise suppression, de-signaling, and computational complexity with this configuration.

Figure 6A shows a configuration 600 using a unidirectional speech microphone and a unidirectional noise microphone, under an embodiment. The relative angle *f* between vectors normal to the faces of the microphones is approximately 180 degrees. The distance *d* is approximately in the range of zero (0) to 15 centimeters. **Figure 6B** shows a general configuration 610 in a handset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 6A. **Figure 6C** shows a general configuration 620 in a headset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 6A.

Figure 7A shows a configuration 700 using a unidirectional speech microphone and a unidirectional noise microphone, under an alternative embodiment. The relative angle *f* between vectors normal to the faces of the microphones is approximately in a range between 60 and 135 degrees. The distances d_1 and d_2 are each approximately in the range of zero (0) to 15 centimeters. **Figure 7B** shows a general configuration 710 in a handset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 7A. **Figure 7C** shows a general configuration 720 in a headset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 7A. One skilled in the art will be able to determine efficient angles for the various UNI/UNI combinations using the descriptions herein.

UNI/UNI Microphone Array

Figure 8A shows a configuration 800 using a unidirectional speech microphone and a unidirectional noise microphone, under an embodiment. The relative angle *f* between vectors normal to the faces of the microphones is approximately 180 degrees. The microphones are placed on an axis 802 that contains the user's mouth at one end (towards speech) and the noise microphone 804 on the other. For optimal performance, the spacing *d* between the microphones should be multiples in space ($d = 1, 2, 3\ldots$) of a sample in time, but are not so limited. The two UNI microphones are not required to be on exactly the same axis with the speaker's mouth, and they may be offset up to 30 degrees or more without significantly affecting the denoising. However the best performance is observed when they are approximately directly in line with each other and the speaker's mouth. Other orientations can be used to those skilled in the art, but for best performance the differential transfer function between the two should be relatively simple. The two UNI microphones of this array can also act as a simple array for use in calculating a VAD signal, as discussed in the Related Applications.

Figure 8B shows a general configuration 810 in a handset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 8A. **Figure 8C** shows a general configuration 820 in a headset using a unidirectional speech microphone and a unidirectional noise microphone, under the embodiment of Figure 8A.

When using the UNI/UNI microphone array, the same type of UNI microphone (cardioid, supercardioid, etc.) should be used. If this is not the case, one microphone could detect signals that the other microphone does not detect, causing a reduction in noise suppression effectiveness. The two UNI microphones should be oriented in the same direction, toward the speaker. Obviously the noise microphone will pick up a lot of speech, so the full version of the Pathfinder system should be used to avoid de-signaling.

Placement of the two UNI microphones on the axis that includes the user's mouth at one end and the noise microphone on the other, and use of a microphone spacing *d* that is a multiple in space of a sample in time allows the differential transfer function between the two microphones to be simple and therefore allows the Pathfinder system to operate at peak efficiency. As an example, if the acoustic data is sampled at 8 kHz, the time between samples is a multiple of 1/8000 seconds, or 0.125 milliseconds. The speed of sound in air is pressure and temperature dependent, but at sea level and room temperature it is about 345 meters per second. Therefore in 0.125 milliseconds the sound will travel 345(0.000125) = 4.3 centimeters and the microphones should be spaced about 4.3 centimeters apart, or 8.6 cm, or 12.9 cm, and so on.

For example, and with reference to **Figure 8**, if for an 8 kHz sampled system the distance *d* is chosen to be 1 sample length, or about 4.3 centimeters, then for acoustic sources located in front of MIC 1 on the axis connecting MIC 1 and MIC 2, the differential transfer function $H_2(z)$ would be

$$H_2(z) = \frac{M_2(z)}{M_1(z)} = Cz^{-1},$$

where $M_n(z)$ is the discrete digital output from microphone *n*, C is a constant depending on the distance from MIC 1 to the acoustic source and the response of the microphones, and z^{-1} is a simple delay in the discrete digital domain. Essentially, for acoustic energy originating from the user's mouth, the information captured by MIC 2 is the same as that captured by MIC 1, only delayed by a single sample (due to the 4.3 cm separation) and with a different amplitude. This simple $H_2(z)$ could be hardcoded for this array configuration and used with Pathfinder to denoise noisy speech with minimal distortion.

Microphone Arrays Including Two OMNI Microphones

The microphone array of an embodiment includes two OMNI microphones, where a first OMNI microphone is the speech microphone and a second OMNI microphone is the noise microphone.

Figure 9A shows a configuration 900 using an omnidirectional speech microphone and an omnidirectional noise microphone, under an embodiment. The microphones are placed on an axis 902 that contains the user's mouth at one end (towards speech) and the noise microphone 904 on the other. For optimal performance, the spacing d between the microphones should be multiples in space ($d = 1, 2, 3\ldots$) of a sample in time, but are not so limited. The two OMNI microphones are not required to be on exactly the same axis with the speaker's mouth, and they may be offset up to 30 degrees or more without significantly affecting the denoising. However the best performance is observed when the microphones are approximately directly in line with each other and the speaker's mouth. Other orientations can be used to those skilled in the art, but for best performance the differential transfer function between the two should be relatively simple, as in the previous section described using two UNI microphones. The two OMNI microphones of this array can also act as a simple array for use in calculating a VAD signal, as discussed in the Related Applications.

Figure 9B shows a general configuration 910 in a handset using an omnidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 9A. **Figure 9C** shows a general configuration 920 in a headset using an omnidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 9A.

As with the UNI/UNI microphone array described above, perfect alignment between the two OMNI microphones and the speaker's mouth is not strictly necessary, although that alignment offers the best performance. This configuration is a likely implementation for handsets, for both price reasons (OMNIs are less expensive than UNIs) and packaging reasons (it is simpler to properly vent OMNIs than UNIs).

VOICE ACTIVITY DETECTION (VAD) DEVICES

Referring to **Figure 1A**, a VAD device is a component of the noise suppression system of an embodiment. Following are a number of VAD devices for use in a noise suppression system and a description how each may be implemented for both a handset and a headset application. The VAD is a component of the Pathfinder denoising system, as described in United States Patent Application number 10/383,162, entitled VOICE ACTIVITY DETECTION (VAD) DEVICES AND METHODS FOR USE WITH NOISE SUPPRESSION SYSTEMS, filed March 5, 2003.

General Electromagnetic Sensor (GEMS) VAD

The GEMS is a radiofrequency (RF) interferometer that operates in the 1-5 GHz frequency range at very low power, and can be used to detect vibrations of very small amplitude. The GEMS is used to detect vibrations of the trachea, neck, cheek, and head associated with the production of speech. These vibrations occur due to the opening and closing of the vocal folds associated with speech production, and detecting them can lead to a very accurate noise-robust VAD, as described in the Related Applications.

Figure 10A shows an area of sensitivity 1002 on the human head appropriate for receiving a GEMS sensor, under an embodiment. The area of sensitivity 1002 further includes areas of optimal sensitivity 1004 near which a GEMS sensor can be placed to detect vibrational signals associated with voicing. The area of sensitivity 1002 along with the areas of optimal sensitivity 1004 is the same for both sides of the human head. Furthermore, the area of sensitivity 1002 includes areas on the neck and chest (not shown).

As the GEMS is an RF sensor, it uses an antenna. Very small (from approximately 4 mm by 7 mm to about 20 mm by 20 mm) micropatch antennae have been constructed and used that allow the GEMS to detect vibrations. These antennae are designed to be close to the skin for maximum efficiency. Other antennae may be used as well. The antennae may be mounted in the handset or earpiece in any manner, the only restriction being that sufficient energy to detect the vibration must reach the vibrating objects. In some cases this will require skin contact, in others skin contact may not be needed.

Figure 10B shows GEMS antenna placement 1010 on a generic handset or headset device 1020, under an embodiment. Generally, the GEMS antenna placement 1010 can be on any part of the device 1020 that corresponds to the area of sensitivity 1002 (**Figure 10A**) on the human head when the device 1020 is in use.

Surface Skin Vibration-based VAD

As described in the Related Applications, accelerometers and devices called Skin Surface Microphones (SSMs) can be used to detect the skin vibrations that occur due to the production of speech. However, these sensors can be polluted by exterior acoustic noise, and so care must be taken in their placement and use. Accelerometers are well known and understood, and the SSM is a device that can also be used to detect vibrations, although not with the same fidelity as the accelerometer. Fortunately, constructing a VAD does not require high fidelity reproduction of the underlying vibration, just the ability to determine if vibrations are taking place. For this the SSM is well suited.

The SSM is a conventional microphone modified to prevent airborne acoustic information from coupling with the microphone's detecting elements. A layer of silicone gel or other covering changes the impedance of the microphone and prevents airborne acoustic information from being detected to a significant degree. Thus this microphone is shielded from airborne acoustic energy but is able to detect acoustic waves traveling in media other than air as long as it maintains physical contact with the media.

During speech, when the accelerometer/SSM is placed on the cheek or neck, vibrations associated with speech production are easily detected. However, the airborne acoustic data is not significantly detected by the accelerometer/SSM. The tissue-borne acoustic signal, upon detection by the accelerometer/SSM, is used to generate a VAD signal used to process and denoise the signal of interest.

Skin Vibrations In The Ear

One placement that can be used to cut down on the amount of external noise detected by the accelerometer/SSM and assure a good fit is to place the accelerometer/SSM in the ear canal. This is already done in some commercial products, such as Temco's Voiceducer, where the vibrations are directly used as the input to a

communication system. In the noise suppression systems described herein, however, the accelerometer signal is only used to calculate a VAD signal. Therefore the accelerometer/SSM in the ear can be less sensitive and require less bandwidth, and thus be less expensive.

Skin Vibrations Outside The Ear

There are many locations outside the ear from which the accelerometer/SSM can detect skin vibrations associated with the production of speech. The accelerometer/SSM may be mounted in the handset or earpiece in any manner, the only restriction being that reliable skin contact is required to detect the skin-borne vibrations associated with the production of speech. **Figure 11A** shows areas of sensitivity 1102, 1104, 1106, 1108 on the human head appropriate for placement of an accelerometer/SSM, under an embodiment. The areas of sensitivity include areas of the jaw 1102, areas on the head 1104, areas behind the ear 1106, and areas on the side and front of the neck 1108. Furthermore, the areas of sensitivity include areas on the neck and chest (not shown). The areas of sensitivity 1102-1108 are the same for both sides of the human head.

The areas of sensitivity 1102-1108 include areas of optimal sensitivity A-F where speech can be reliably detected by a SSM, under an embodiment. The areas of optimal sensitivity A-F include, but are not limited to, the area behind the ear A, the area above the ear B, the mid-cheek area C of the jaw, the area in front of the ear canal D, the area E inside the ear canal in contact with the mastoid bone or other vibrating tissue, and the nose F. Placement of an accelerometer/SSM in the proximity of any of these areas of sensitivity 1102-1108 will work with a headset, but a handset requires contact with the cheek, jaw, head, or neck. The above areas are only meant to guide, and there may be other areas not specified where useful vibrations can also be detected.

Figure 11B shows accelerometer/SSM placement 1110 on a generic handset or headset device 1120, under an embodiment. Generally, the accelerometer/SSM placement 1110 can be on any part of the device 1120 that corresponds to the areas of sensitivity 1102-1108 **(Figure 11A)** on the human head when the device 1120 is in use.

Two-Microphone Acoustic VAD

These VADs, which include array VAD, Pathfinder VAD, and stereo VAD, operate with two microphones and without any external hardware. Each of the array VAD, Pathfinder VAD, and stereo VAD takes advantage of the two-microphone configuration in a different way, as described below.

Array VAD

The array VAD, described further in the Related Applications, arranges the microphones in a simple linear array and detects the speech using the characteristics of the array. It functions best when the microphones and the user's mouth are linearly co-located and the microphones are located a multiple of a sample distance away. That is, if the sampling frequency of the system is 8 kHz, and the speed of sound is approximately 345 m/s, then in one sample sound will travel

$$d = 345 \text{ m/s} \cdot (1/8000 \text{ s}) = 4.3 \text{ cm}$$

and the microphones should be separated by 4.3, 8.6, 12.9... cm. Embodiments of the array VAD in both handsets and headsets are the same as the microphone configurations of **Figures 8 and 9**, described above. Either OMNI or UNI microphones or a combination of the two may be used. If the microphones are to be used for VAD and to capture the acoustic information used for denoising, this configuration uses microphones arranged as in the UNI/UNI microphone array and OMNI/OMNI microphone array described above.

Pathfinder VAD

The Pathfinder VAD, also described further in the Related Applications, uses the gain of the differential transfer function $H_1(z)$ of the Pathfinder technique to determine when voicing is occurring. As such, it can be used with virtually any of the microphone configurations above with little modification. Very good performance has been noted with the UNI/UNI microphone configuration described above with reference to **Figure 7**.

Stereo VAD

The stereo VAD, also described further in the Related Applications, uses the difference in frequency amplitude from the noise and the speech to determine when speech is occurring. It uses a microphone configuration in which the SNR is larger in the speech microphone than in the noise microphone. Again, virtually any of the microphone configurations above can be configured to work with this VAD technique, but very good performance has been noted with the UNI/UNI microphone configuration described above with reference to **Figure 7**.

Manually Activated VAD

In this embodiment, the user or an outside observer manually activates the VAD, using a pushbutton or switching device. This can even be done offline, on a recording of the data recorded using one of the above configurations. Activation of the manual VAD device, or manually overriding an automatic VAD device like those described above, results in generation of a VAD signal. As this VAD does not rely on the microphones, it may be used with equal utility with any of the microphone configurations above.

Single-Microphone/Conventional VAD

Any conventional acoustic method can also be used with either or both of the speech and noise microphones to construct the VAD signal used by Pathfinder for noise suppression. For example, a conventional mobile phone VAD (see United States Patent Number 6,453,291 of Ashley, where a VAD configuration appropriate to the front-end of a digital cellular system is described) can be used with the speech microphone to construct a VAD signal for use with the Pathfinder noise suppression system. In another embodiment, a "close talk" or gradient microphone may be used to record a high-SNR signal near the mouth, through which a VAD signal may be easily calculated. This microphone could be used as the speech microphone of the system, or could be completely separate. In the case where the gradient microphone is also used as the speech microphone of the system, the gradient microphone takes the place of the UNI microphones in either of the microphone array including mixed OMNI and UNI microphones when the UNI microphone is the speech microphone (described above with

reference to **Figure 3**) or the microphone array including two UNI microphones when the noise UNI microphone is oriented away from the speaker (described above with reference to **Figures 6 and 7**).

Pathfinder Noise Suppression System

As described above, **Figure 1** is a block diagram of a signal processing system 100 including the Pathfinder noise suppression system 105 and a VAD system 106, under an embodiment. The signal processing system 105 includes two microphones MIC 1 103 and MIC 2 104 that receive signals or information from at least one speech source 101 and at least one noise source 102. The path s(n) from the speech source 101 to MIC 1 and the path n(n) from the noise source 102 to MIC 2 are considered to be unity. Further, $H_1(z)$ represents the path from the noise source 102 to MIC 1, and $H_2(z)$ represents the path from the signal source 101 to MIC 2.

A VAD signal 106, derived in some manner, is used to control the method of noise removal. The acoustic information coming into MIC 1 is denoted by $m_1(n)$. The information coming into MIC 2 is similarly labeled $m_2(n)$. In the *z* (digital frequency) domain, we can represent them as $M_1(z)$ and $M_2(z)$. Thus

$$\begin{aligned} M_1(z) &= S(z) + N(z)H_1(z) \\ M_2(z) &= N(z) + S(z)H_2(z) \end{aligned} \qquad (1)$$

This is the general case for all realistic two-microphone systems. There is always some leakage of noise into MIC 1, and some leakage of signal into MIC 2. Equation 1 has four unknowns and only two relationships and, therefore, cannot be solved explicitly.

However, perhaps there is some way to solve for some of the unknowns in Equation 1 by other means. Examine the case where the signal is not being generated, that is, where the VAD indicates voicing is not occurring. In this case, s(n) = S(z) = 0, and Equation 1 reduces to

$$\begin{aligned} M_{1n}(z) &= N(z)H_1(z) \\ M_{2n}(z) &= N(z) \end{aligned}$$

where the n subscript on the M variables indicate that only noise is being received. This leads to

$$M_{1n}(z) = M_{2n}(z)H_1(z)$$
$$H_1(z) = \frac{M_{1n}(z)}{M_{2n}(z)} \quad (2)$$

Now, $H_1(z)$ can be calculated using any of the available system identification algorithms and the microphone outputs when only noise is being received. The calculation should be done adaptively in order to allow the system to track any changes in the noise.

After solving for one of the unknowns in Equation 1, $H_2(z)$ can be solved for by using the VAD to determine when voicing is occurring with little noise. When the VAD indicates voicing, but the recent history (on the order of 1 second or so) of the microphones indicate low levels of noise, assume that $n(s) = N(z) \sim 0$. Then Equation 1 reduces to

$$M_{1s}(z) = S(z)$$
$$M_{2s}(z) = S(z)H_2(z)$$

which in turn leads to

$$M_{2s}(z) = M_{1s}(z)H_2(z)$$
$$H_2(z) = \frac{M_{2s}(z)}{M_{1s}(z)}$$

This calculation for $H_2(z)$ appears to be just the inverse of the $H_1(z)$ calculation, but remember that different inputs are being used as the calculation now takes place when speech is being produced. Note that $H_2(z)$ should be relatively constant, as there is always just a single source (the user) and the relative position between the user and the microphones should be relatively constant. Use of a small adaptive gain for the $H_2(z)$ calculation works well and makes the calculation more robust in the presence of noise.

Following the calculation of $H_1(z)$ and $H_2(z)$ above, they are used to remove the noise from the signal. Rewriting Equation 1 as

$$S(z) = M_1(z) - N(z)H_1(z)$$
$$N(z) = M_2(z) - S(z)H_2(z)$$
$$S(z) = M_1(z) - [M_2(z) - S(z)H_2(z)]H_1(z)$$
$$S(z)[1 - H_2(z)H_1(z)] = M_1(z) - M_2(z)H_1(z)$$

allows solving for S(z)

$$S(z) = \frac{M_1(z) - M_2(z)H_1(z)}{1 - H_2(z)H_1(z)}. \quad (3)$$

Generally, $H_2(z)$ is quite small, and $H_1(z)$ is less than unity, so for most situations at most frequencies

$$H_2(z)H_1(z) << 1,$$

and the signal can be calculated using

$$S(z) \approx M_1(z) - M_2(z)H_1(z).$$

Therefore the assumption is made that $H_2(z)$ is not needed, and $H_1(z)$ is the only transfer to be calculated. While $H_2(z)$ can be calculated if desired, good microphone placement and orientation can obviate the need for $H_2(z)$ calculation.

Significant noise suppression can only be achieved through the use of multiple subbands in the processing of acoustic signals. This is because most adaptive filters used to calculate transfer functions are of the FIR type, which use only zeros and not poles to calculate a system that contains both zeros and poles as

$$H_1(z) \xrightarrow[\text{MODELS}]{} \frac{B(z)}{A(z)}.$$

Such a model can be sufficiently accurate given enough taps, but this can greatly increase computational cost and convergence time. What generally occurs in an energy-based adaptive filter system such as the least-mean squares (LMS) system is that the system matches the magnitude and phase well at a small range of frequencies that contain more energy than other frequencies. This allows the LMS to fulfill its requirement to minimize the energy of the error to the best of its ability, but this fit may cause the noise in areas outside of the matching frequencies to rise, reducing the effectiveness of the noise suppression.

The use of subbands alleviates this problem. The signals from both the primary and secondary microphones are filtered into multiple subbands, and the resulting data from each subband (which can be frequency shifted and decimated if desired, but it is not necessary) is sent to its own adaptive filter. This forces the adaptive filter to try to fit the data in its own subband, rather than just where the energy is highest in the signal. The noise-suppressed results from each subband can be added together to form the final

denoised signal at the end. Keeping everything time-aligned and compensating for filter shifts is not easy, but the result is a much better model to the system at the cost of increased memory and processing requirements.

At first glance, it may seem as if the Pathfinder algorithm is very similar to other algorithms such as classical ANC (adaptive noise cancellation), shown in **Figure 1B**. However, close examination reveals several areas that make all the difference in terms of noise suppression performance, including using VAD information to control adaptation of the noise suppression system to the received signals, using numerous subbands to ensure adequate convergence across the spectrum of interest, and supporting operation with acoustic signal of interest in the reference microphone of the system, as described in turn below.

Regarding the use of VAD to control adaptation of the noise suppression system to the received signals, classical ANC uses no VAD information. Since, during speech production, there is signal in the reference microphone, adapting the coefficients of $H_1(z)$ (the path from the noise to the primary microphone) during the time of speech production would result in the removal of a large part of the speech energy from the signal of interest. The result is signal distortion and reduction (de-signaling). Therefore, the various methods described above use VAD information to construct a sufficiently accurate VAD to instruct the Pathfinder system when to adapt the coefficients of H_1 (noise only) and H_2 (if needed, when speech is being produced).

An important difference between classical ANC and the Pathfinder system involves subbanding of the acoustic data, as described above. Many subbands are used by the Pathfinder system to support application of the LMS algorithm on information of the subbands individually, thereby ensuring adequate convergence across the spectrum of interest and allowing the Pathfinder system to be effective across the spectrum.

Because the ANC algorithm generally uses the LMS adaptive filter to model H_1, and this model uses all zeros to build filters, it was unlikely that a "real" functioning system could be modeled accurately in this way. Functioning systems almost invariably have both poles and zeros, and therefore have very different frequency responses than those of the LMS filter. Often, the best the LMS can do is to match the phase and magnitude of the real system at a single frequency (or a very small range), so that outside

this frequency the model fit is very poor and can result in an increase of noise energy in these areas. Therefore, application of the LMS algorithm across the entire spectrum of the acoustic data of interest often results in degradation of the signal of interest at frequencies with a poor magnitude/phase match.

Finally, the Pathfinder algorithm supports operation with the acoustic signal of interest in the reference microphone of the system. Allowing the acoustic signal to be received by the reference microphone means that the microphones can be much more closely positioned relative to each other (on the order of a centimeter) than in classical ANC configurations. This closer spacing simplifies the adaptive filter calculations and enables more compact microphone configurations/solutions. Also, special microphone configurations have been developed that minimize signal distortion and de-signaling, and support modeling of the signal path between the signal source of interest and the reference microphone.

In an embodiment, the use of directional microphones ensures that the transfer function does not approach unity. Even with directional microphones, some signal is received into the noise microphone. If this is ignored and it is assumed that $H_2(z) = 0$, then, assuming a perfect VAD, there will be some distortion. This can be seen by referring to Equation 2 and solving for the result when $H_2(z)$ is not included:

$$S(z)[1 - H_2(z)H_1(z)] = M_1(z) - M_2(z)H_1(z). \quad (4)$$

This shows that the signal will be distorted by the factor $[1 - H_2(z)H_1(z)]$. Therefore, the type and amount of distortion will change depending on the noise environment. With very little noise, $H_1(z)$ is approximately zero and there is very little distortion. With noise present, the amount of distortion may change with the type, location, and intensity of the noise source(s). Good microphone configuration design minimizes these distortions.

The calculation of H_1 in each subband is implemented when the VAD indicates that voicing is not occurring or when voicing is occurring but the SNR of the subband is sufficiently low. Conversely, H_2 can be calculated in each subband when the VAD indicates that speech is occurring and the subband SNR is sufficiently high. However, with proper microphone placement and processing, signal distortion can be minimized and only H_1 need be calculated. This significantly reduces the processing required and simplifies the implementation of the Pathfinder algorithm. Where classical ANC does

not allow any signal into MIC 2, the Pathfinder algorithm tolerates signal in MIC 2 when using the appropriate microphone configuration. An embodiment of an appropriate microphone configuration, as described above with reference to **Figure 7A**, is one in which two cardioid unidirectional microphones are used, MIC 1 and MIC 2. The configuration orients MIC 1 toward the user's mouth. Further, the configuration places MIC 2 as close to MIC 1 as possible and orients MIC 2 at about 90 degrees with respect to MIC 1.

Perhaps the best way to demonstrate the dependence of the noise suppression on the VAD is to examine the effect of VAD errors on the denoising in the context of a VAD failure. There are two types of errors that can occur. False positives (FP) are when the VAD indicates that voicing has occurred when it has not, and false negatives (FN) are when the VAD does not detect that speech has occurred. False positives are only troublesome if they happen too often, as an occasional FP will only cause the H_1 coefficients to stop updating briefly, and experience has shown that this does not appreciably affect the noise suppression performance. False negatives, on the other hand, can cause problems, especially if the SNR of the missed speech is high.

Assuming that there is speech and noise in both microphones of the system, and the system only detects the noise because the VAD failed and returned a false negative, the signal at MIC 2 is

$$M_2 = H_1 N + H_2 S,$$

where the z's have been suppressed for clarity. Since the VAD indicates only the presence of noise, the system attempts to model the system above as a single noise and a single transfer function according to

$$\text{TF model} = \tilde{H}_1 \tilde{N}.$$

The Pathfinder system uses an LMS algorithm to calculate $\tilde{H}_1$, but the LMS algorithm is generally best at modeling time-invariant, all-zero systems. Since it is unlikely that the noise and speech signal are correlated, the system generally models either the speech and its associated transfer function or the noise and its associated transfer function, depending

on the SNR of the data in MIC 1, the ability to model H_1 and H_2, and the time-invariance of H_1 and H_2, as described below.

Regarding the SNR of the data in MIC 1, a very low SNR (less than zero (0)) tends to cause the Pathfinder system to converge to the noise transfer function. In contrast, a high SNR (greater than zero (0)) tends to cause the Pathfinder system converge to the speech transfer function. As for the ability to model H_1, if either H_1 or H_2 is more easily modeled using LMS (an all-zero model), the Pathfinder system tends to converge to that respective transfer function.

In describing the dependence of the system modeling on the time-invariance of H_1 and H_2, consider that LMS is best at modeling time-invariant systems. Thus, the Pathfinder system would generally tend to converge to H_2, since H_2 changes much more slowly than H_1 is likely to change.

If the LMS models the speech transfer function over the noise transfer function, then the speech is classified as noise and removed as long as the coefficients of the LMS filter remain the same or are similar. Therefore, after the Pathfinder system has converged to a model of the speech transfer function H_2 (which can occur on the order of a few milliseconds), any subsequent speech (even speech where the VAD has not failed) has energy removed from it as well as the system "assumes" that this speech is noise because its transfer function is similar to the one modeled when the VAD failed. In this case, where H_2 is primarily being modeled, the noise will either be unaffected or only partially removed.

The end result of the process is a reduction in volume and distortion of the cleaned speech, the severity of which is determined by the variables described above. If the system tends to converge to H_1, the subsequent gain loss and distortion of the speech will not be significant. If, however, the system tends to converge to H_2, then the speech can be severely distorted.

This VAD failure analysis does not attempt to describe the subtleties associated with the use of subbands and the location, type, and orientation of the microphones, but is meant to convey the importance of the VAD to the denoising. The results above are applicable to a single subband or an arbitrary number of subbands, because the interactions in each subband are the same.

In addition, the dependence on the VAD and the problems arising from VAD errors described in the above VAD failure analysis are not limited to the Pathfinder noise suppression system. Any adaptive filter noise suppression system that uses a VAD to determine how to denoise will be similarly affected. In this disclosure, when the Pathfinder noise suppression system is referred to, it should be kept in mind that all noise suppression systems that use multiple microphones to estimate the noise waveform and subtract it from a signal including both speech and noise, and that depend on VAD for reliable operation, are included in that reference. Pathfinder is simply a convenient referenced implementation.

The microphone and VAD configurations described above are for use with communication systems, wherein the communication systems comprise: a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

The two unidirectional microphones are separated by a distance approximately in the range of zero (0) to 15 centimeters.

The two unidirectional microphones have an angle between maximums of a spatial response curve of each microphone approximately in the range of zero (0) to 180 degrees.

The voice detection subsystem of an embodiment further comprises at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals, and at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

The voice detection subsystem of another embodiment further comprises at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals, and at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

The voice detection subsystem of yet another embodiment further comprises at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals, and at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

The voice detection subsystem can also receive voice activity signals via couplings with the microphones.

The voice detection subsystem of still another embodiment further comprises two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and wherein the angle is approximately in the range of zero (0) to 180 degrees, and at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals.

The voice detection subsystem of other alternative embodiments further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

The communications system of an embodiment further includes a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal

digital assistants (PDAs), and personal computers (PCs). The portable handset can include at least one of the voice detection subsystem and the denoising subsystem.

The communications system of an embodiment further includes a portable headset that includes the microphones along with at least one speaker device. The portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs). The portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

The communication device can include at least one of the voice detection subsystem and the denoising subsystem. Alternatively, the portable headset can include at least one of the voice detection subsystem and the denoising subsystem.

The portable headset described above is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

The microphone and VAD configurations described above are for use with communication systems of alternative embodiments, wherein the communication systems comprise: a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including an omnidirectional microphone and a unidirectional microphone separated by a distance, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform

estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

The omnidirectional and unidirectional microphones are separated by a distance approximately in the range of zero (0) to 15 centimeters.

The omnidirectional microphone is oriented to capture signals from at least one speech signal source and the unidirectional microphone is oriented to capture signals from at least one noise signal source, wherein an angle between the speech signal source and a maximum of a spatial response curve of the unidirectional microphone is approximately in the range of 45 to 180 degrees.

The voice detection subsystem of an embodiment further comprises at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals, and at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

The voice detection subsystem of another embodiment further comprises at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals, and at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

The voice detection subsystem of yet another embodiment further comprises at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals, and at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

The voice detection subsystem of yet other embodiments further comprises two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and wherein the angle is approximately in the range of zero (0) to 180 degrees, and at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals.

The voice detection subsystem can also include at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

The communications system of an embodiment further includes a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs). The portable handset can include at least one of the voice detection subsystem and the denoising subsystem.

The communications system of an embodiment further includes a portable headset that includes the microphones along with at least one speaker device. The portable headset can couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs). The portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings. In one embodiment, the communication device includes at least one of the voice detection subsystem and the denoising subsystem. In an alternative embodiment, the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

The portable headset described above is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

The microphone and VAD configurations described above are for use with communication systems comprising: at least one transceiver for use in a communications network; a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including a first microphone and a second microphone

separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

In an embodiment, each of the first and second microphones is a unidirectional microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and the angle is approximately in the range of zero (0) to 180 degrees.

In an embodiment, the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone, wherein the first microphone is oriented to capture signals from at least one speech signal source and the second microphone is oriented to capture signals from at least one noise signal source, wherein an angle between the speech signal source and a maximum of a spatial response curve of the second microphone is approximately in the range of 45 to 180 degrees.

The transceiver of an embodiment includes the first and second microphones, but is not so limited.

The transceiver can couple information between the communications network and a user via a headset. The headset used with the transceiver can include the first and second microphones.

Aspects of the invention may be implemented as functionality programmed into any of a variety of circuitry, including programmable logic devices (PLDs), such as field programmable gate arrays (FPGAs), programmable array logic (PAL) devices, electrically programmable logic and memory devices and standard cell-based devices, as well as application specific integrated circuits (ASICs). Some other possibilities for implementing aspects of the invention include: microcontrollers with memory (such as electronically erasable programmable read only memory (EEPROM)), embedded microprocessors, firmware, software, etc. If aspects of the invention are embodied as software at least one stage during manufacturing (e.g. before being embedded in

firmware or in a PLD), the software may be carried by any computer readable medium, such as magnetically- or optically-readable disks (fixed or floppy), modulated on a carrier signal or otherwise transmitted, etc.

Furthermore, aspects of the invention may be embodied in microprocessors having software-based circuit emulation, discrete logic (sequential and combinatorial), custom devices, fuzzy (neural) logic, quantum devices, and hybrids of any of the above device types. Of course the underlying device technologies may be provided in a variety of component types, e.g., metal-oxide semiconductor field-effect transistor (MOSFET) technologies like complementary metal-oxide semiconductor (CMOS), bipolar technologies like emitter-coupled logic (ECL), polymer technologies (e.g., silicon-conjugated polymer and metal-conjugated polymer-metal structures), mixed analog and digital, etc.

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising," and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in a sense of "including, but not limited to." Words using the singular or plural number also include the plural or singular number respectively. Additionally, the words "herein," "hereunder," "above," "below," and words of similar import, when used in this application, shall refer to this application as a whole and not to any particular portions of this application. When the word "or" is used in reference to a list of two or more items, that word covers all of the following interpretations of the word: any of the items in the list, all of the items in the list and any combination of the items in the list.

The above descriptions of embodiments of the invention are not intended to be exhaustive or to limit the invention to the precise forms disclosed. While specific embodiments of, and examples for, the invention are described herein for illustrative purposes, various equivalent modifications are possible within the scope of the invention, as those skilled in the relevant art will recognize. The teachings of the invention provided herein can be applied to other processing systems and communication systems, not only for the communication systems described above.

The elements and acts of the various embodiments described above can be combined to provide further embodiments. These and other changes can be made to the invention in light of the above detailed description.

All of the above references and United States patent applications are incorporated herein by reference. Aspects of the invention can be modified, if necessary, to employ the systems, functions and concepts of the various patents and applications described above to provide yet further embodiments of the invention.

In general, in the following claims, the terms used should not be construed to limit the invention to the specific embodiments disclosed in the specification and the claims, but should be construed to include all processing systems that operate under the claims to provide a method for compressing and decompressing data files or streams. Accordingly, the invention is not limited by the disclosure, but instead the scope of the invention is to be determined entirely by the claims.

While certain aspects of the invention are presented below in certain claim forms, the inventors contemplate the various aspects of the invention in any number of claim forms. For example, while only one aspect of the invention is recited as embodied in a computer-readable medium, other aspects may likewise be embodied in a computer-readable medium. Accordingly, the inventors reserve the right to add additional claims after filing the application to pursue such additional claim forms for other aspects of the invention.

CLAIMS

What we claim is:

1. A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

2. The system of claim 1, wherein the distance is approximately in the range of zero (0) to 15 centimeters.

3. The system of claim 1, wherein the angle is approximately in the range of zero (0) to 180 degrees.

4. The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. The system of claim 1, wherein the voice detection subsystem receives voice activity signals via couplings with the microphones.

8. The system of claim 1, wherein the voice detection subsystem further comprises:

two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and wherein the angle is approximately in the range of zero (0) to 180 degrees; and

at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals.

9. The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones,

wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

18. A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including an omnidirectional microphone and a unidirectional microphone separated by a distance, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

19. The system of claim 18, wherein the distance is approximately in the range of zero (0) to 15 centimeters.

20. The system of claim 18, wherein the omnidirectional microphone is oriented to capture signals from at least one speech signal source and the unidirectional microphone is oriented to capture signals from at least one noise signal source, wherein an angle between the speech signal source and a maximum of a spatial response curve of the unidirectional microphone is approximately in the range of 45 to 180 degrees.

21. The system of claim 18, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

22. The system of claim 18, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

23. The system of claim 18, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

24. The system of claim 18, wherein the voice detection subsystem further comprises:

two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and wherein the angle is approximately in the range of zero (0) to 180 degrees; and

at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals.

25. The system of claim 18, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

26. The system of claim 18, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

27. The system of claim 26, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

28. The system of claim 18, further including a portable headset that includes the microphones along with at least one speaker device.

29. The system of claim 28, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

30. The system of claim 29, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

31. The system of claim 29, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

32. The system of claim 28, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

33. The system of claim 28, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

34. A communications system, comprising:

at least one transceiver for use in a communications network;

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including a first microphone and a second microphone separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

35. The system of claim 34, wherein each of the first and second microphones is a unidirectional microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and the angle is approximately in the range of zero (0) to 180 degrees.

36. The system of claim 34, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone, wherein the first microphone is oriented to capture signals from at least one speech signal source and the second microphone is oriented to capture signals from at least one noise signal source, wherein an angle between the speech signal source and a maximum of a spatial response curve of the second microphone is approximately in the range of 45 to 180 degrees.

37. The system of claim 34, wherein the transceiver includes the first and second microphones.

38. The system of claim 34, wherein the transceiver couples information between the communications network and a user via a headset.

39. The system of claim 38, wherein the headset includes the first and second microphones.

Attorney Docket No. ALPH.P020

Microphone and Voice Activity Detection (VAD) Configurations For Use With Communication Systems

ABSTRACT

Communication systems are described, including both portable handset and headset devices, which use a number of microphone configurations to receive acoustic signals of an environment. The microphone configurations include, for example, a two-microphone array including two unidirectional microphones, and a two-microphone array including one unidirectional microphone and one omnidirectional microphone. The communication systems also include Voice Activity Detection (VAD) devices to provide information of human voicing activity. Components of the communications systems receive the acoustic signals and voice activity signals and, in response, automatically generate control signals from data of the voice activity signals. Components of the communication systems use the control signals to automatically select a denoising method appropriate to data of frequency subbands of the acoustic signals. The selected denoising method is applied to the acoustic signals to generate denoised acoustic signals when the acoustic signal includes speech and noise.

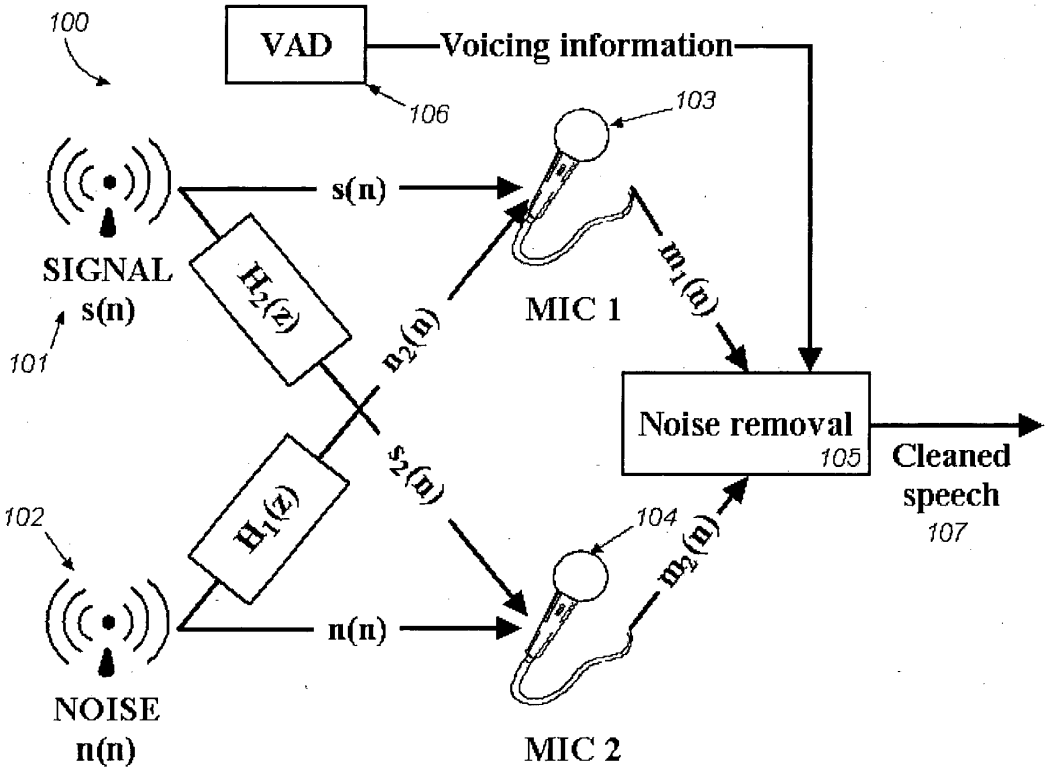

100
VAD
Voicing information
106
103
s(n)
SIGNAL
s(n)
101
$H_2(z)$
$n_2(n)$
MIC 1
$m_1(n)$
Noise removal
105
Cleaned
speech
107
$s_2(n)$
$H_1(z)$
102
104
$m_2(n)$
n(n)
NOISE
n(n)
MIC 2

FIGURE 1

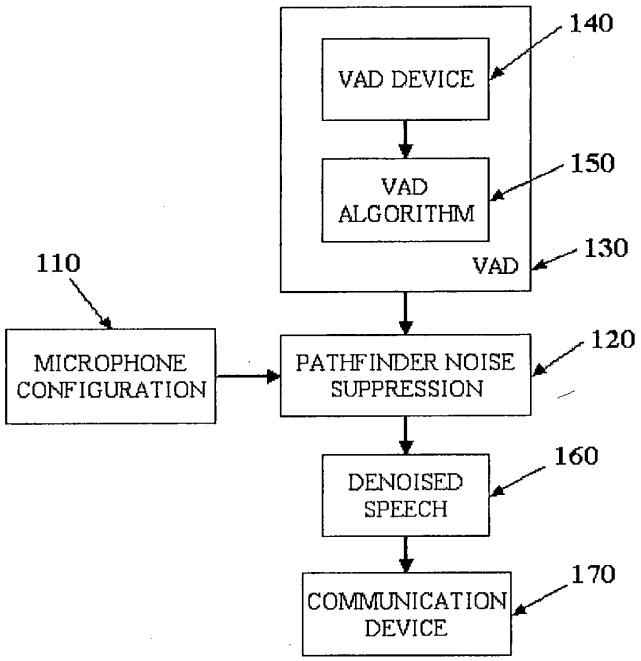

140
VAD DEVICE
150
VAD ALGORITHM
130
VAD
110
MICROPHONE CONFIGURATION
120
PATHFINDER NOISE SUPPRESSION
160
DENOISED SPEECH
170
COMMUNICATION DEVICE

FIGURE 1A

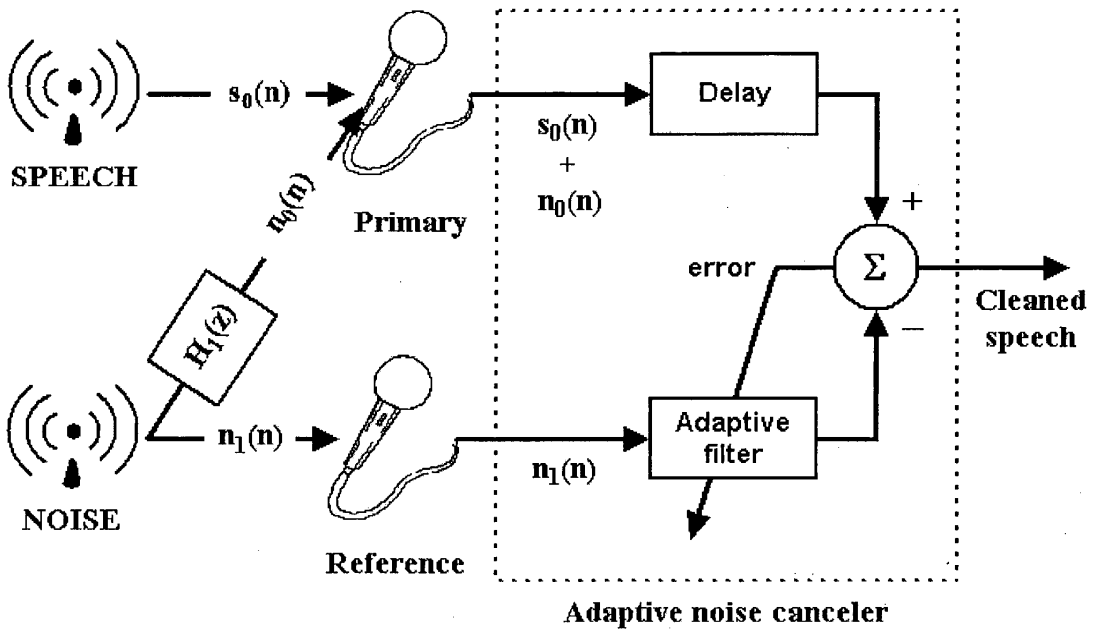


FIGURE 1B
(PRIOR ART)

UNIDIRECTIONAL

CHARACTERISTIC	OMNI-DIRECTIONAL	CARDIOID	SUPER-CARDIOID	HYPER-CARDIOID	BI-DIRECTIONAL
POLAR RESPONSE PATTERN					
COVERAGE ANGLE	360°	131°	115°	105°	90°
ANGLE OF MAXIMUM REJECTION (null angle)	—	180°	126°	110°	90°
REAR REJECTION (relative to front)	0	25 dB	12 dB	6 dB	0
AMBIENT SOUND SENSITIVITY (relative to omni)	100%	33%	27%	25%	33%
DISTANCE FACTOR (relative to omni)	1	1.7	1.9	2	1.7

FIGURE 2
(PRIOR ART)

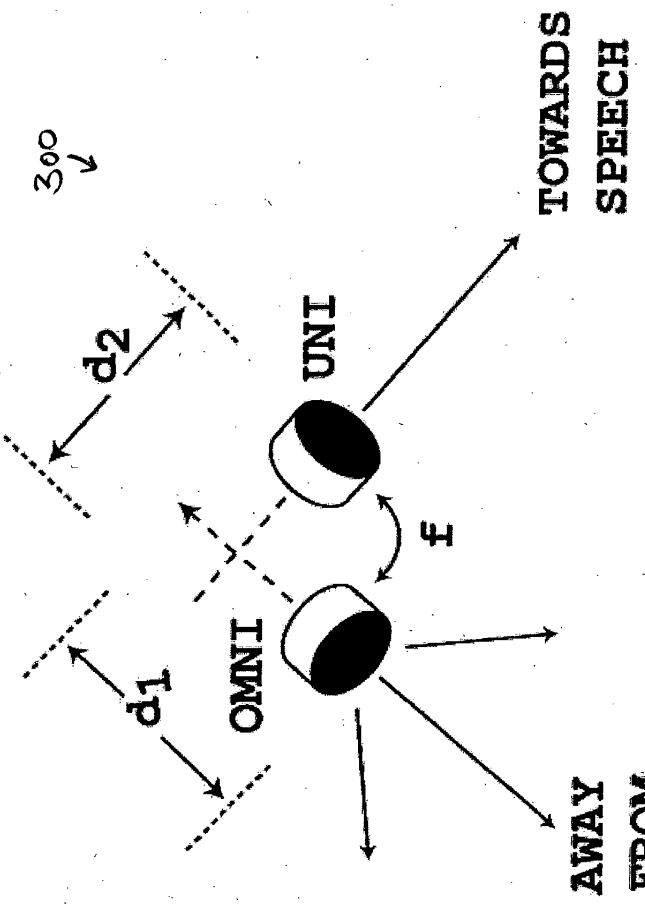


FIGURE 3A

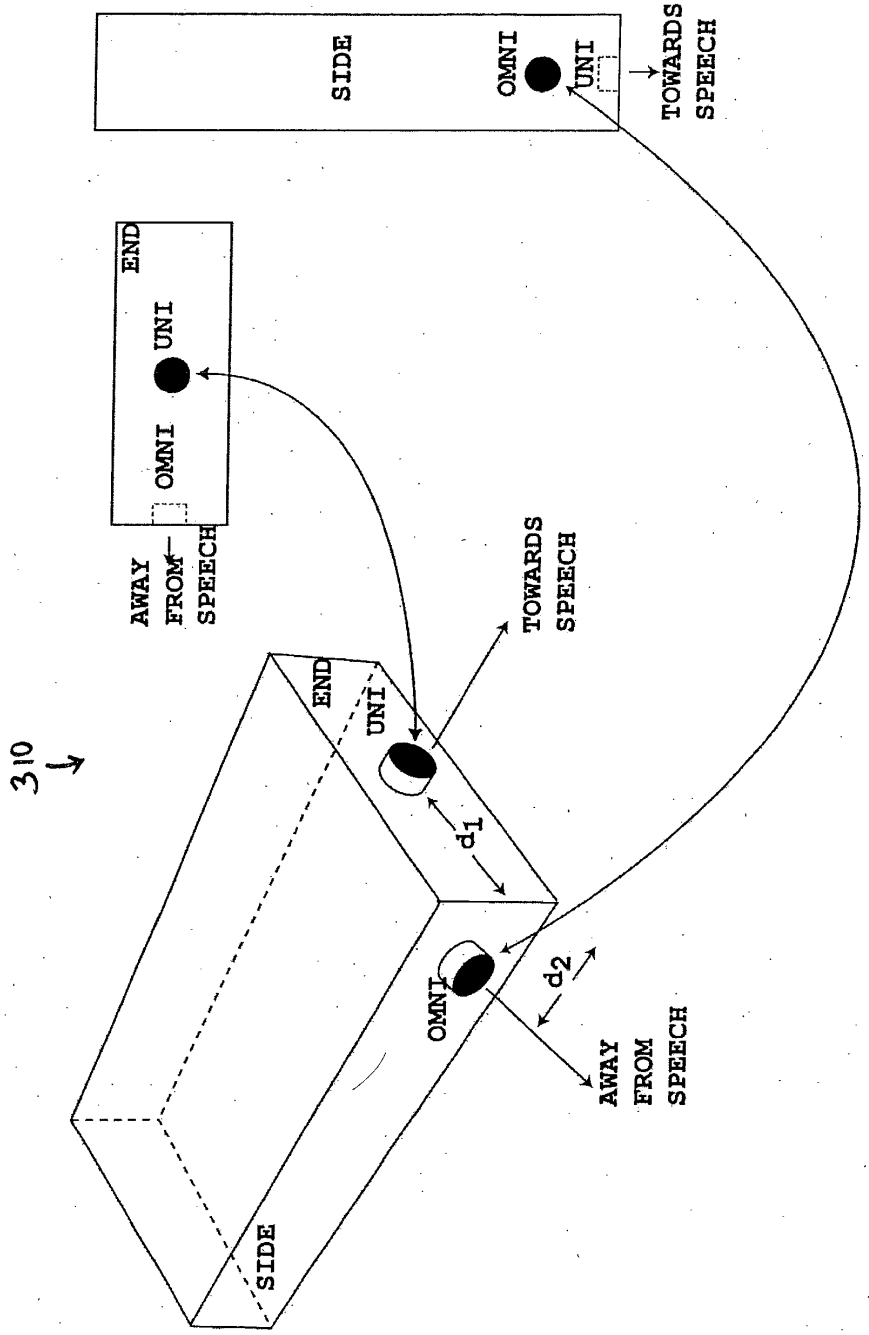

310
SIDE
END
UNI
OMNI
d1
d2
TOWARDS SPEECH
AWAY FROM SPEECH
SIDE
OMNI
UNI
TOWARDS SPEECH
END
UNI
OMNI
AWAY FROM SPEECH
HANDSET

FIGURE 3B

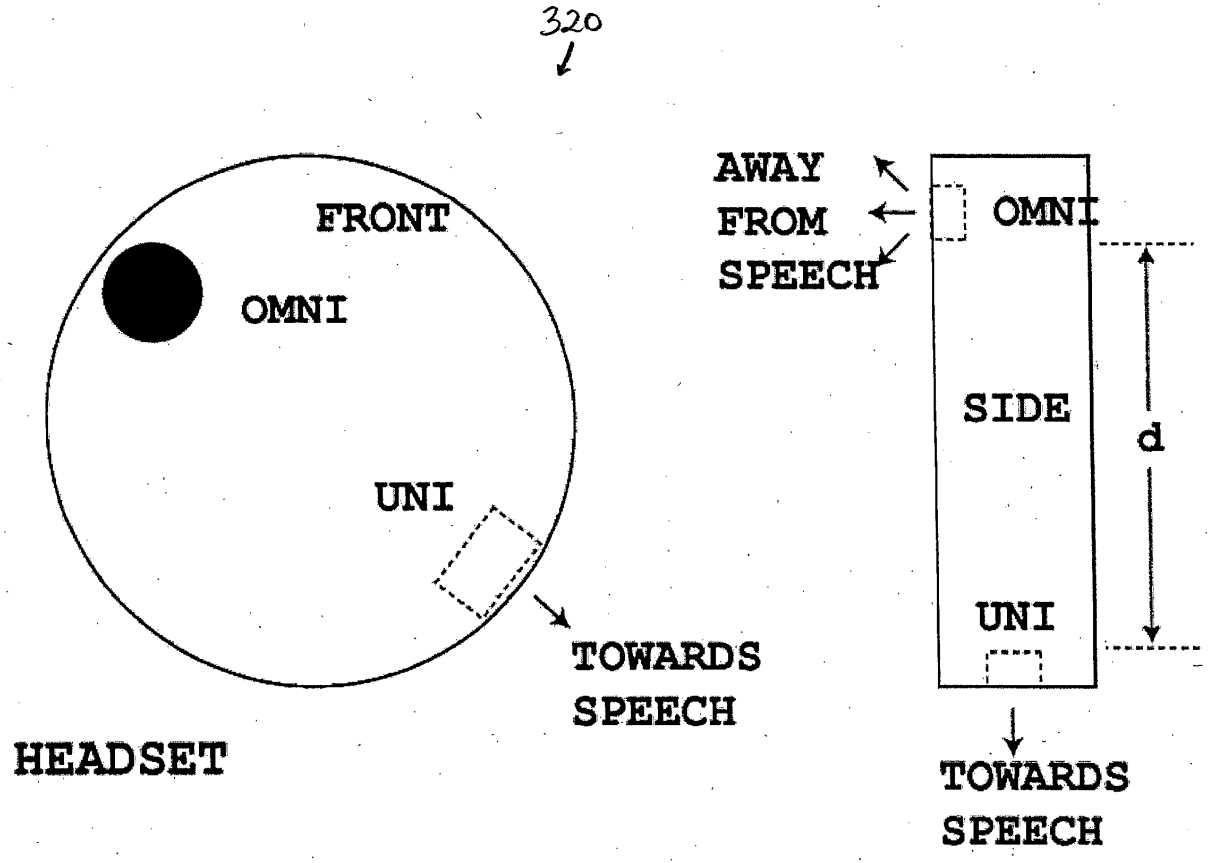


FIGURE 3C

20220-2520.00P

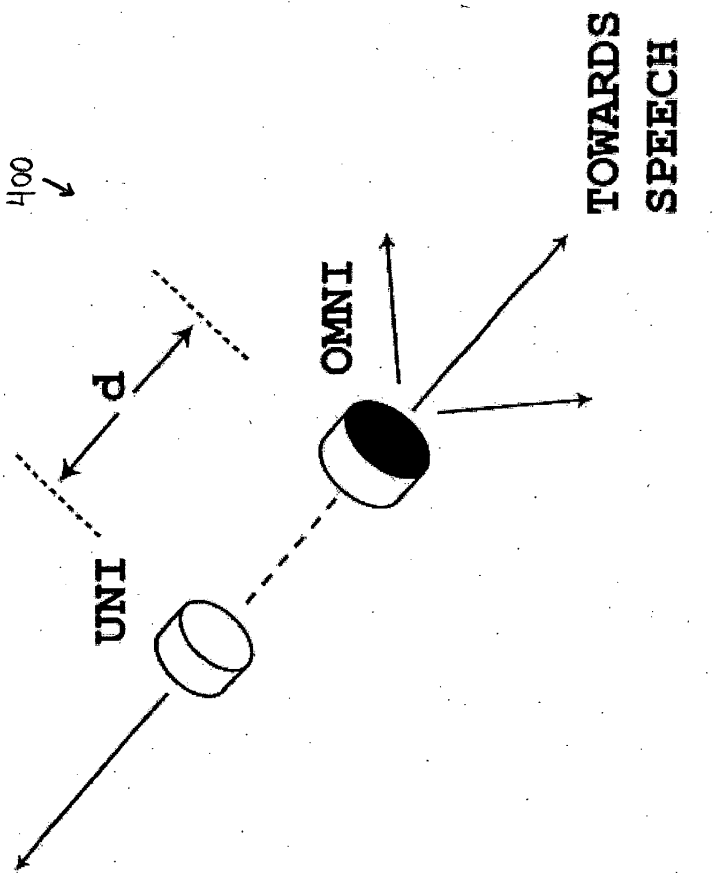


FIGURE 4A

410
UNI
SIDE
OMNI
TOWARDS SPEECH
END
OMNI
TOWARDS SPEECH
END
OMNI
d
UNI
SIDE
AWAY FROM SPEECH
HANDSET

FIGURE 4B

d
UNI
SIDE
OMNI
TOWARDS
SPEECH
420
AWAY
FROM
SPEECH
FRONT
UNI
OMNI
TOWARDS
SPEECH
HEADSET

FIGURE 4C

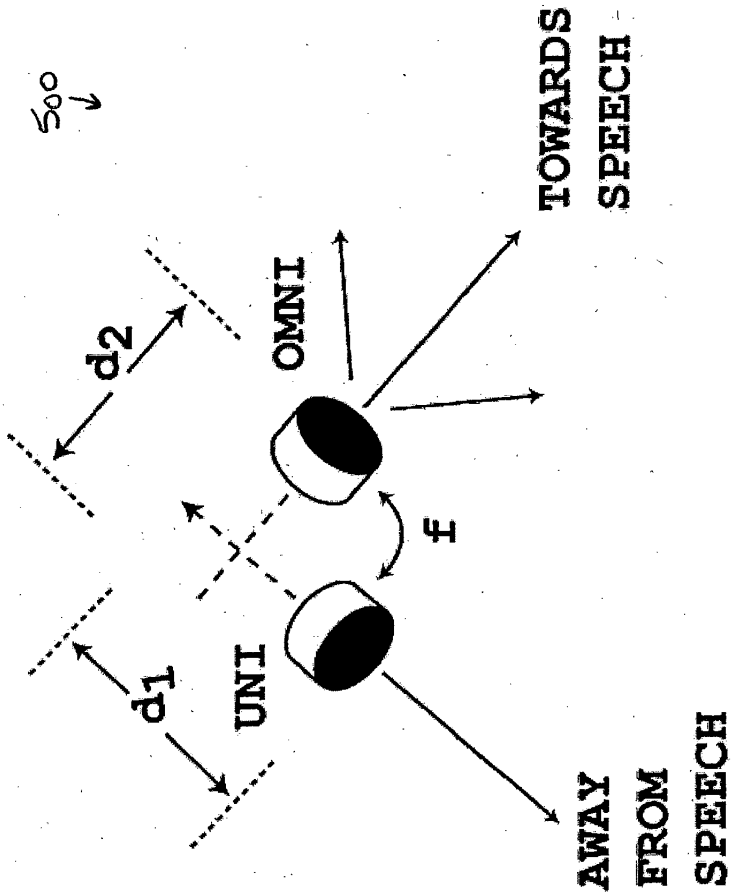


FIGURE 5A

510
SIDE
END
OMNI
UNI
d_1
d_2
TOWARDS SPEECH
AWAY FROM HEAD
HANDSET

FIGURE 5B

520
FRONT
UNI
OMNI
TOWARDS
SPEECH
HEADSET
AWAY
FROM
HEAD
UNI
SIDE
OMNI
d
TOWARDS
SPEECH

FIGURE 5C

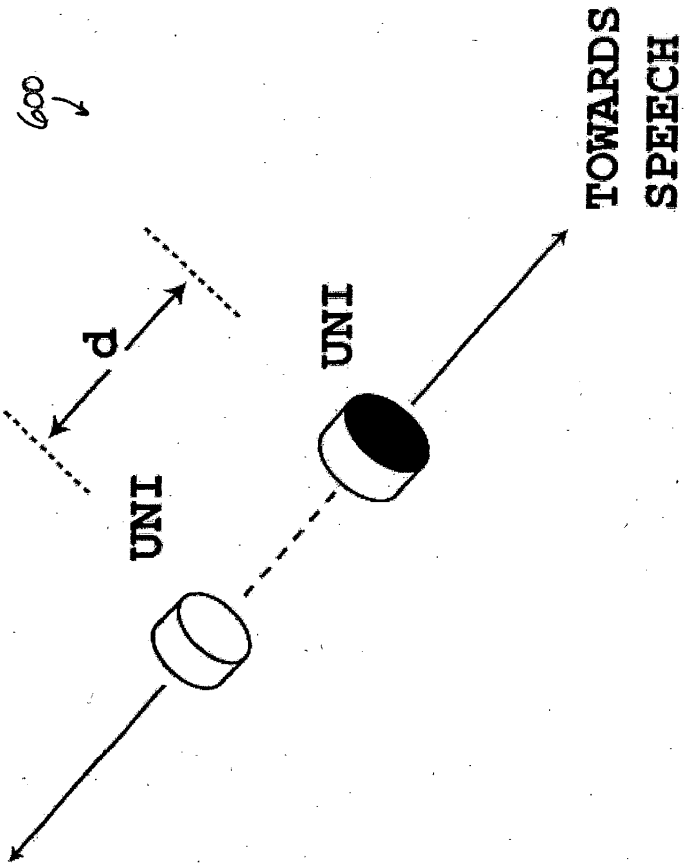


FIGURE 6A

UNI
SIDE
UNI
TOWARDS
SPEECH
END
UNI
TOWARDS
SPEECH
610
END
UNI
d
UNI
SIDE
AWAY
FROM
SPEECH
HANDSET

FIGURE 6B

620
AWAY FROM SPEECH
FRONT
UNI
UNI
TOWARDS SPEECH
HEADSET
UNI
SIDE
UNI
d
TOWARDS SPEECH

FIGURE 6C

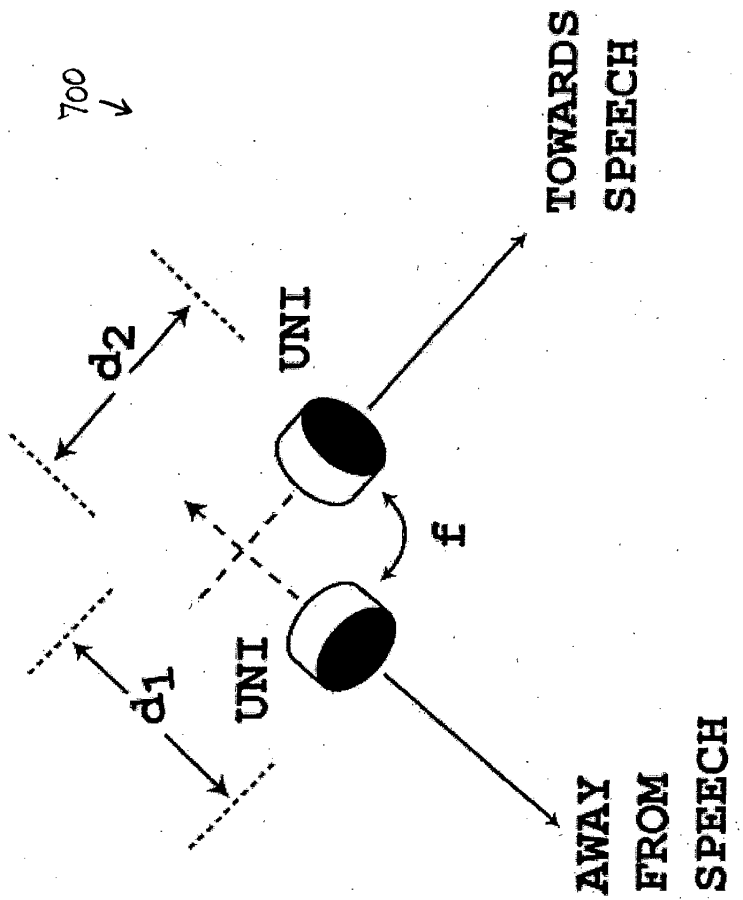


FIGURE 7A

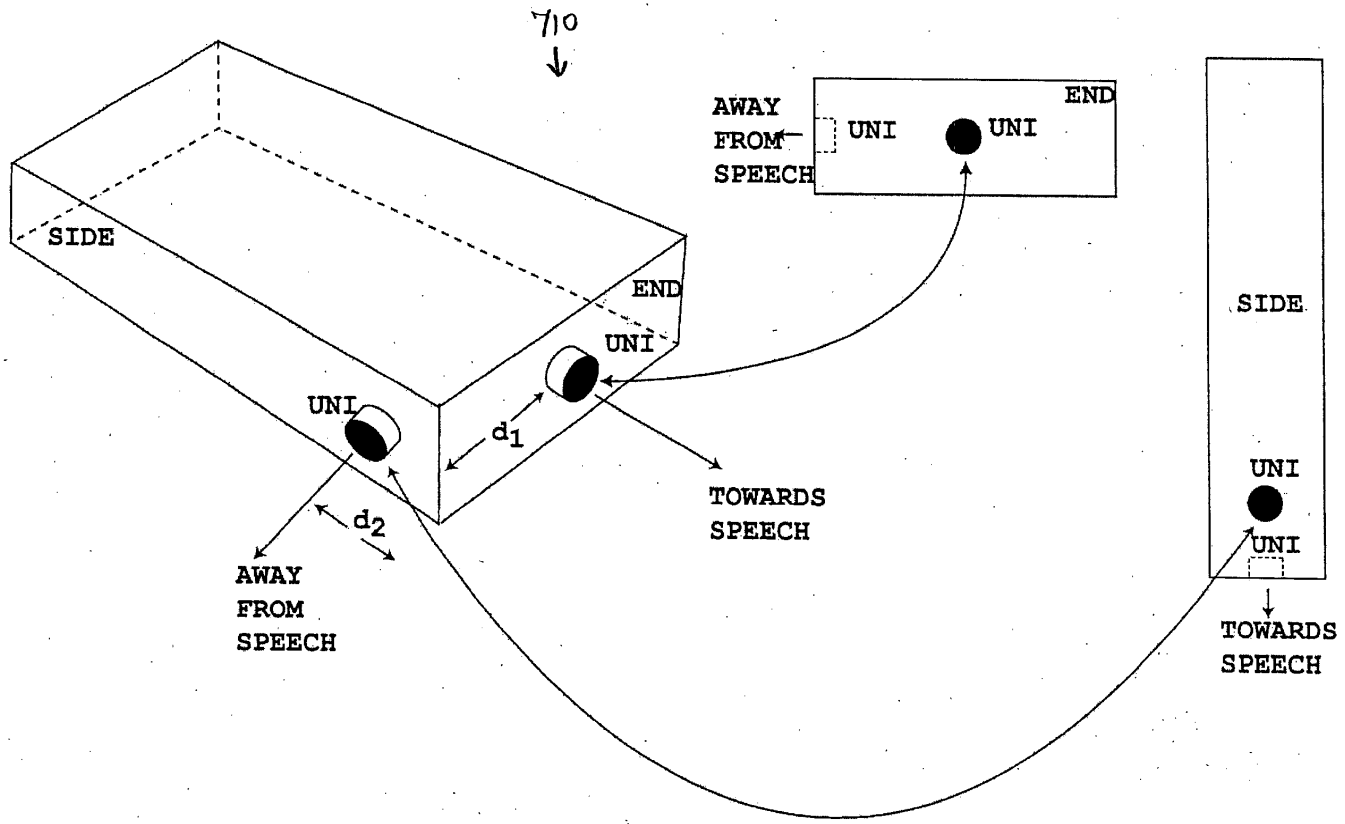


FIGURE 7B

20/20 - 2002040815

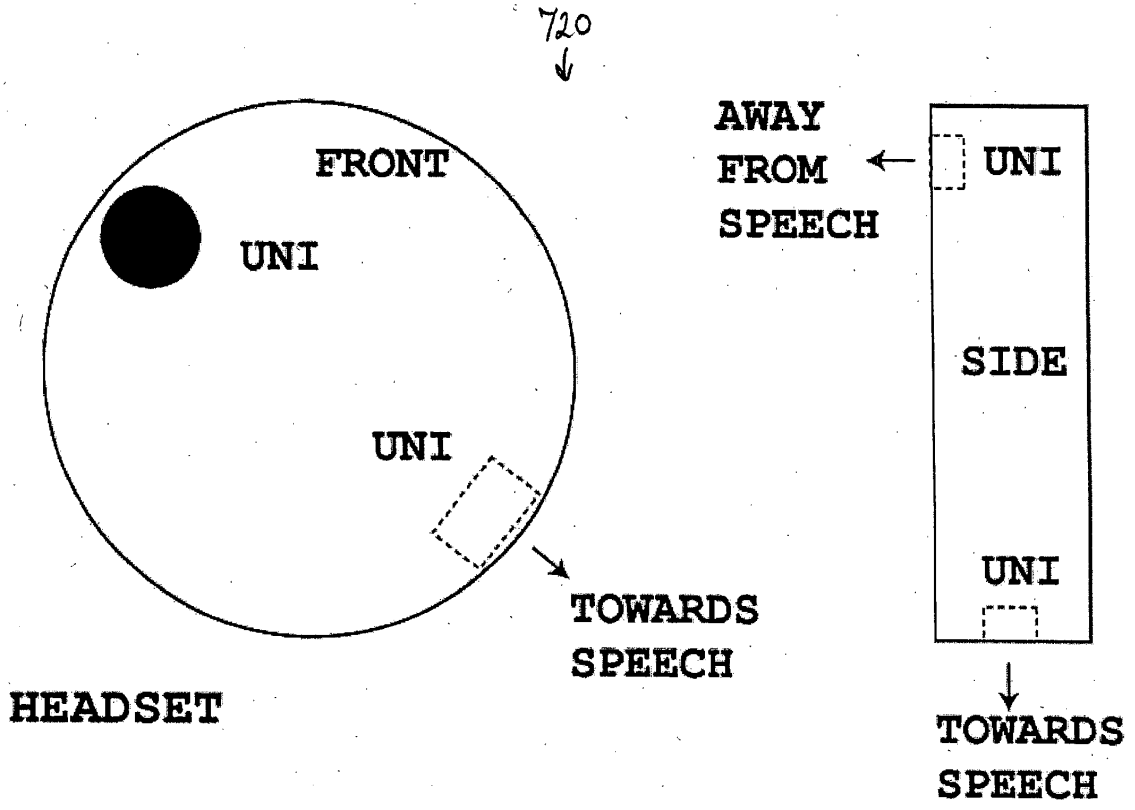


FIGURE 7C

SUBSTITUTE SHEET (RULE 26)

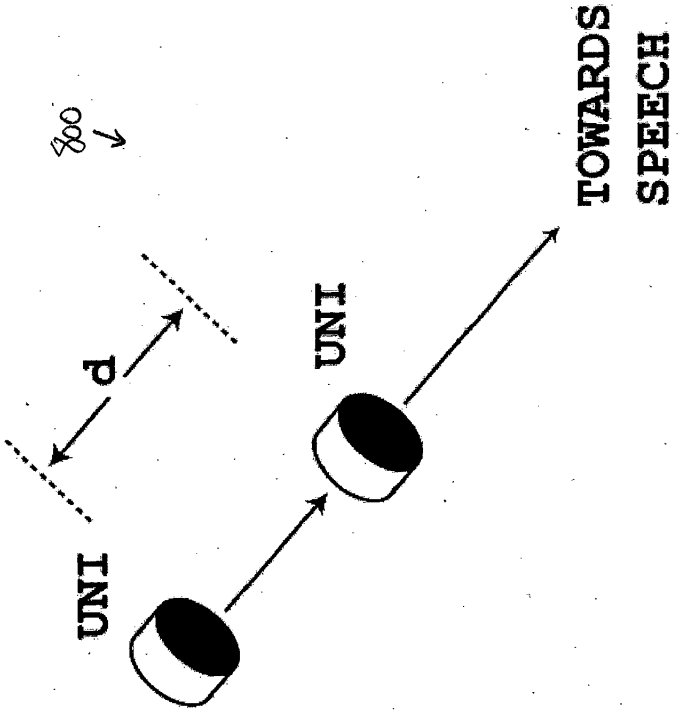


FIGURE 8A

810
SIDE
UNI
UNI
TOWARDS SPEECH
END
UNI
TOWARDS SPEECH
END
UNI
UNI
d
SIDE
HANDSET

FIGURE 8B

d
UNI
SIDE
UNI
TOWARDS
SPEECH
820
FRONT
UNI
UNI
TOWARDS
SPEECH
HEADSET

FIGURE 8C

FIGURE 9A

OMNI
SIDE
OMNI
TOWARDS
SPEECH
END
910
END
OMNI
TOWARDS
SPEECH
OMNI
d
SIDE
HANDSET

FIGURE 9B

d
OMNI
SIDE
OMNI
TOWARDS
SPEECH
920
FRONT
OMNI
OMNI
TOWARDS
SPEECH
HEADSET

FIGURE 9C

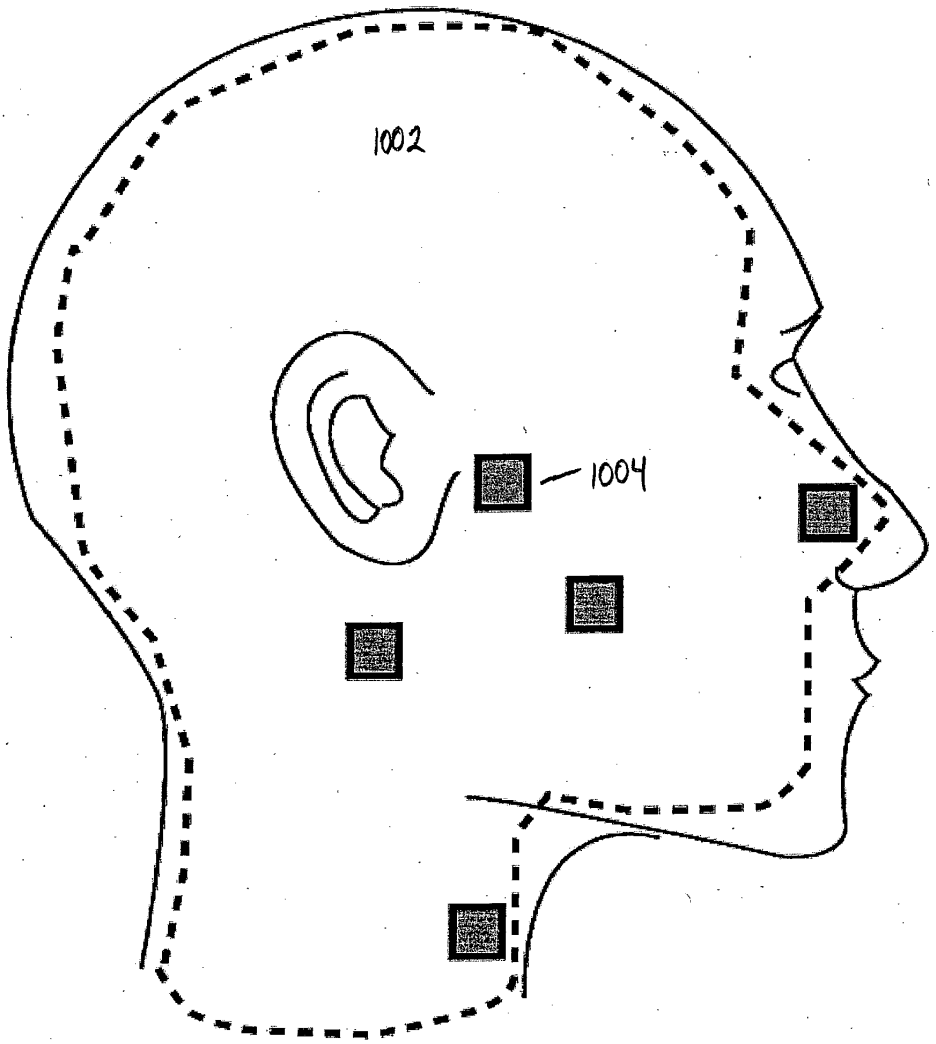


FIGURE 10A

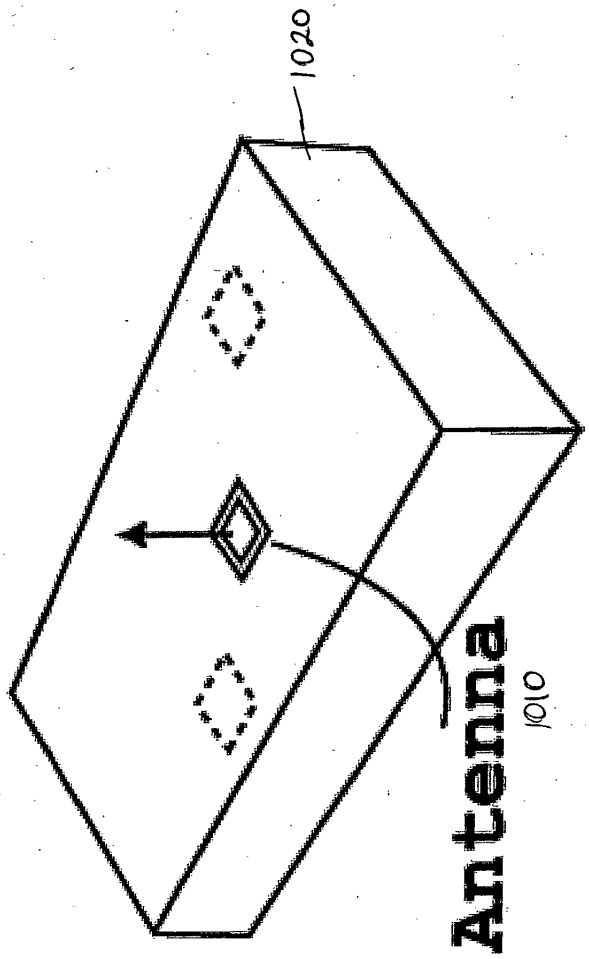
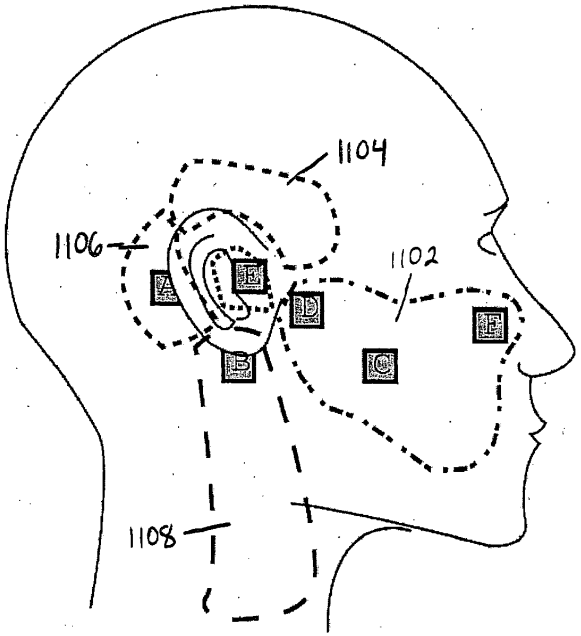


FIGURE 10B



A - Area Behind The Ear
B - Area Above The Ear
C - Mid Cheek Area
D - Area In Front of Ear Canal
E - Inside Ear Canal in Contact with Mastoid Bone Or Other Vibrating Tissue
F - Nose

FIGURE 11A

Apple v. Masimo
IPR2018-01681

FIGURE 11b

Atty. Docket No.: ALPH.P020

PATENT

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:

Gregory C. Burnett et al.

Application No.: Not Yet Assigned

Filed: HEREWITH

For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

Examiner: Not Yet Assigned

Art Unit: Not Yet Assigned

Assistant Commissioner for Patents
Washington, D.C. 20231

Power of Attorney by Assignee and Certification Under 37 CFR §3.73(b)

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, the undersigned, acting on behalf of the Assignee of the entire right, title and interest in the above-referenced patent applications, hereby revoke all prior powers of attorney for said applications and appoint the practitioners at Customer Number 30554, the Customer Number of Shemwell Gregory & Courtney LLP, as my/our attorney(s) or agent(s) to prosecute said applications, and to transact all business in the United States Patent and Trademark Office connected therewith. This appointment is to the exclusion of the inventor(s) and their attorney(s) and agent(s) in accordance with the provisions of 37 CFR 3.71.

Effective immediately, please direct all further communications in the above-identified patent application to the following address:

Shemwell Gregory & Courtney LLP
4880 Stevens Creek Blvd., Ste. 201
San Jose, CA 95129

Telephone: (408) 236-6640
Facsimile: (408) 236-6641
Customer No. 30554

[redacted]

In accordance with 37 CFR 3.73(b), I hereby certify that I am empowered to act on behalf of the Assignee. To the best of my knowledge and belief, title is in the Assignee, as evidenced by the duly executed assignment document enclosed herewith.

I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, USC §1001 and that such willful false statements may jeopardize the validity of the this application or any patent resulting therefrom.

ASSIGNEE:	**AliphCom, Inc.**
Signature:	H.S. R
Typed Name:	Hosain Rahman
Title:	Vice President of Business Development; Founder
Date:	3/24/03
Address:	410 Jessie Street, Unit 601 San Francisco, California 94103

PTO/SB/01 (10-01)
Approved for use through 10/31/2002. OMB 0651-0032
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.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☑ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	ALPH.P020
First Named Inventor	Gregory C. Burnett
COMPLETE IF KNOWN	
Application Number	To be assigned
Filing Date	HEREWITH
Art Unit	To be assigned
Examiner Name	To be assigned

As the below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original and first inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

(Title of the Invention)

the specification of which

☑ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) [ ] as United States Application Number or PCT International

Application Number [ ] and was amended on (MM/DD/YYYY) [ ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

[redacted]

PTO/SB/01 (10-01)
Approved for use through 10/31/2002. OMB 0651-0032
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DECLARATION — Utility or Design Patent Application

Direct all correspondence to: ☐ Customer Number or Bar Code Label [ ] OR ☑ Correspondence address below

SHEMWELL GREGORY & COURTNEY LLP
Name

4880 Stevens Creek Boulevard
Suite 201
Address

San Jose	California	95129
City	**State**	**ZIP**

US	408-236-6647	408-236-6641
Country	**Telephone**	**Fax**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR : ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]) Gregory C.	**Family Name or Surname** Burnett

Inventor's Signature G. R [signature] **Date** 3-24-03

Livermore	California	US	US
Residence: City	**State**	**Country**	**Citizenship**

675 South H Street
Mailing Address

Livermore	California	94550	US
City	**State**	**ZIP**	**Country**

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]) Nicolas J.	**Family Name or Surname** Petit

Inventor's Signature [signature] **Date** 3-24-03

San Francisco	California	US	BE
Residence: City	**State**	**Country**	**Citizenship**

3300 Scott Street #207
Mailing Address

San Francisco	California	94123	US
City	**State**	**ZIP**	**Country**

☑ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

[redacted]

PTO/SB/02A (10-00)
Approved for use through 10/31/2002. OMB 0651-0032
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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 1 of 1

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Alexander M. **Given Name**	Asseily **Family Name or Surname**		
Inventor's Signature			**Date** 3-24-03
San Francisco **Residence: City**	California **State**	US **Country**	UK **Citizenship**
2539 Post Street **Mailing Address**			
Mailing Address			
City San Francisco	California **State**	94115 **ZIP**	US **Country**

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Andrew E. **Given Name**	Einaudi **Family Name or Surname**		
Inventor's Signature			**Date** 3-24-03
San Francisco **Residence: City**	California **State**	US **Country**	US **Citizenship**
1570 Grove Street **Mailing Address**			
Mailing Address			
City San Francisco	California **State**	94117 **ZIP**	US **Country**

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name	**Family Name or Surname**		
Inventor's Signature			**Date**
Residence: City	**State**	**Country**	**Citizenship**
Mailing Address			
Mailing Address			
City	**State**	**ZIP**	**Country**

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Atty. Docket No. ALPH.P020 *PATENT*

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:	)	
	)	
Gregory C. Burnett et al.	)	Examiner: To be assigned
	)	
Application No. To be assigned	)	Art Unit: To be assigned
	)	
Filed: March 27, 2003 (HEREWITH)	)	
	)	
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	)	

Assistant Commissioner for Patents
Washington, D.C. 20231

ASSERTION OF SMALL ENTITY STATUS UNDER 37 CFR 1.27

Sir:

Applicants hereby state that small entity status is entitled to be asserted for the above-referenced patent application filed herewith.

Respectfully submitted,

SHEMWELL GREGORY & COURTNEY LLP

Dated: March 27, 2003

Richard L. Gregory, Jr.
Registration No. 42,607

PATENT APPLICATION FEE DETERMINATION RECORD
Effective January 1, 2003

Application or Docket Number: 10400282

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	39	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	39 minus 20=	*
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	375.00	OR	BASIC FEE	750.00
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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 number found in the appropriate box in column 1.

FORM PTO-875 (Rev 12-02) — Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020

CONFIRMATION NO. 1397

Shemwell Gregory & Courtney LLP
Suite 201
4880 Stevens Creek Boulevard
San Jose, CA 95129

FORMALITIES LETTER

OC000000010155264

Date Mailed: 05/30/2003

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. 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 statutory basic filing fee is missing.
  Applicant must submit $ **375** *to complete the basic filing fee for a small entity.*
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

Items Required To Avoid Processing Delays:

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- Additional claim fees of **$171** as a small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$611** for a Small Entity

- **$375** Statutory basic filing fee.
- **$65** Late oath or declaration Surcharge.
- Total additional claim fee(s) for this application is **$171**
  - **$171** for **19** total claims over 20 .

A copy of this notice <u>MUST</u> be returned with the reply.

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 3 - OFFICE COPY

OIPE JC81 SEP 08 2003 PATENT & TRADEMARK

0120

Atty Docket No. ALPH.P020

PATENT

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:

Gregory C. Burnett

Application No. 10/400,282

Filed: March 27, 2003

For: MICROPHONE AND VOICE ACTIVITY DETECTION(VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

Examiner: To be assigned
Art Unit: To be assigned

FIRST CLASS MAIL CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service FIRST CLASS MAIL service with sufficient postage on the date indicated below and that the paper(s) and/or fee(s) have been addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Barbara B. Courtney
(Typed or printed name of person mailing paper(s) or fee(s))

(Signature of person mailing paper or fee)

September 4, 2003
(Date signed)

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

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97

Sir:

Enclosed is an Information Disclosure Citation Form PTO/SB/08 together with copies of the references cited therein. It is respectfully requested that the cited references be considered and that the enclosed copy of the Form PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to Applicant.

Pursuant to 37 CFR 1.97(h), the submission of this Information Disclosure Statement is not to be construed as an admission that the information cited in this statement is material to patentability.

This Information Disclosure Statement is being submitted pursuant to 37 CFR 1.97(b)(3).

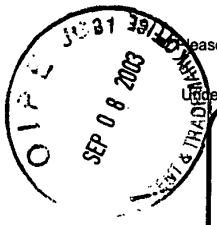
The Commissioner is hereby authorized to charge any fees which may be required in connection with this submission to Deposit Account No. 501914.

Respectfully submitted,

SHEMWELL GREGORY & COURTNEY LLP

Dated: September 3, 2003

Barbara B. Courtney
Registration No. 42,442



Please type a plus sign (+) inside this box → [+]

PTO/SB/08A (08-00)
Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complet if Kn wn	
Application Number	10/400,282
Filing Date	March 27, 2003
First Named Inventor	Gregory C. Burnett
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	ALPH.P020

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		5,212,764		Ariyoshi	05-18-1993	
		5,400,409		Linhard	03-21,1995	
		5,414,776		Sims, Jr.	05-09-1995	
		5,539,859		Robbe et al.	07-23-1996	
		5,633,935		Kanamori et al.	05-27-1997	
		5,835,608		Warnaka et al.	11-10-1998	
		5,917,921		Sasaki et al.	06-29-1999	
		6,000,396		Nagata	12-28-1999	
		6,191,724	B1	McEwan	02-20-2001	
		5,986,600		McEwan	11-16-1999	
		5,966,090		McEwan	10-12-1999	
		6,006,175		Holzrichter	12-21-1999	
		5,406,662		Silverberg et al.	04-11-1995	
		5,517,435		Sugiyama	05-14-1996	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

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[1] Unique citation designation number. [2] See attached Kinds of U.S. Patent Documents. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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PTO/SB/08B (08-00)
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Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	10/400,282
Filing Date	March 27, 2003
First Named Inventor	Gregory C. Burnett
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	ALPH.P020

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		ZHAO LI et al: "Robust Speech Coding Using Microphone Arrays", Signals Systems and Computers, 1997. Conf. record of 31st Asilomar Conf., Nov. 2-5, 1997, IEEE Comput. Soc. Nov. 2, 1997, USA.	
		L.C. NG et al.: "Denoising of Human Speech Using Combined Acoustic and EM Sensor Signal Processing", 2000 IEEE Intl Conf on Acoustics Speech and Signal Processing. Proceedings (Cat. No. 00CH37100), Istanbul, Turkey, June 5-9, 2000 XP002186255, ISBN 0-7803-6293-4	
		S. AFFES et al.: "A Signal Subspace Tracking Algorithm for Microphone Array Processing of Speech". IEEE Transactions on Speech and Audio Processing, N.Y, USA Vol. 5, No. 5, Sept. 1, 1997, XP000774303, ISBN 1063-6676	
		GREGORY C. BURNETT: "The Physiological Basis of Glottal Electromagnetic Micropower Sensors (GEMS) and Their Use in Defining an Excitation Function for the Human Vocal Tract", Dissertation, University of California at Davis, January, 1999, USA.	
		TODD J. GABLE et al.: "Speaker Verification Using Combined Acoustic and EM Sensor Signal Processing", ICASSP-2001, Salt Lake City, USA.	
		A. HUSSAIN: "Intelligibility Assessment of a Multi-Band Speech Enhancement Scheme", Proceedings IEEE Intl. Conf. on Acoustics, Speech & Signal Processing (ICASSP-2000). Istanbul, Turkey, June 2000.	

Examiner Signature		Date Considered	

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

[1] Unique citation designation number. [2] Applicant is to place a check mark here if English language Translation is attached.

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PATENT & TRADEMARK OFFICE

2644
IFW

Atty. Docket No. ALPH.P020 *PATENT*

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:	
Gregory C. Burnett	Examiner: To be assigned Art Unit: 2644
Application No. 10/400,282	
Filed: March 27, 2003	
For: MICROPHONE AND VOICE ACTIVITY DETECTION(VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	

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

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR § 1.97

Sir:

Enclosed is an Information Disclosure Citation Form PTO/SB/08. Also enclosed are copies of all references that are not U.S. Patent references. It is respectfully requested that all cited references be considered and that a copy of the enclosed Form PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to Applicant.

Pursuant to 37 CFR 1.97(h), the submission of this Information Disclosure Statement is not to be construed as an admission that the information cited in this statement is material to patentability.

This Information Disclosure Statement is being submitted pursuant to 37 CFR 1.97(b)(3) before the mailing of a first office action on the merits.

The Commissioner is hereby authorized to charge any fees which may be required in connection with this submission to Deposit Account No. 501914.

Respectfully submitted,

SHEMWELL GREGORY & COURTNEY LLP

Dated: November 4, 2004

Barbara B. Courtney
Registration No. 42,442

OIPE JC73
NOV 0 5 2004
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PTO/SB/08A (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	10/400,282
Filing Date	03/27/2003
First Named Inventor	Gregory C. Burnett
Art Unit	2644
Examiner Name	Not yet assigned
Attorney Docket Number	ALPH.P020

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 2002/039425 A1	04-04-2002	Burnett et al.	
		US- 3,789,166	01-29-1974	Sebesta	
		US- 4,006,318	02-01-1977	Sebesta et al.	
		US- 4,591,668	05-27-1986	Iwata	
		US- 4,901,354	02-13-1990	Gollmar et al.	
		US- 5,473,702	12-05-1995	Yoshida et al.	
		US- 5,515,865	05-14-1996	Scanlon et al.	
		US- 5,649,055	07-15-1997	Gupta et al.	
		US- 5,684,460	11-04-1997	Scanlon et al.	
		US- 5,729,694	03-17-1998	Holzrichter et al.	
		US- 5,754,665	05-19-1998	Hosoi et al.	
		US- 5,853,005	12-29-1998	Scanlon	
		US- 6,069,963	05-30-2000	Martin et al.	
		US- 6,266,422	07-24-2001	Ikeda	
		US- 6,430,295	08-06-2002	Handel et al.	
		US- 5,097,515	03-17-2002	Baba	
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
		EP 0 637 187 A	02-01-1995	Pan Communicati		
		EP 0 795 851 A2	09-17-1997	Tokyo Shibaura		
		EP 0 984 660 A2	03-08-2000	Nippon T&T Corp		
		JP 2000 312 395	11-07-2000	Alpine Electron		
		JP 2001 189 987	07-10-2001	Pioneer Electro		
		WO 02 07151	01-24-2002	ALIPHCOM, Inc.		

Examiner Signature		Date Considered	

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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 2 hours 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, 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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Barbara B. Courtney
(Name of person transmitting correspondence)

November 4, 2004
Date

Serial/Patent No.: 10/400,282 Filing/Issue Date: March 27, 2003 Client: ALIPH, Inc.
Title: Voice Activity Detection (VAD) Configurations for use with Communication Systems

Atty. Docket No.: ALPH.P020 Date Mailed: November 4, 2004

The following has been received in the U.S. Patent & Trademark Office on the date stamped hereon:

- ☐ Amendment/Response (pgs.)
- ☐ Preliminary Amendment (pgs.)
- ☐ Application - Utility (pgs.)
- ☐ Application - Rule 1.53(b) Contin. (pgs.)
- ☐ Application - Rule 1.53(b) Divis. (pgs.)
- ☐ Application - Rule 1.53(b) CIP (pgs.)
- ☐ Application - Rule 1.53(d) CPA (pgs.)
- ☐ Application - PCT (pgs.)
- ☐ Application - Provisional (pgs.)
- ☐ Drawings (sheets)
- ☐ Declaration & POA (pgs.)
- ☐ Assignment & Cover Sheet (pgs.)
- ☐ Power of Attorney
- ☐ Nonpublication Request (35 USC 122(b))
- ☑ Other Seven (7) cited references
- ☐ Petition for Extension of Time (month(s))
- ☑ Information Disclosure Statement & PTO/SB/08A
- ☑ Information Disclosure Statement Transmittal
- ☐ Submission of Formal Drawings
- ☐ Notice of Appeal
- ☐ Appeal Brief (pgs. in triplicate)
- ☐ Reply Brief
- ☐ Response to Notice of Missing Parts
- ☐ Utility Patent Application Transmittal
- ☐ Fee Transmittal (in duplicate)
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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
10/400,282		2654	0500

Correspondence Address / Fee Address Change

The following fields have been set to Customer Number 53186 on 08/26/2005

- Correspondence Address
- Maintenance Fee Address

The address of record for Customer Number 53186 is:
COURTNEY STANIFORD & GREGORY LLP
P.O. BOX 9686
SAN JOSE,CA 95157

PLUS Search Results for S/N 10400282, Searched Thu Aug 24 15:15:36 EDT 2006

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

5732143 65
5825897 65
6061456 65
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5463694 58
5289544 55
6108415 55
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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	344	381/92.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:36
S2	8751	(voice near3 detect$3)	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:36
S3	23	S1 and S2	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:08
S4	3	("2003/0044025").URPN.	USPAT	ADJ	ON	2007/01/19 11:43
S5	911	704/226,233.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:18
S6	279	S5 and S2	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:25
S7	1834	microphone near5 array	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:25
S8	12	S5 and S2 and S7	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:32
S9	458	381/94.1,94.2,94.3.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 07:58
S10	25	S9 and S7	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:33
S11	3	S9 and S7 and S2	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:33
S12	6048	(speech near3 detect$3)	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:34
S13	496	(S1 or S5 or S9) and S12	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:34
S14	42	(S1 or S5 or S9) and S12 and S7	US-PGPUB; USPAT	ADJ	ON	2007/01/19 13:39
S15	1256	(omni-directional or omnidirectional) and (uni-directional or unidirectional)	US-PGPUB; USPAT	ADJ	ON	2007/01/19 12:45
S17	13	S7 and (S2 or S12) and S15 and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/19 13:29
S18	698	pathfinder	US-PGPUB; USPAT	ADJ	ON	2007/01/19 13:29
S19	2	S18 and S7 and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/19 13:31
S20	8	("20010028713"|"20020165711"|"5205285"|"5406622"|"5463694"|"5625684"|"6668062"|"6766292").PN.	US-PGPUB; USPAT	ADJ	ON	2007/01/22 16:46
S21	8877	(subtract$3 near10 noise)	US-PGPUB; USPAT	ADJ	ON	2007/01/19 13:39
S22	90	(S1 or S5 or S9) and S21 and S2	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:32
S23	207014	noise near5 (estimat$3 or signal)	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:36
S24	287374	subtract$3	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:36
S25	4868	S23 near10 S24	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:36
S26	432	381/92,94.7.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:36

EAST Search History

S27	91	S25 and S26	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:36
S28	13063	(voice or speech) near3 detect$3	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:37
S29	29	S25 and S26 and S28	US-PGPUB; USPAT	ADJ	ON	2007/01/22 12:37
S30	8	glottal electromagnetic micropower sensor	US-PGPUB; USPAT	ADJ	ON	2007/01/22 16:44
S31	8	glottal electromagnetic micropower	US-PGPUB; USPAT	ADJ	ON	2007/01/22 16:44
S32	25909	accelerometer	US-PGPUB; USPAT	ADJ	ON	2007/01/22 16:46
S33	11	S26 and S32	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:18
S34	204	skin near5 microphone	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:19
S35	458	381/94.1,94.2,94.3.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:39
S36	911	704/226,233.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:39
S37	1	(S26 or S35 or S36) and S34	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:19
S38	339	skin near15 microphone	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:22
S39	2	(S26 or S35 or S36) and S38	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:21
S40	236	throat near15 microphone	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:21
S41	4	(S26 or S35 or S36) and S40	US-PGPUB; USPAT	ADJ	ON	2007/01/22 17:21
S42	20	glottal near15 microphone	US-PGPUB; USPAT	ADJ	ON	2007/01/23 07:58
S43	7205	electromagnetic near2 sensor	US-PGPUB; USPAT	ADJ	ON	2007/01/23 07:58
S44	13074	(speech or voice) near3 detect$3	US-PGPUB; USPAT	ADJ	ON	2007/01/23 09:44
S46	52	S43 and S44 and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:03
S47	30	(skin near5 surface) near5 microphone	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:03
S48	297	skin near10 microphone	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:03
S49	13	S48 and S44 and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:04
S50	30	381/364.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:31
S51	176501	(portable handset) or ((cellular or portable or satellite or internet or wireless) (telephone or phone)) or pda	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:31
S52	432	381/92,94.7.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:31
S53	38	S51 and S52	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:39

EAST Search History

S54	47972	bluetooth or earpiece or earphone or headset	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:39
S55	46	S54 and S52	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:57
S56	912	704/226,233.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:39
S57	458	381/94.1,94.2,94.3.ccls. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:39
S58	106	S54 and (S56 or S57)	US-PGPUB; USPAT	ADJ	ON	2007/01/23 08:59
S59	8758	voice near3 detect$3	US-PGPUB; USPAT	ADJ	ON	2007/01/23 09:44
S60	861468	manual or manually	US-PGPUB; USPAT	ADJ	ON	2007/01/23 09:44
S61	42	S59 near10 S60	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:13
S62	225574	(manual or user) near3 control$5	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:16
S63	304	S62 same S44	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:14
S64	209	S62 same S59	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:14
S65	1	(S62 same S44) and (S52 or S56 or S57)	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:15
S66	62473	manually near3 control$5	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:15
S67	0	(S66 same S44) and (S52 or S56 or S57)	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:15
S68	60157	(manual$2 or user) near3 activat$3	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:15
S69	0	(S68 same S44) and (S52 or S56 or S57)	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:16
S70	265902	(manual$2 or user) near3 control$5	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:16
S71	1	(S70 same S44) and (S52 or S56 or S57)	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:16
S72	3765	(S70 or S68) and S44	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:16
S74	116	(S70 or S68) and S44 and "381"/.clas. and (@ad<"20020327" or @rlad<"20020327")	US-PGPUB; USPAT	ADJ	ON	2007/01/23 10:17

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020	1397

53186 7590 02/09/2007
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2615	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/09/2007	PAPER

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

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	Brian T. Pendleton	2615	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *27 March 2003*.

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

3)☐ 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

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-14,16-23,26-30,32-37* is/are rejected.

7)☒ Claim(s) *8, 9, 15, 24, 25, 31, 38 and 39* is/are objected to.

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

Application Papers

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

10)☒ The drawing(s) filed on *3/27/03* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al, US Patent 5,473,702 in view of Oh et al, US Patent 5,353,376. Yoshida discloses a communications system comprising a voice detection subsystem 300, denoising subsystem 20, microphones 1 and 2, whereby the voice detection subsystem 300 is used to select a denoising method which subtracts a noise waveform from an acoustic signal generated from microphone 1. Yoshida does not disclose that the microphones are unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone. Oh et al teach a system for improved speech acquisition for a hands-free system in a noise environment comprising microphone array 10 and generalized sidelobe canceller 14 (denoising system). As proposed in column 7 lines 14-25, the use of unidirectional microphones improved performance of the speech acquisition. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida et al by substituting unidirectional microphones, as taught by Oh, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system. Claims 1 and 7 are rejected. Regarding claims 2, 3, and 8, one of ordinary skill in the art would have realized the claimed distance and angle between the microphones without undue experimentation. As to claims 4 and

6, Examiner takes Official Notice that it was well known in the art at the time of invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Yoshida et al and Oh et al to use such sensors in the place of microphone 1 for the purpose of improving the voice detection performance.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al in view of Oh et al, as applied to claim 1 above, and further in view of Park et al. The combination of Yoshida and Oh et al do not disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park et al teach a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Yoshida et al and Oh et al to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

Claims 10-14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al in view of Oh et al as applied to claim 1 above, and further in view of Housni, US Patent 6,795,713. The combination of Yoshida et al and Oh et al does not disclose that the system includes a portable handset that includes the microphones. It was well known to use a two microphone system as taught by Yoshida et al in a portable handset as demonstrated by Housni who discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al and Oh et al in a portable handset

for the purpose of improving wireless speech communication. Claim 10 is rejected. Regarding claim 11, the modified Yoshida et al and Oh et al combination provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset. As to claim 12, the portable handset 1 of Housni includes a speaker 4. Per claims 13 and 14, the portable handset of Housni inherently couples to another wireless phone via wireless couplings. Regarding claims 16 and 17, the combination meets the limitations.

Claims 18-21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al, in view of Ouyang et al, US Patent Application Publication 2003/0044025. Yoshida discloses a communications system comprising a voice detection subsystem 300, denoising subsystem 20, microphones 1 and 2, whereby the voice detection subsystem 300 is used to select a denoising method which subtracts a noise waveform from an acoustic signal generated from microphone 1. Yoshida does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida et al by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system. Claim 18 is rejected. Regarding claims 19 and 20, one of ordinary skill in the art would have realized the claimed distance and angle between the microphones without undue experimentation. As to claims 21 and 23, Examiner takes Official Notice that it

was well known in the art at the time of invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Yoshida et al and Ouyang et al to use such sensors in the place of microphone 1 for the purpose of improving the voice detection performance.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al in view of Ouyang et al, as applied to claim 18 above, and further in view of Park et al. The combination of Yoshida and Ouyang et al do not disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park et al teach a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Yoshida et al and Ouyang et al to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

Claims 26-30, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al in view of Ouyang et al as applied to claim 18 above, and further in view of Housni. The combination of Yoshida et al and Oh et al does not disclose that the system includes a portable handset that includes the microphones. It was well known to use a two microphone system as taught by Yoshida et al in a portable handset as demonstrated by Housni who discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the

time of invention to implement the circuitry of Yoshida et al and Oh et al in a portable handset for the purpose of improving wireless speech communication. Claim 26 is rejected. Regarding claim 27, the modified Yoshida et al and Ouyang et al combination provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset. As to claim 28, the portable handset 1 of Housni includes a speaker 4. Per claims 29 and 30, the portable handset of Housni inherently couples to another wireless phone via wireless couplings. Regarding claims 32 and 33, the combination meets the limitations.

Claims 34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al, in view of Housni. Yoshida discloses a communications system comprising a voice detection subsystem 300, denoising subsystem 20, microphones 1 and 2, whereby the voice detection subsystem 300 is used to select a denoising method which subtracts a noise waveform from an acoustic signal generated from microphone 1. Yoshida does not disclose at least one transceiver for use in a communications network. Housni discloses a portable transceiver having microphones 3 and 12 and an anti-noise circuit. It would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al in a transceiver, as taught by Housni, for the purpose of providing noise cancellation in wireless applications. Claims 34 and 37 are rejected.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al in view of Housni, as applied to claim 34 above, and further in view of Oh et al. The combination of Yoshida et al and Housni does not disclose that the first and second microphones are unidirectional with the claimed distance and angle. Oh et al teach a system for improved speech acquisition for a hands-free system in a noise environment comprising microphone array 10 and

generalized sidelobe canceller 14 (denoising system). As proposed in column 7 lines 14-25, the use of unidirectional microphones improved performance of the speech acquisition. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida et al and Housni by substituting unidirectional microphones, as taught by Oh, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system. An artisan would have realized the claimed distance and angle between the microphones without undue experimentation.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al in view of Housni, as applied to claim 34 above, and further in view of Ouyang et al. The combination of Yoshida et al and Housni does not disclose that the first and second microphones are omnidirectional and unidirectional, respectively, with the claimed distance and angle. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20, unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida et al and Housni by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Allowable Subject Matter

Claims 8, 9, 15, 24, 25, 31, 38 and 39 are 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

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (571) 272-7527. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian T. Pendleton
Primary Examiner
Art Unit 2615

btp

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PTO/SB/08A (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	10/400,282
Filing Date	03/27/2003
First Named Inventor	Gregory C. Burnett
Art Unit	2644
Examiner Name	Not yet assigned
Attorney Docket Number	ALPH.P020

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
BTP		US- 2002/039425 A1	04-04-2002	Burnett et al.	
		US- 3,789,166	01-29-1974	Sebesta	
		US- 4,006,318	02-01-1977	Sebesta et al.	
		US- 4,591,668	05-27-1986	Iwata	
		US- 4,901,354	02-13-1990	Gollmar et al.	
		US- 5,473,702	12-05-1995	Yoshida et al.	
		US- 5,515,865	05-14-1996	Scanlon et al.	
		US- 5,649,055	07-15-1997	Gupta et al.	
		US- 5,684,460	11-04-1997	Scanlon et al.	
		US- 5,729,694	03-17-1998	Holzrichter et al.	
		US- 5,754,665	05-19-1998	Hosoi et al.	
		US- 5,853,005	12-29-1998	Scanlon	
		US- 6,069,963	05-30-2000	Martin et al.	
		US- 6,266,422	07-24-2001	Ikeda	
		US- 6,430,295	08-06-2002	Handel et al.	
BTP		US- 5,097,515	03-17-2002	Baba	
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
BTP		EP 0 637 187 A	02-01-1995	Pan Communicati		
		EP 0 795 851 A2	09-17-1997	Tokyo Shibaura		
		EP 0 984 660 A2	03-08-2000	Nippon T&T Corp		
		JP 2000 312 395	11-07-2000	Alpine Electron		
		JP 2001 189 987	07-10-2001	Pioneer Electro		
BTP		WO 02 07151	01-24-2002	ALIPHCOM, Inc.		

Examiner Signature		Date Considered	1/23/07

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complet if Kn wn	
Application Number	10/400,282
Filing Date	March 27, 2003
First Named Inventor	Gregory C. Burnett
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	ALPH.P020

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
BTP		5,212,764		Ariyoshi	05-18-1993	
		5,400,409		Linhard	03-21,1995	
		5,414,776		Sims, Jr.	05-09-1995	
		5,539,859		Robbe et al.	07-23-1996	
		5,633,935		Kanamori et al.	05-27-1997	
		5,835,608		Warnaka et al.	11-10-1998	
		5,917,921		Sasaki et al.	06-29-1999	
		6,000,396		Nagata	12-28-1999	
		6,191,724	B1	McEwan	02-20-2001	
		5,986,600		McEwan	11-16-1999	
		5,966,090		McEwan	10-12-1999	
		6,006,175		Holzrichter	12-21-1999	
		5,406,662		Silverberg et al.	04-11-1995	
BTP		5,517,435		Sugiyama	05-14-1996	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	1/23/07

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[1] Unique citation designation number. [2] See attached Kinds of U.S. Patent Documents. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 2

Complete if Known	
Application Number	10/400,282
Filing Date	March 27, 2003
First Named Inventor	Gregory C. Burnett
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	ALPH.P020

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
BTP		ZHAO LI et al: "Robust Speech Coding Using Microphone Arrays", Signals Systems and Computers, 1997. Conf. record of 31st Asilomar Conf., Nov. 2-5, 1997, IEEE Comput. Soc. Nov. 2, 1997, USA.	
		L.C. NG et al.: "Denoising of Human Speech Using Combined Acoustic and EM Sensor Signal Processing", 2000 IEEE Intl Conf on Acoustics Speech and Signal Processing. Proceedings (Cat. No. 00CH37100), Istanbul, Turkey, June 5-9, 2000 XP002186255, ISBN 0-7803-6293-4	
		S. AFFES et al.: "A Signal Subspace Tracking Algorithm for Microphone Array Processing of Speech". IEEE Transactions on Speech and Audio Processing, N.Y, USA Vol. 5, No. 5, Sept. 1, 1997. XP000774303. ISBN 1063-6676	
		GREGORY C. BURNETT: "The Physiological Basis of Glottal Electromagnetic Micropower Sensors (GEMS) and Their Use in Defining an Excitation Function for the Human Vocal Tract", Dissertation. University of California at Davis, January, 1999, USA.	
		TODD J. GABLE et al.: "Speaker Verification Using Combined Acoustic and EM Sensor Signal Processing", ICASSP-2001, Salt Lake City, USA.	
BTP		A. HUSSAIN: "Intelligibility Assessment of a Multi-Band Speech Enhancement Scheme", Proceedings IEEE Intl. Conf. on Acoustics, Speech & Signal Processing (ICASSP-2000). Istanbul, Turkey. June 2000.	

Examiner Signature		Date Considered	1/23/07

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

[1] Unique citation designation number. [2] Applicant is to place a check mark here if English language Translation is attached.

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Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner Brian T. Pendleton	Art Unit 2615	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,353,376 A	10-1994	Oh et al.	704/233
*	B	US-5,473,702 A	12-1995	Yoshida et al.	381/94.7
*	C	US-5,590,241 A	12-1996	Park et al.	704/227
*	D	US-2003/0044025 A1	03-2003	Ouyang et al.	381/92
*	E	US-6,795,713 B2	09-2004	Housni, Jamal	455/550.1
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	Pendleton, Brian T	2615

SEARCHED			
Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP

SEARCH NOTES		
Search Notes	Date	Examiner
East Word Search	1/22/07	BTP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	Pendleton, Brian T	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
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	36	✓								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	Pendleton, Brian T	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007								
	37	✓								
	38	O								
	39	O								

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CONFIRMATION NO. 1397

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/400,282	03/27/2003 RULE	381	2615	ALPH.P020

APPLICANTS

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Nicolas J. Petit, San Francisco, CA;
Alexander M. Asseily, San Francisco, CA;
Andrew E. Einaudi, San Francisco, CA;

** CONTINUING DATA **********

This appln claims benefit of 60/368,209 03/27/2002 Yes BTP

** FOREIGN APPLICATIONS **********

None BTP

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 05/30/2003

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☒ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged Examiner's Signature BTP Initials	CA	29	39	3

ADDRESS
53186

TITLE
Microphone and Voice Activity Detection (VAD) configurations for use with communication systems

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
611	No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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To: Art Unit 2615
USPTO

From: Barbara Courtney
Courtney Staniford & Gregory & LLP
Phone: 408-342-1902
Fax: 408-342-1909

Fax: **571-273-8300** Pages: 17 including cover

Phone: 571-272-7527 Date: June 4, 2007

Re: **Application Serial No. 10/400,282**
Art Unit 2615
Examiner Brian T. Pendleton

CC:

Atty Docket No. ALPH.P020

☑ Urgent ☑ For Review ☑ Please Comment ☑ Please Acknowledge

Attorney Docket No. ALPH.P020 Patent

Transmittal of Office Action Response

Certification of Transmission Under 37 C.F.R. §1.8

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Date of Transmission

571-273-8300

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Barbara B. Courtney
(Print Name of Person Transmitting Facsimile)

(Signature of Person Transmitting Facsimile)

1. Response to the Final Office Action mailed February 2, 2007
2. Petition for one month Extension of Time; and
3. Authorization to charge Credit Card.

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(Signature of Person Transmitting Facsimile)

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:
Gregory C. Burnett et al.
Application No. 10/400,282
Filed: March 27, 2003
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

Examiner: Brian T. Pendleton
Art Unit: 2615

CENTRAL FAX NUMBER **571-273-8300**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AND REPONSE UNDER 37 C.F.R. § 1.111

Sir:

Response under 37 C.F.R. § 1.111

This is a response to the Office action mailed February 9, 2007. Applicants respectfully request entry of the following amendments and consideration of the Remarks.

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Attorney Docket No. ALPH.P020

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IN THE CLAIMS

1. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals, the voice detection subsystem comprising,

two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and wherein the angle is approximately in the range of zero (0) to 180 degrees; and

at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

2. (Original) The system of claim 1, wherein the distance is approximately in the range of zero (0) to 15 centimeters.

3. (Original) The system of claim 1, wherein the angle is approximately in the range of zero (0) to 180 degrees.

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4. (Original) The system of claim 1, wherein the voice detection subsystem further comprises: at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Original) The system of claim 1, wherein the voice detection subsystem further comprises: at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Original) The system of claim 1, wherein the voice detection subsystem further comprises: at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. (Original) The system of claim 1, wherein the voice detection subsystem receives voice activity signals via couplings with the microphones.

Claim 8 (Canceled).

9. (Original) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Original) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet

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telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Original) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Original) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Original) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Original) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Original) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Original) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Original) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

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18. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals, wherein the voice detection subsystem further comprises,

two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and wherein the angle is approximately in the range of zero (0) to 180 degrees; and

at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including an omnidirectional microphone and a unidirectional microphone separated by a distance, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

19. (Original) The system of claim 18, wherein the distance is approximately in the range of zero (0) to 15 centimeters.

20. (Original) The system of claim 18, wherein the omnidirectional microphone is oriented to capture signals from at least one speech signal source and the unidirectional microphone is oriented to capture signals from at least one noise signal source, wherein

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an angle between the speech signal source and a maximum of a spatial response curve of the unidirectional microphone is approximately in the range of 45 to 180 degrees.

21. (Original) The system of claim 18, wherein the voice detection subsystem further comprises: at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

22. (Original) The system of claim 18, wherein the voice detection subsystem further comprises: at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

23. (Original) The system of claim 18, wherein the voice detection subsystem further comprises: at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

Claim 24 (Canceled).

25. (Original) The system of claim 18, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

26. (Original) The system of claim 18, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet

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telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

27. (Original) The system of claim 26, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

28. (Original) The system of claim 18, further including a portable headset that includes the microphones along with at least one speaker device.

29. (Original) The system of claim 28, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

30. (Original) The system of claim 29, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

31. (Original) The system of claim 29, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

32. (Original) The system of claim 28, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

33. (Original) The system of claim 28, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

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34. (Currently amended) A communications system, comprising:

at least one transceiver for use in a communications network;

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including a first microphone and a second microphone separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise, wherein the transceiver couples information between the communications network and a user via a headset.

35. (Original) The system of claim 34, wherein each of the first and second microphones is a unidirectional microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and the angle is approximately in the range of zero (0) to 180 degrees.

36. (Original) The system of claim 34, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone, wherein the first microphone is oriented to capture signals from at least one speech signal source and the second microphone is oriented to capture signals from at least one noise signal source, wherein an angle between the speech signal source and a maximum of a

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spatial response curve of the second microphone is approximately in the range of 45 to 180 degrees.

37. (Original) The system of claim 34, wherein the transceiver includes the first and second microphones.

Claim 38 Canceled.

39. (Currently amended) The system of claim 3438, wherein the headset includes the first and second microphones.

40. (New) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals, the voice detection subsystem comprising at least one manually activated voice activity detector (VAD) for generating the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

41. (New) A communications system, comprising:

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a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise; and

a portable headset comprising the microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

42. (New) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including

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an omnidirectional microphone and a unidirectional microphone separated by a distance, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

43. (New) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including an omnidirectional microphone and a unidirectional microphone separated by a distance, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise; and

a portable a portable headset that includes the microphones along with at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

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Attorney Docket No. ALPH.P020

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REMARKS

Petition for extension of time

This response is submitted with a Petition for an extension of time (1 month) under 37 C.F.R. § 1.136(a) to respond to the Office action. The fee under 37 C.F.R. § 1.17(a) is also submitted herewith.

Status of the claims

Claims 1-38 are pending in the application. Claims 1, 18, and 34 have been amended herein. Claims 9, 25, and 38 have been canceled herein without prejudice. Claims 40-43 have been added. No new matter is introduced by the new claims. Allowable subject matter was indicated in the Office action as further referenced below.

Allowable subject matter

Claims 8, 9, 15, 24, 25, 31, 38and 39 were objected to as being dependent on 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. Applicants have amended the claims accordingly to overcome these objections and place the claims in condition for allowance as indicated by the Examiner.

Claim 1 now includes the limitations of claim 8.

Claim 18 now includes the limitations of claim 24.

Claim 34 now includes the limitations of claim 38.

New claim 40 includes the limitations of original claim 1 and claim 9.

New claim 41 includes the limitations of original claim 1 and claims 12, 13, and 15.

New claim 42 includes the limitations of original claim 18 and claim25.

New claim 43 includes the limitations of original claim 18 and claims 28, 29, and 31.

Rejections under 35 U.S.C. § 103

Claims 1-4, 6, and 7 were rejected under 35 U.S.C. § 103 as being unpatentable

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over Yoshida et al., U.S. Patent No. 5,473,702 (hereinafter "Yoshida") in view of Oh et al., U.S. Patent No. 5,353,376 (hereinafter "Oh").

Claim 5 was rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Oh, and further in view of Park et al., U.S. Patent No. 5,590,241 (hereinafter "Park").

Claims 10-14, 16, and 17 were rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Oh, and further in view of Housni, U.S. Patent No. 6,795,713 (hereinafter "Housni").

Claims 18-21, and 23 were rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Ouyang et al., U.S. Patent Publication No. 2003/0044025 (hereinafter "Ouyang").

Claim 22 was rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Ouyang, and further in view of Park.

Claims 26-30, 32, and 33 were rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Ouyang, and further in view of Housni.

Claims 34 and 37 were rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Housni.

Claim 35 was rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Housni, and further in view of Oh.

Claim 36 was rejected under 35 U.S.C. § 103 as being unpatentable over Yoshida in view of Housni, and further in view of Ouyang.

Applicants have amended the claims to overcome the rejections in the manner suggested by the examiner. The independent claims are now allowable as indicated in the "Allowable Subject Matter" section of the Office action. All of the dependent claims now depend from allowable independent claims. Accordingly, Applicants respectfully submit that the rejections are overcome.

AUTHORIZATION TO CHARGE DEPOSIT ACCOUNT

Please use our Deposit account no. 503616 to pay any fee deficiencies and credit any overpayments during the pendency of this application.

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Attorney Docket No. ALPH.P020

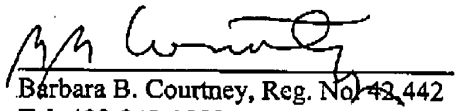
CONCLUSION

Applicants respectfully submit that the claims as amended are allowable over the prior art. Applicants respectfully request withdrawal of the rejections and allowance of the claims. If the Examiner determines that a phone conference would expedite allowance of the application, the Examiner is respectfully encouraged to call the undersigned.

Respectfully submitted,

Courtney Staniford & Gregory LLP

Date: June 4, 2007



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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) FY 2005 (Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)	Docket Number (Optional) ALPH.P020
Application Number 10/400,282	Filed 03/27/2003
For Microphone and voice activity detection (VAD) configurations for use with communication systems	
Art Unit 2615	Examiner Brian T. Pendleton

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☑ One month (37 CFR 1.17(a)(1))	$120	$60	$ 120
☐ Two months (37 CFR 1.17(a)(2))	$450	$225	$
☐ Three months (37 CFR 1.17(a)(3))	$1020	$510	$
☐ Four months (37 CFR 1.17(a)(4))	$1590	$795	$
☐ Five months (37 CFR 1.17(a)(5))	$2160	$1080	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☑ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 503616. I have enclosed a duplicate copy of this sheet.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 42,442

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

Signature — June 4, 2007 (Date)

Barbara B. Courtney (Typed or printed name) — 408-342-1902 (Telephone Number)

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. 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 1.136(a). 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 6 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.

06/05/2007 TL0111 00000015 10400282
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Document code: WFEE

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PATENT APPLICATION FEE DETERMINATION RECORD
Effective January 1, 2003

Application or Docket Number: 10400282

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	39	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	39 minus 20=	* 19
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☑		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	375.00	OR	BASIC FEE	750.00
X$ 9=	171	OR	XS18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL	546	OR	TOTAL	

6/4/07

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 40	Minus	** 39	= 1
Independent	* 7	Minus	*** 3	= 4
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 25=	25	OR	XS18=	
X 400=	400	OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE	425	OR	TOTAL ADDIT. FEE	

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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 number found in the appropriate box in column 1.

OIPE IAP66
JUL 25 2007
PATENT & TRADEMARK OFFICE

Attorney Docket No. ALPH.P020 Patent

Transmittal of Supplemental Amendment

Certification Under 37 C.F.R. §1.10 (if applicable)

EV 708 402 415 US
"Express Mail" Label Number

July 25, 2007
Date of Transmission

I hereby certify that this application, and any other documents referred to as enclosed herein are being deposited in an envelope with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and addressed to the Mail Stop Amendment, Commissioner for Patents, PO Box 1450, Alexandria, VA. 22313-1450

Jerry Donnard
(Print Name of Person Mailing Application)

(Signature of Person Mailing Application)

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:

Gregory C. Burnett et al.

Application No. 10/400,282

Filed: March 27, 2003

For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

) Examiner: Brian T. Pendleton

) Art Unit: 2615

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

SUPPLEMENTAL AMENDMENT

Sir:

Please enter the following amendments to the specification and drawings to correct informalities.

IN THE SPECIFICATION

On page 21, lines 17-25, replace the entire paragraph with the following paragraph as amended.

The areas of sensitivity 1102-1108 include areas of optimal sensitivity A-F where speech can be reliably detected by a SSM, under an embodiment. The areas of optimal sensitivity A-F include, but are not limited to, the area behind the ear A, the area ~~above the ear~~ below the ear B, the mid-cheek area C of the jaw, the area in front of the ear canal D, the area E inside the ear canal in contact with the mastoid bone or other vibrating tissue, and the nose F. Placement of an accelerometer/SSM in the proximity of any of these areas of sensitivity 1102-1108 will work with a headset, but a handset requires contact with the cheek, jaw, head, or neck. The above areas are only meant to guide, and there may be other areas not specified where useful vibrations can also be detected.

REMARKS

Applicants respectfully request entry of the foregoing amendments in the application.

Respectfully submitted,

Courtney Staniford & Gregory LLP

Date: July 25, 2007

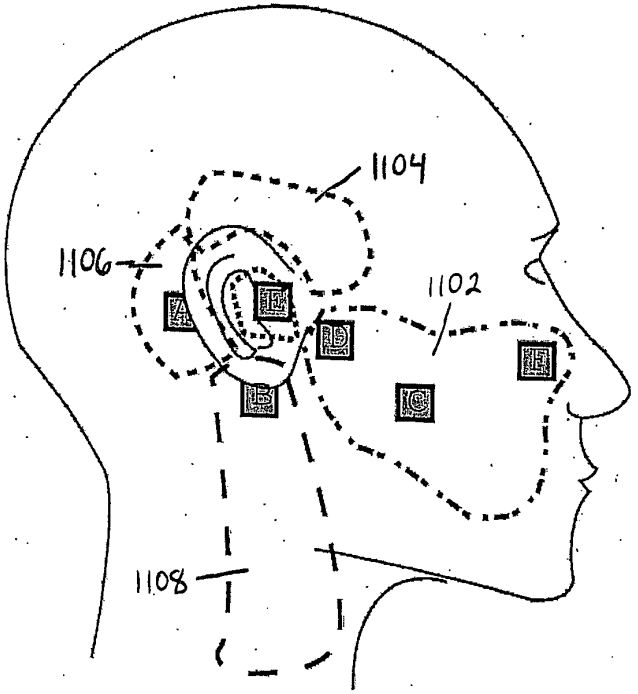
Barbara B. Courtney, Reg. No. 42,442
Tel. 408-342-1902

Courtney Staniford & Gregory LLP
P.O. Box 9686
San Jose, CA 95157
Tel. 408-342-1902
Fax. 408-342-1909

IN THE DRAWINGS

Please replace figures 1-29 of the drawings with the formalized and amended drawings submitted herewith. No new matter is added by the amendments, which merely correct informalities. Specifically, Figure 11A, the description for item B – Area Below the Ear. A marked-up copy of Figure 11A, labeled "Annotated Sheet" is included.

ANNOTATED SHEET



A - Area Behind The Ear
B - Area ~~Above~~ BELOW The Ear
C - Mid Cheek Area
D - Area In Front of Ear Canal
E - Inside Ear Canal in Contact with Mastoid Bone Or Other Vibrating Tissue
F - Nose

FIGURE 11A

OIPE IAP66 JUL 25 2007 PATENT & TRADEMARK OFFICE

OIPE IAP68
JUL 25 2007
PATENT & TRADEMARK OFFICE

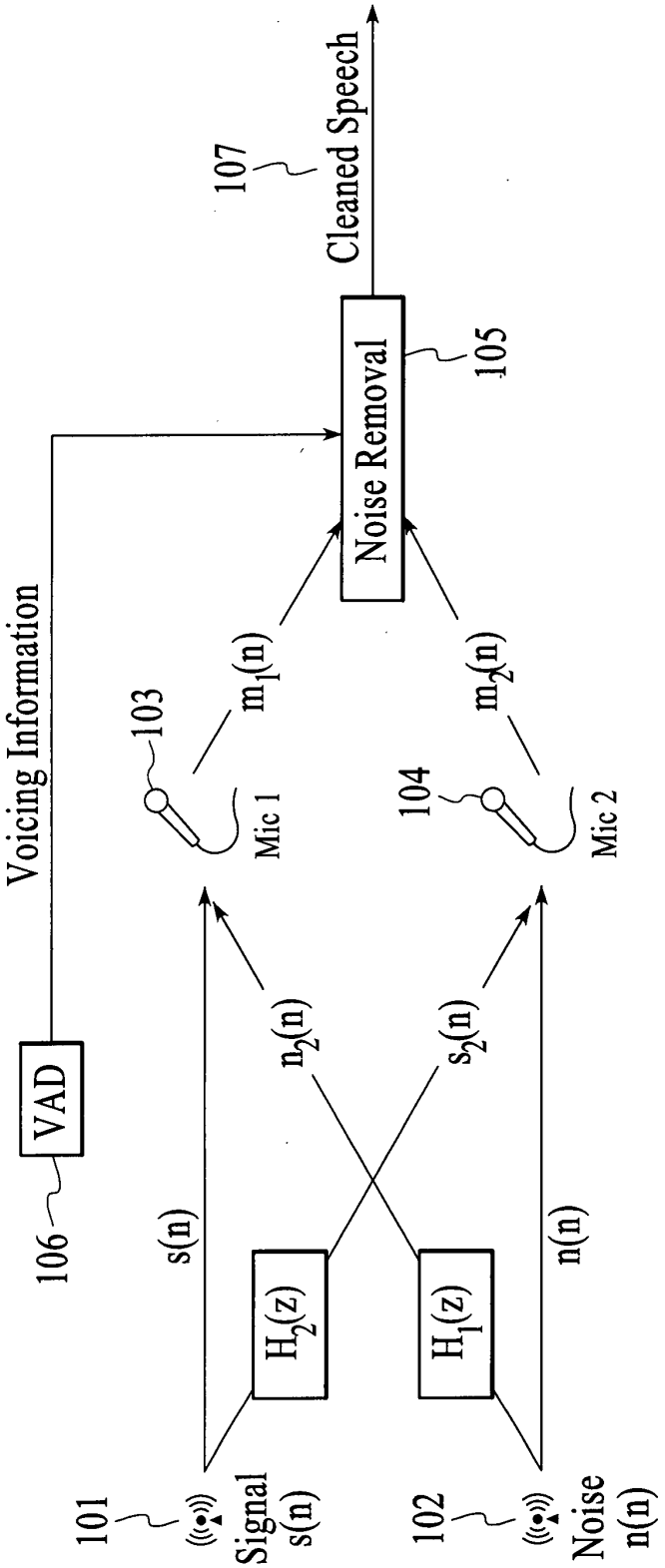


FIG.1

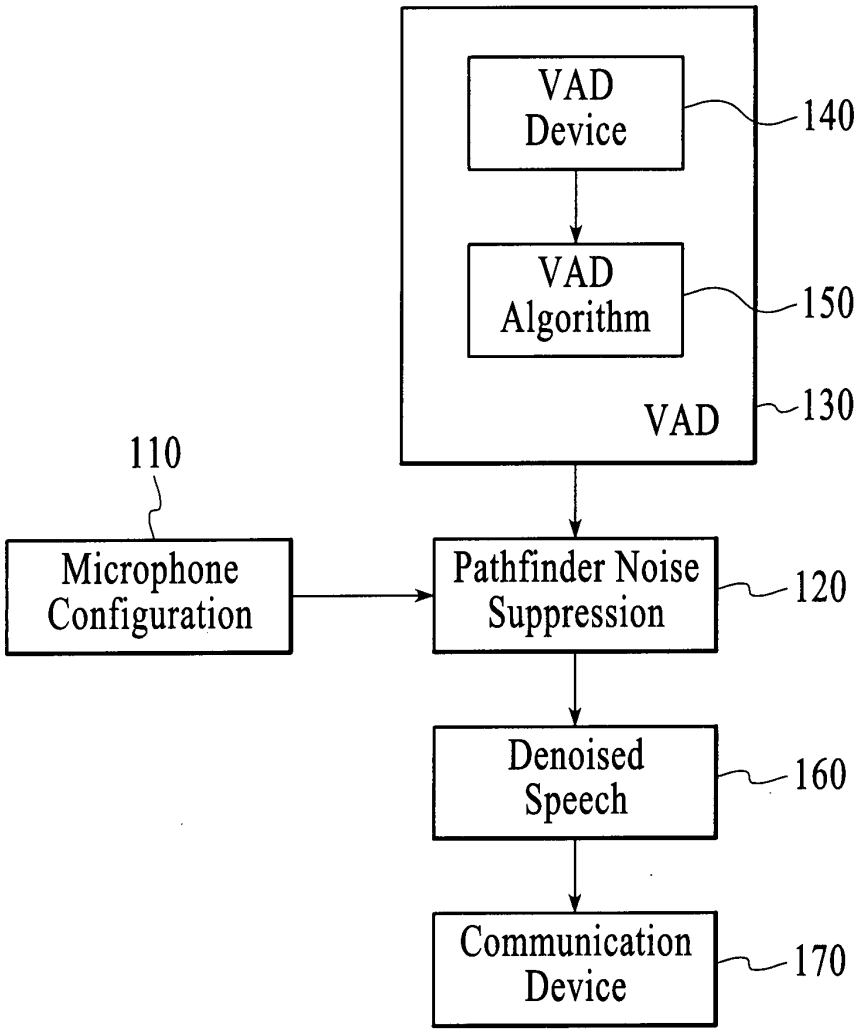

VAD
Device
140
VAD
Algorithm
150
VAD
130
110
Microphone
Configuration
Pathfinder Noise
Suppression
120
Denoised
Speech
160
Communication
Device
170

FIG.1A

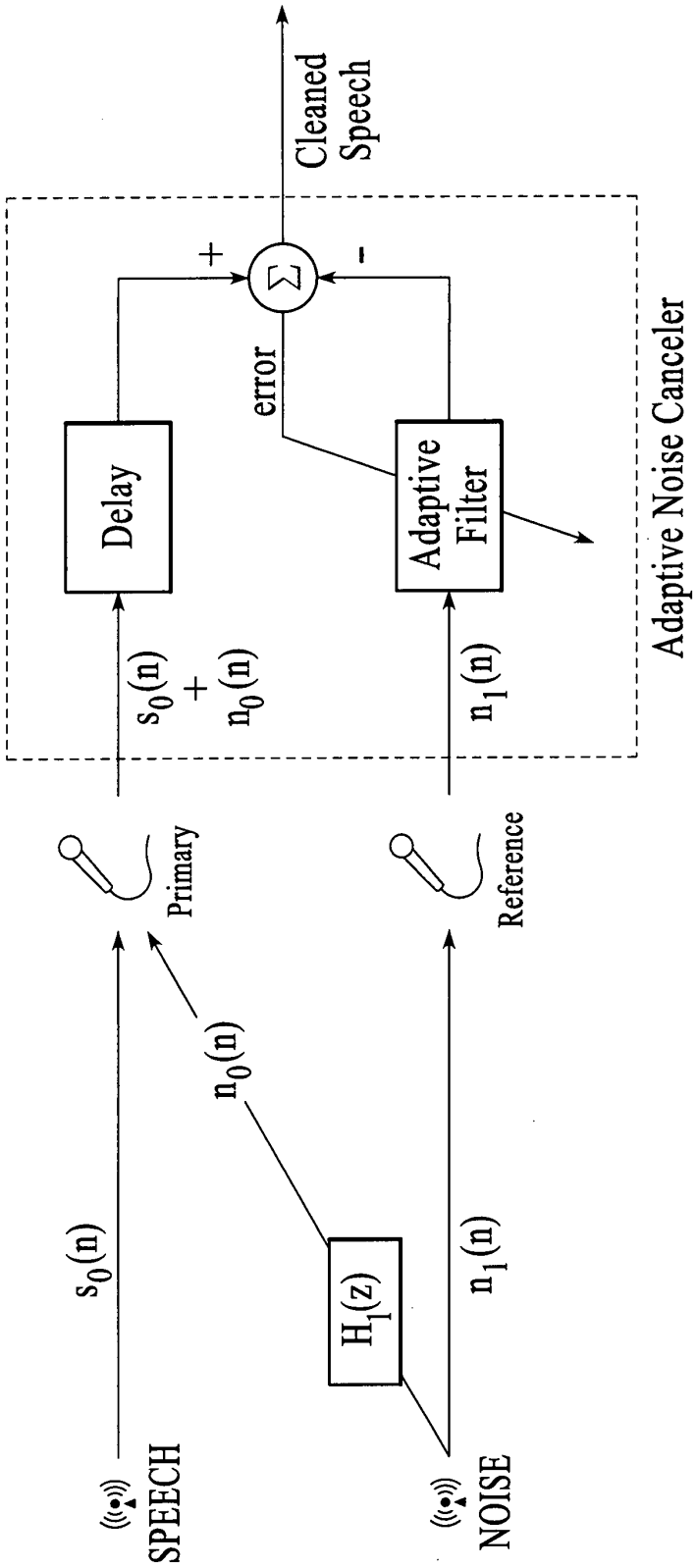


FIG.1B
(PRIOR ART)

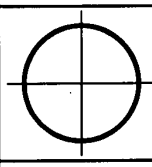
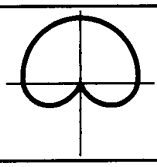
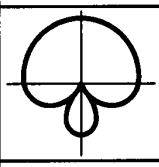
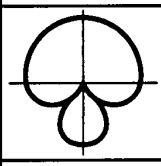
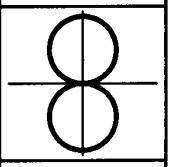
		UNIDIRECTIONAL			
Characteristic	Omni-Directional	Cardioid	Super-Cardioid	Hyper-Cardioid	Bi-Directional
Polar Response Pattern					
Coverage Angle	360°	131°	115°	105°	90°
Angle of Maximum Rejection (null angle)	—	180°	126°	110°	90°
Rear Rejection (relative to front)	0	25 dB	12 dB	6 dB	0
Ambient Sound Sensitivity (relative to omni)	100%	33%	27%	25%	33%
Distance Factor (relative to omni)	1	1.7	1.9	2	1.7

FIG.2
(PRIOR ART)

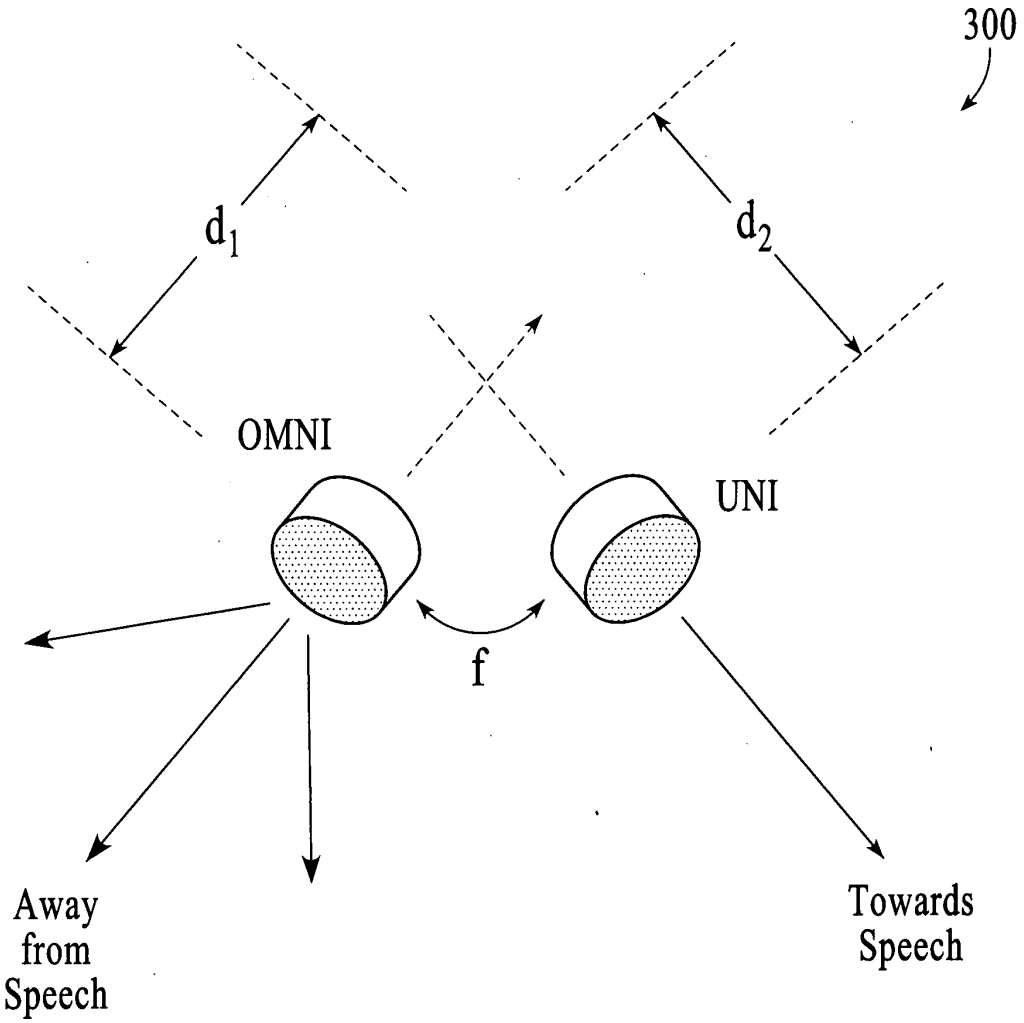


FIG.3A

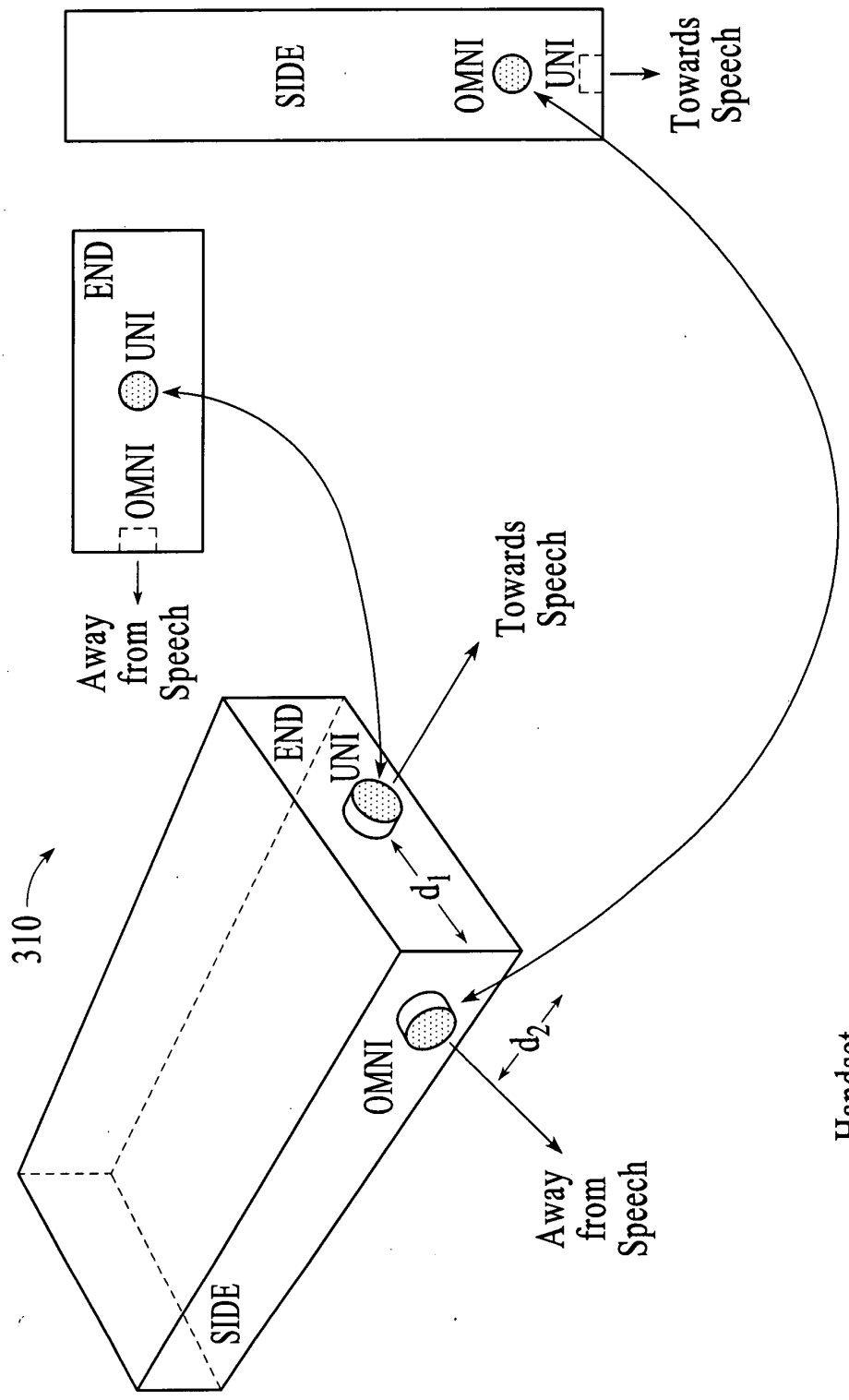

SIDE
OMNI
UNI
Towards Speech
END
UNI
OMNI
Away from Speech
Towards Speech
310
END
UNI
d_1
OMNI
d_2
Away from Speech
SIDE
Handset

FIG.3B

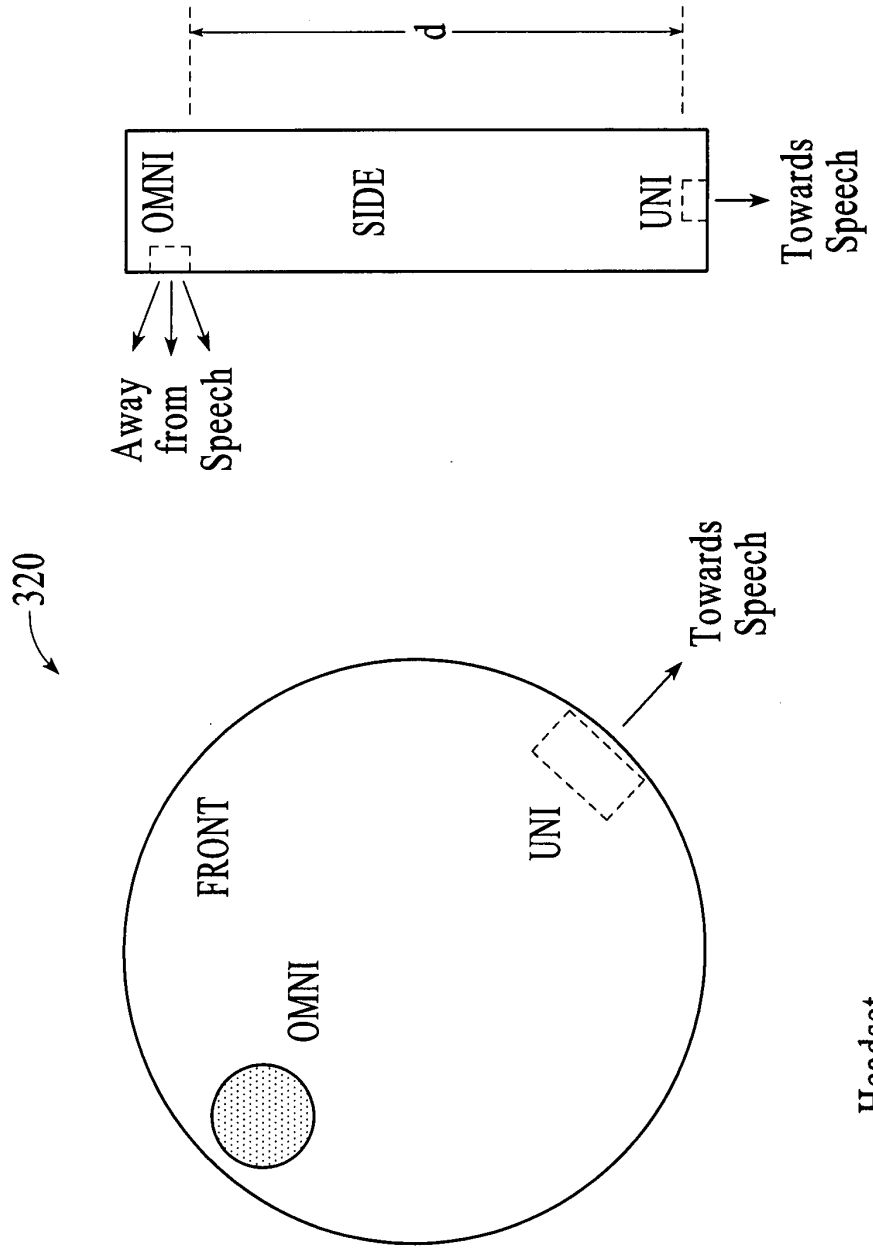

320
d
OMNI
SIDE
UNI
Towards Speech
Away from Speech
Towards Speech
FRONT
OMNI
UNI
Headset

FIG.3C

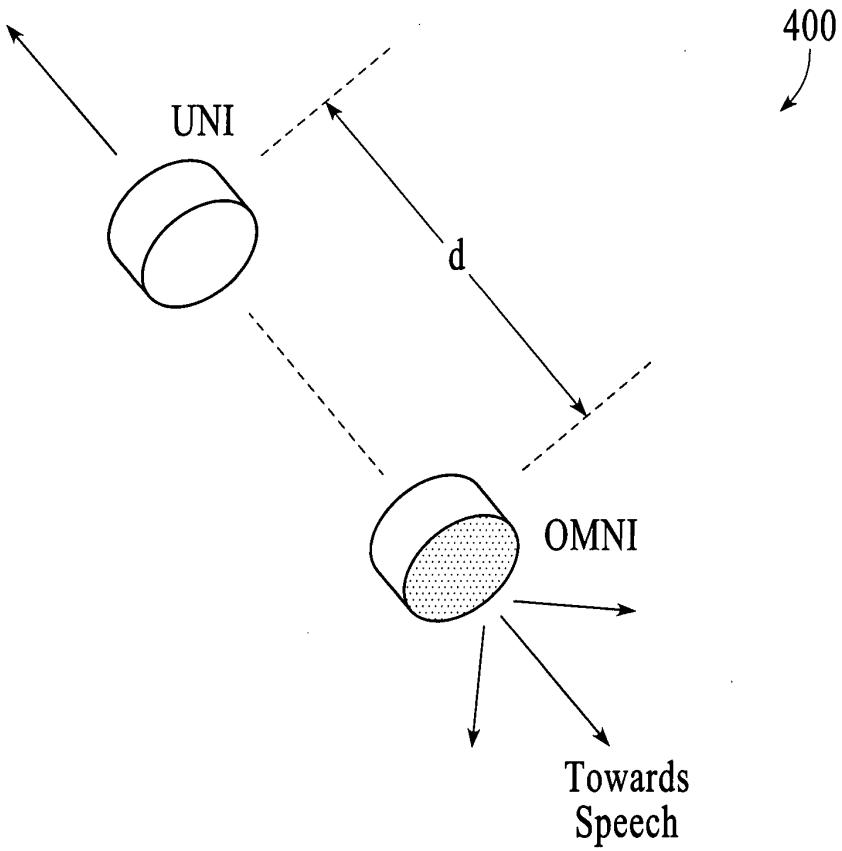


FIG.4A

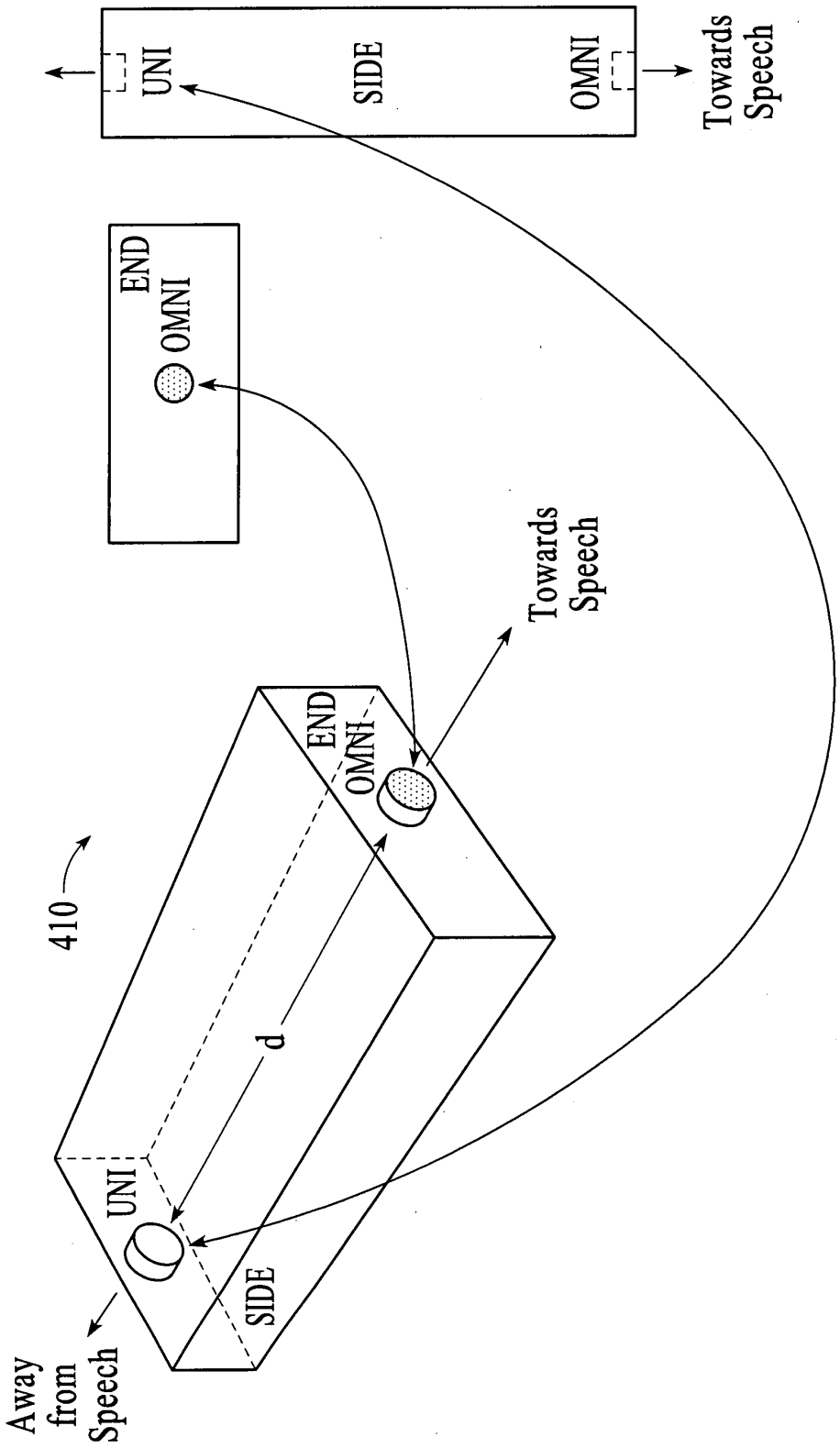

UNI
SIDE
OMNI
Towards Speech
END OMNI
Towards Speech
END OMNI
410
d
UNI
SIDE
Away from Speech
Handset

FIG.4B

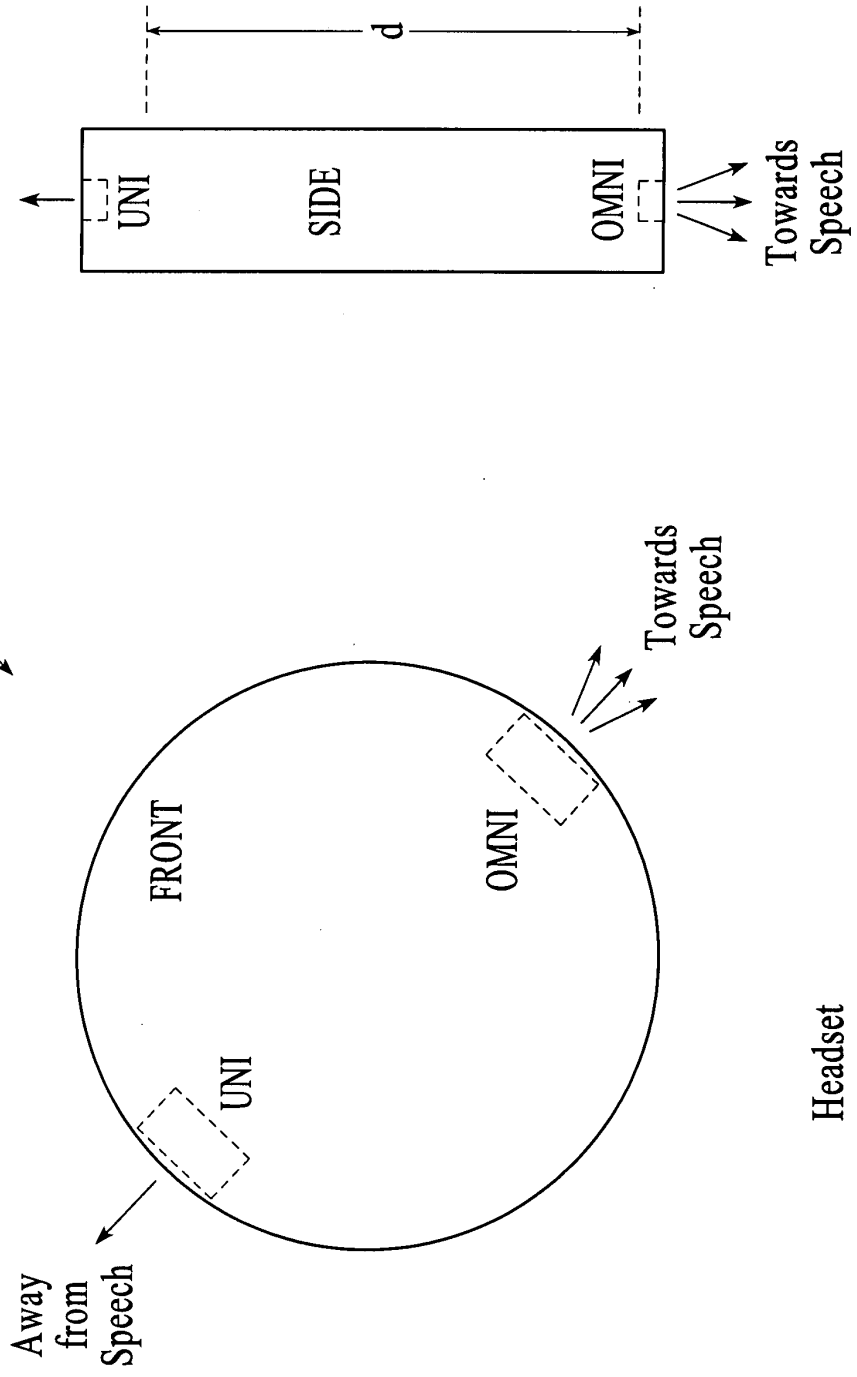

d
UNI
SIDE
OMNI
Towards Speech
420
FRONT
OMNI
Towards Speech
UNI
Away from Speech
Headset

FIG.4C

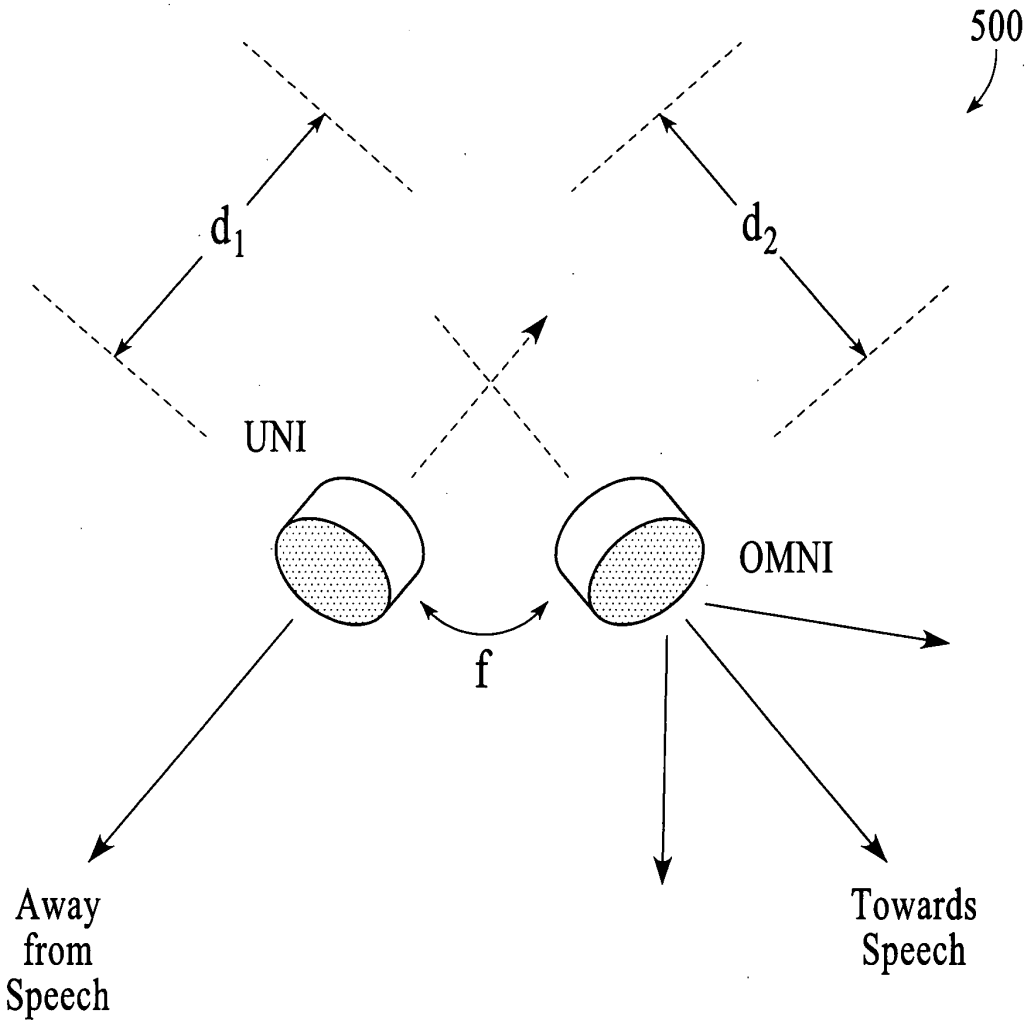


FIG.5A

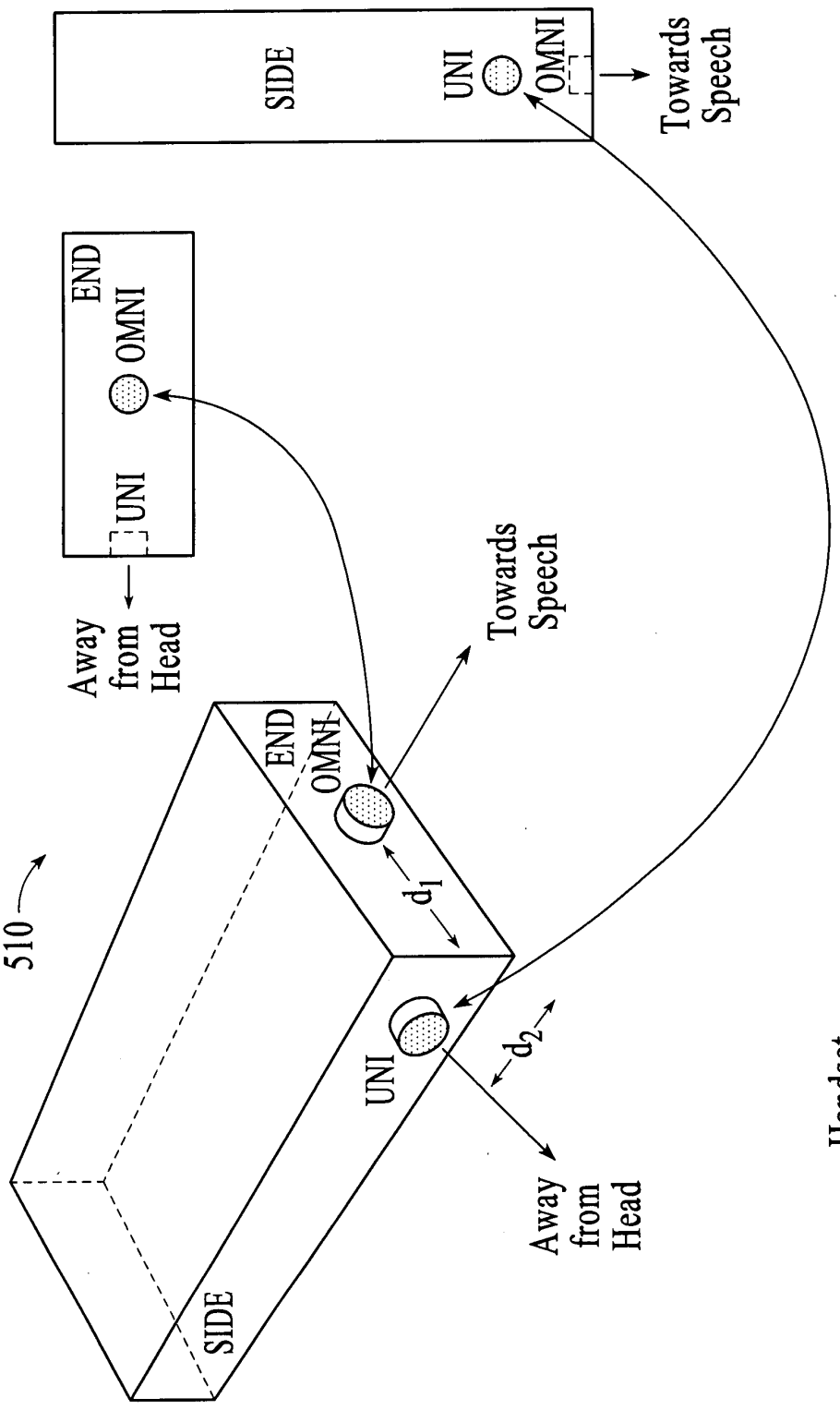

SIDE
UNI
OMNI
Towards Speech
END
OMNI
UNI
Away from Head
Towards Speech
510
END
OMNI
d_1
UNI
d_2
Away from Head
SIDE
Handset

FIG.5B

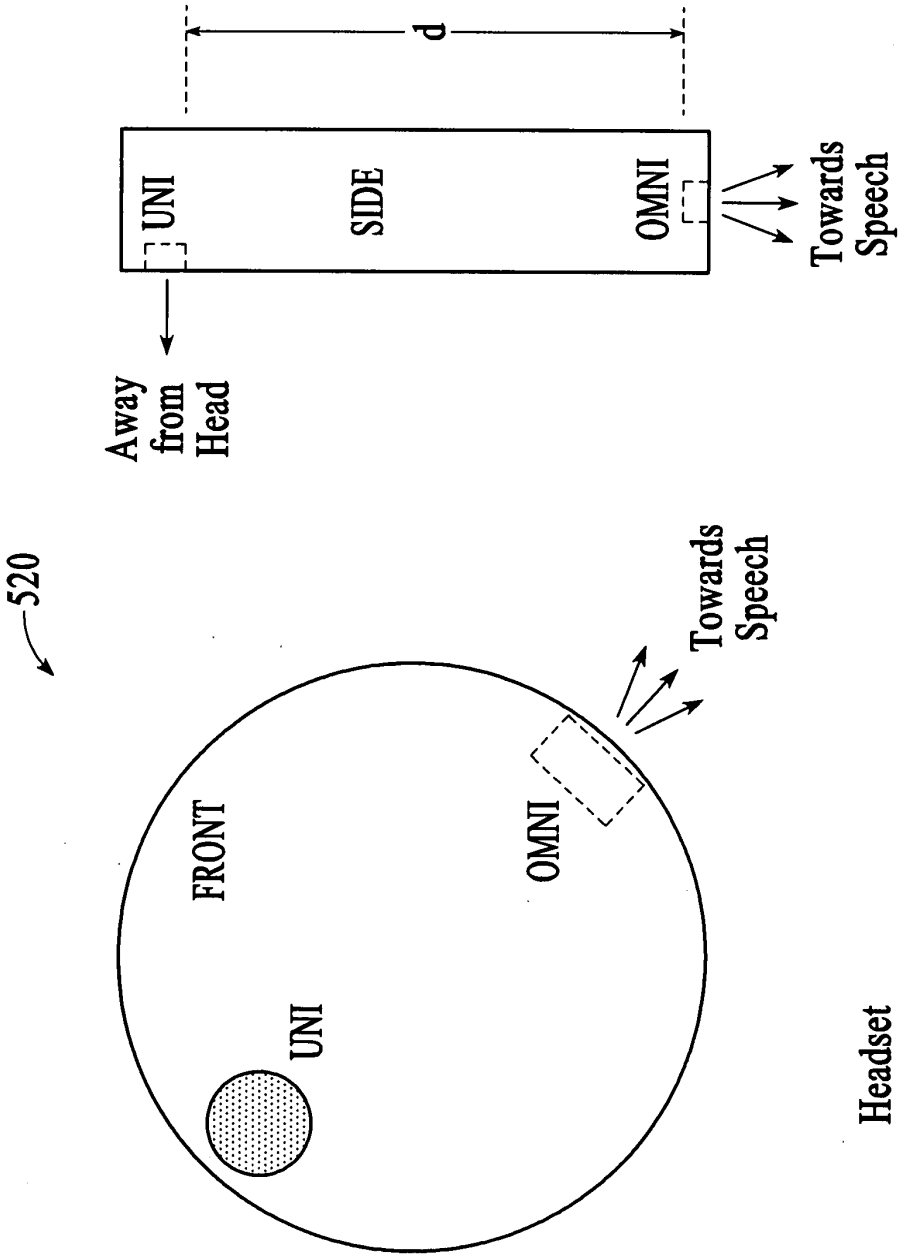

d
UNI
SIDE
OMNI
Towards Speech
Away from Head
520
Towards Speech
FRONT
OMNI
UNI
Headset

FIG.5C

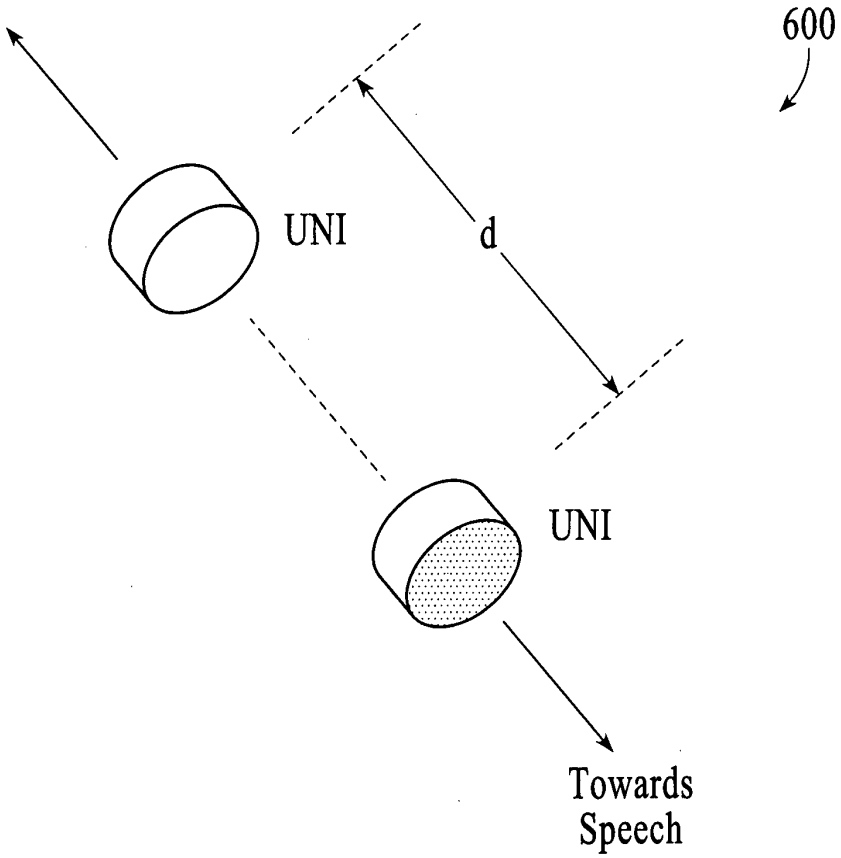


FIG.6A

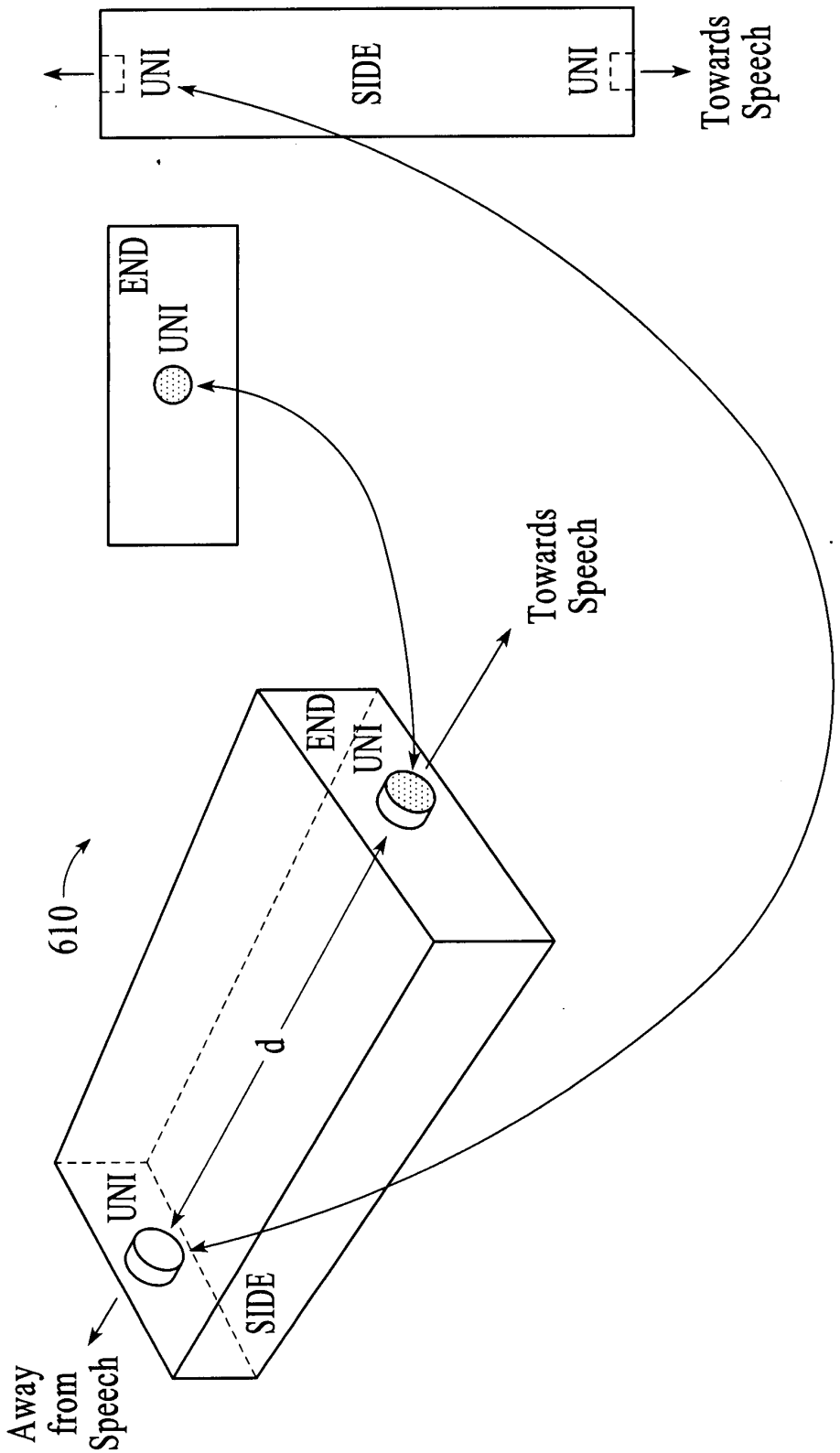

UNI
SIDE
UNI
Towards Speech
END
UNI
Towards Speech
610
END
UNI
d
UNI
SIDE
Away from Speech
Handset

FIG.6B

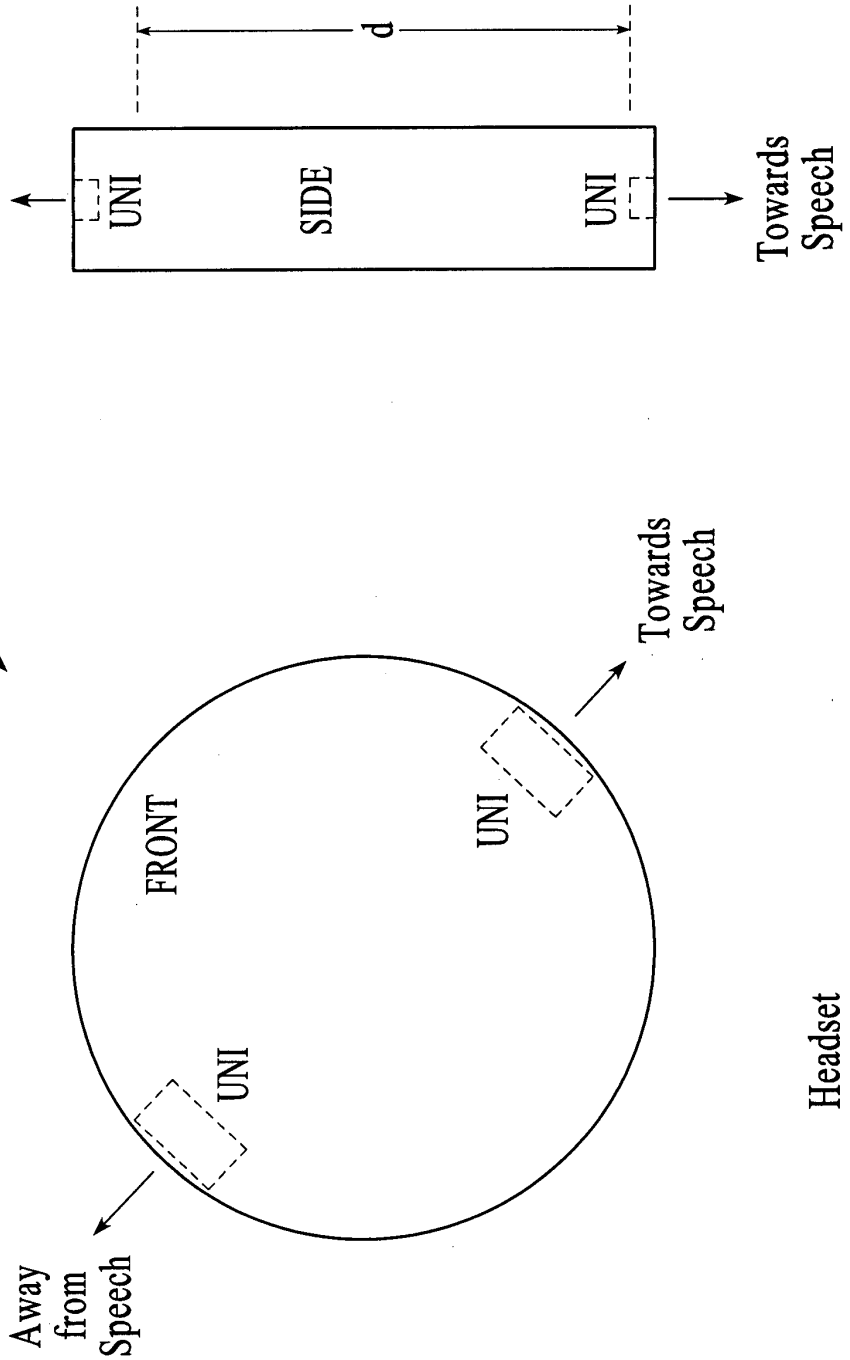

d
UNI
SIDE
UNI
Towards Speech
620
FRONT
UNI
Towards Speech
UNI
Away from Speech
Headset

FIG.6C

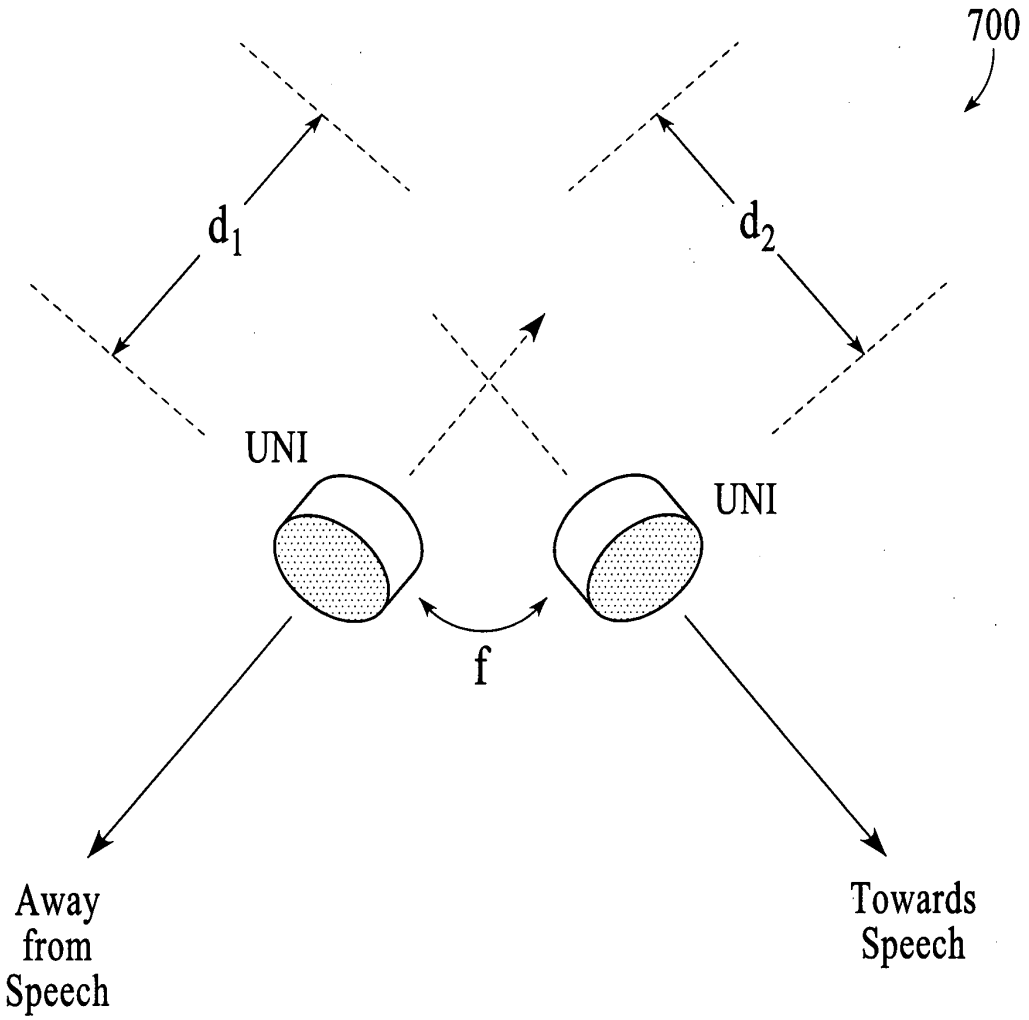


FIG.7A

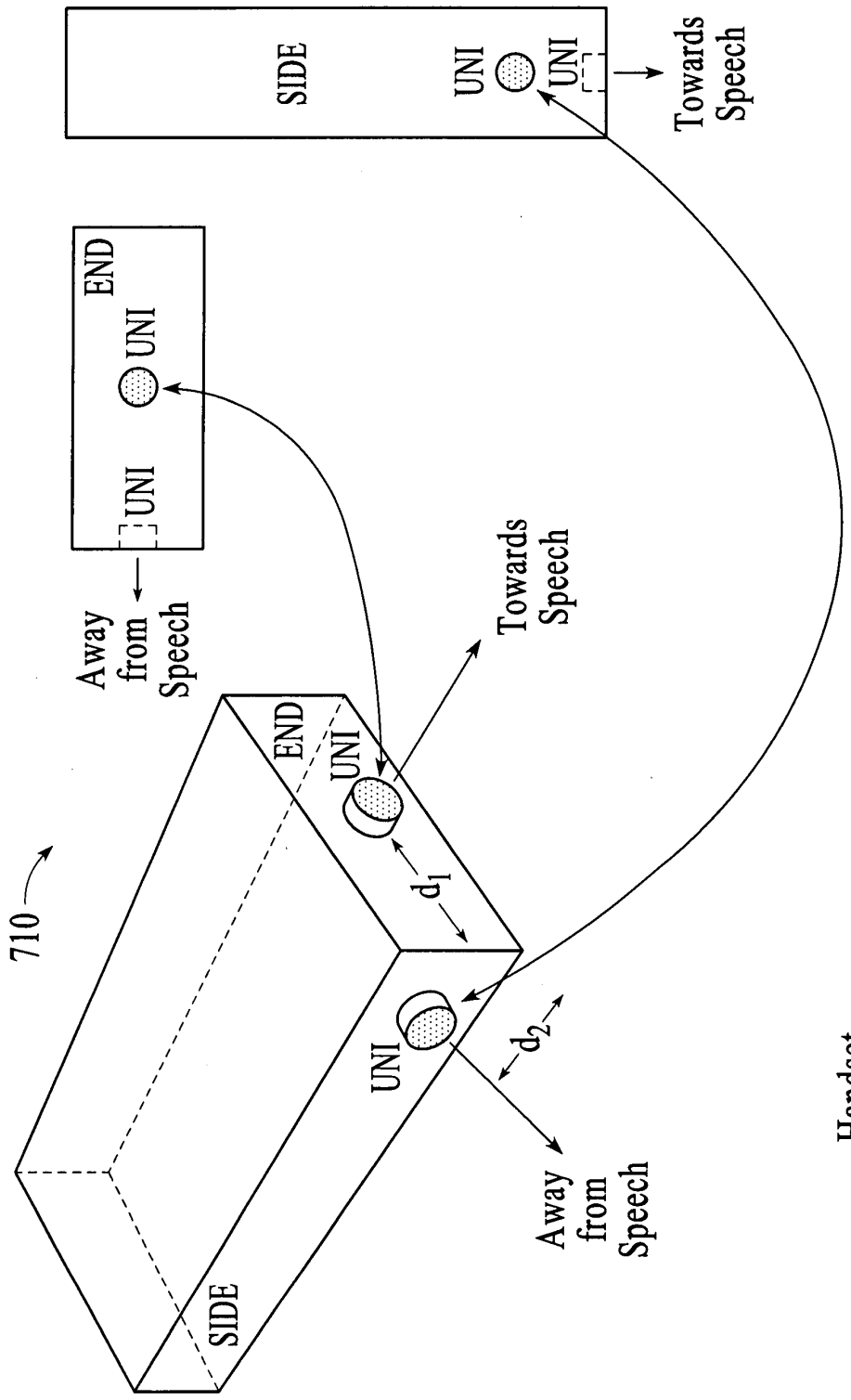

SIDE
UNI
UNI
Towards Speech
END
UNI
UNI
Away from Speech
Towards Speech
END
UNI
710
d_1
UNI
d_2
Away from Speech
SIDE
Handset

FIG.7B

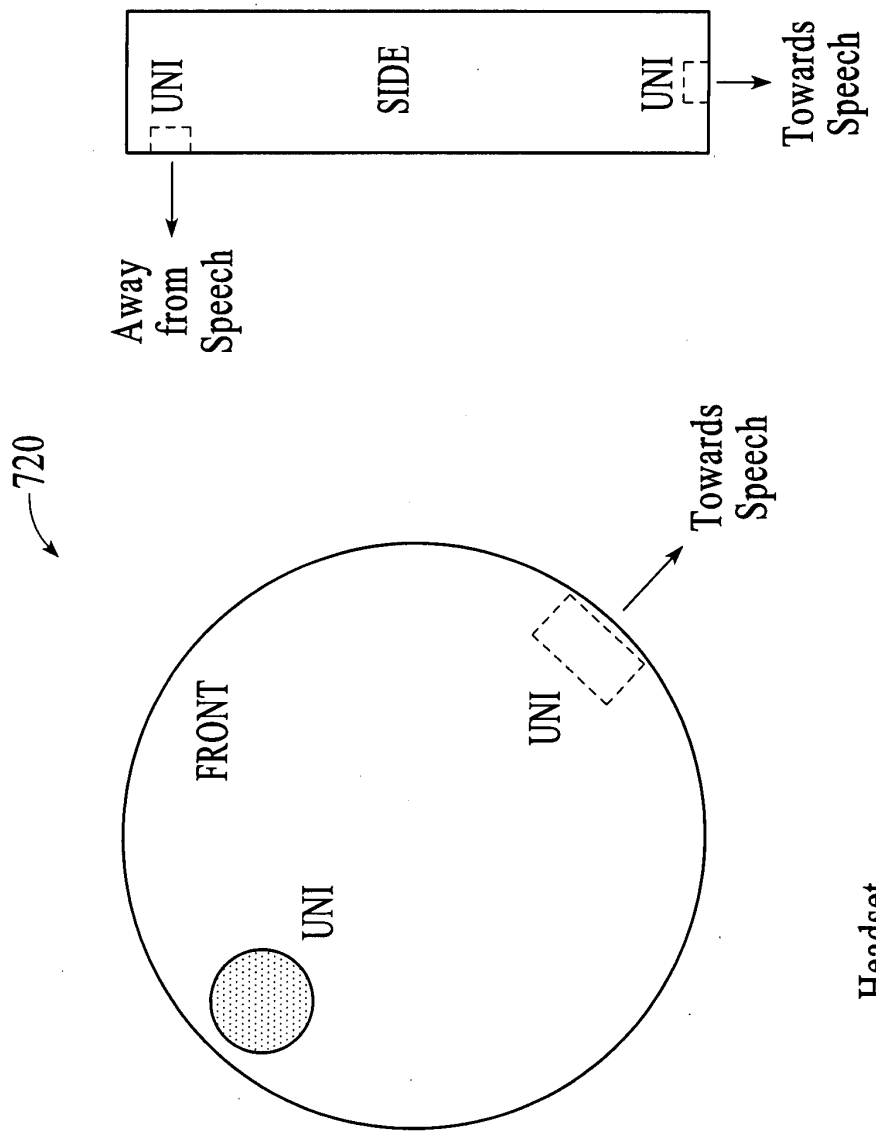

720
UNI
SIDE
UNI
Towards Speech
Away from Speech
Towards Speech
FRONT
UNI
UNI
Headset

FIG.7C

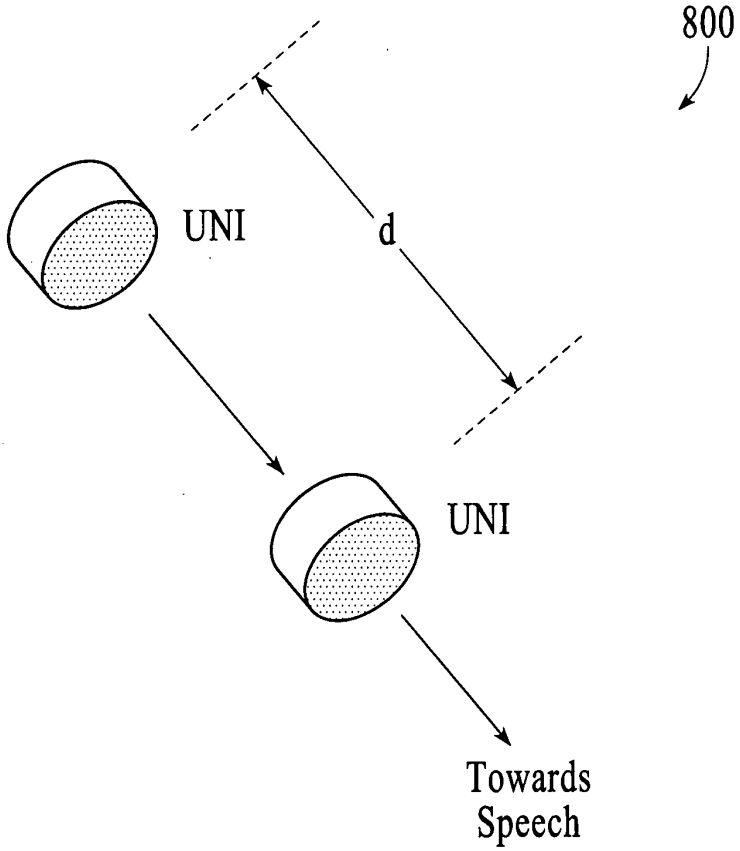


FIG.8A

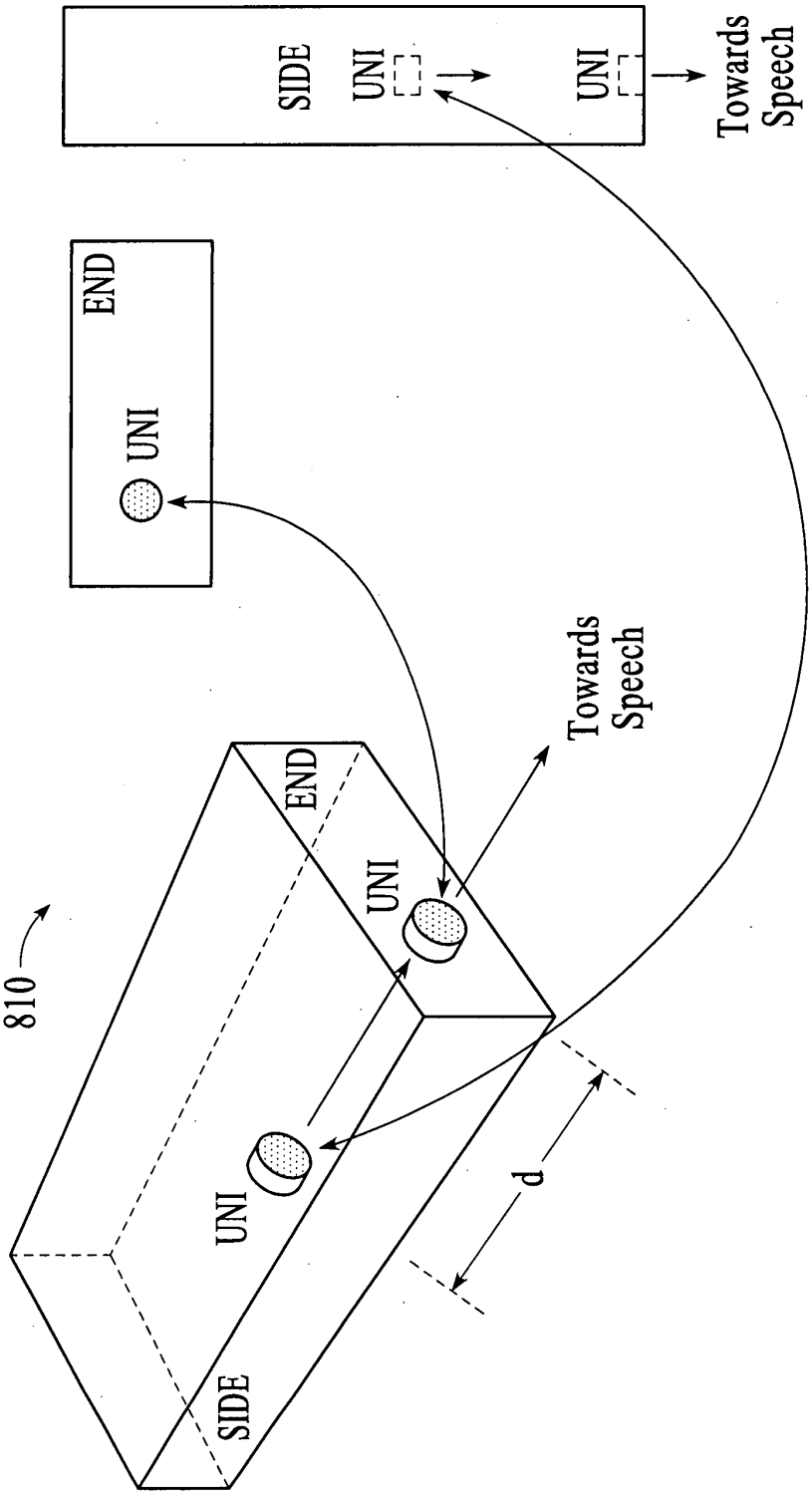

SIDE
UNI
UNI
Towards Speech
END
UNI
Towards Speech
END
UNI
810
UNI
d
SIDE
Handset

FIG.8B

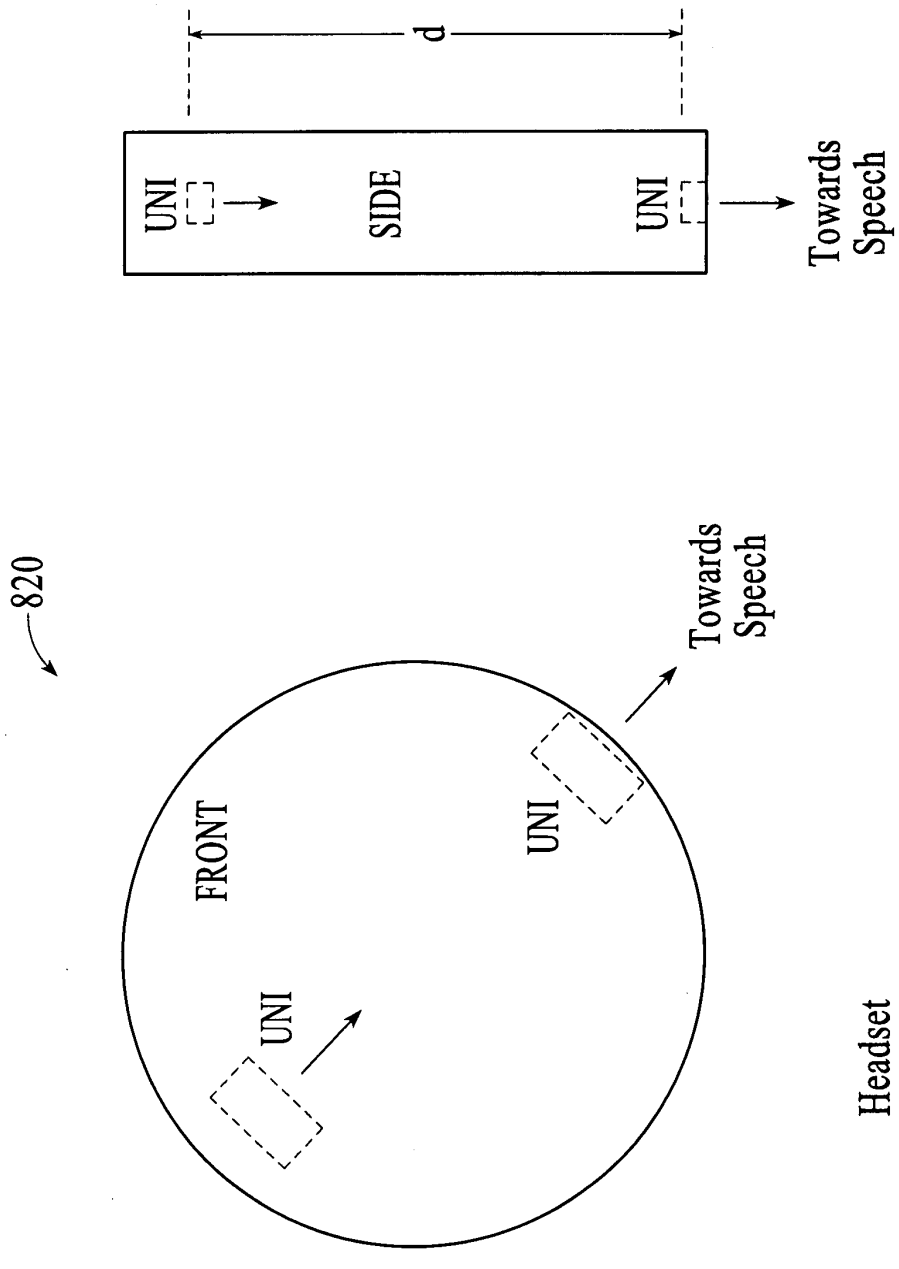

d
UNI
SIDE
UNI
Towards Speech
820
FRONT
UNI
UNI
Towards Speech
Headset

FIG.8C

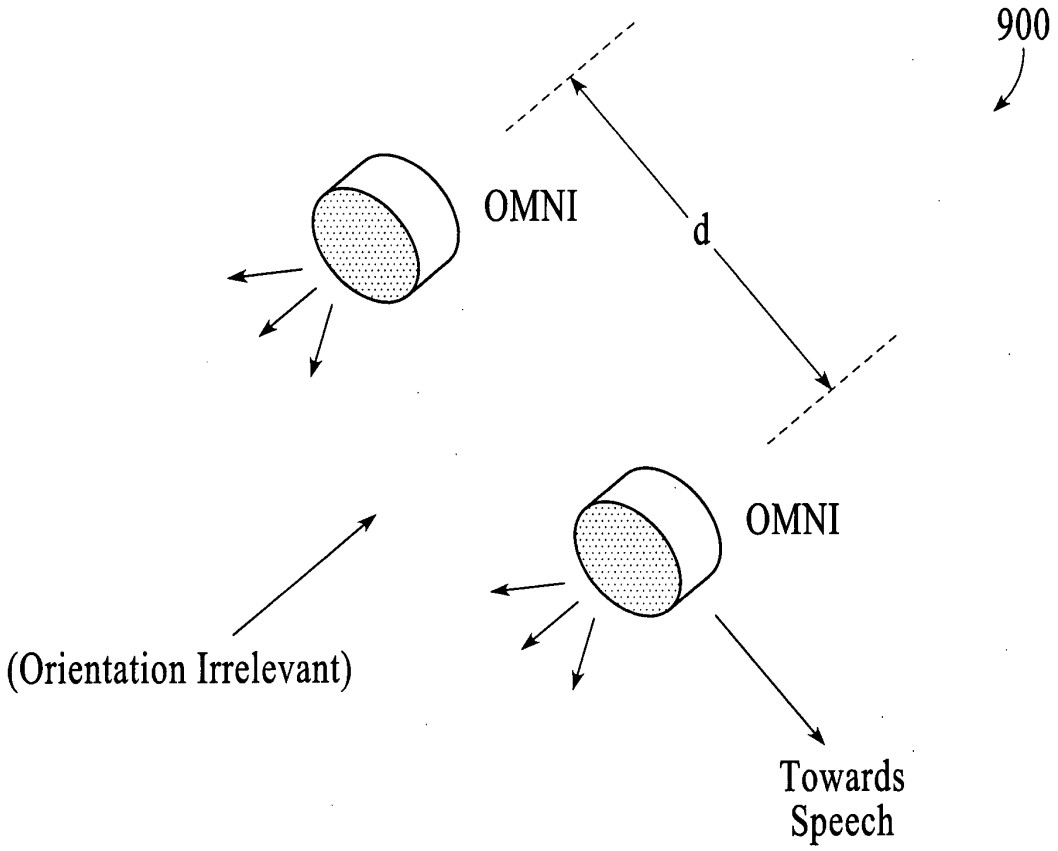


FIG.9A

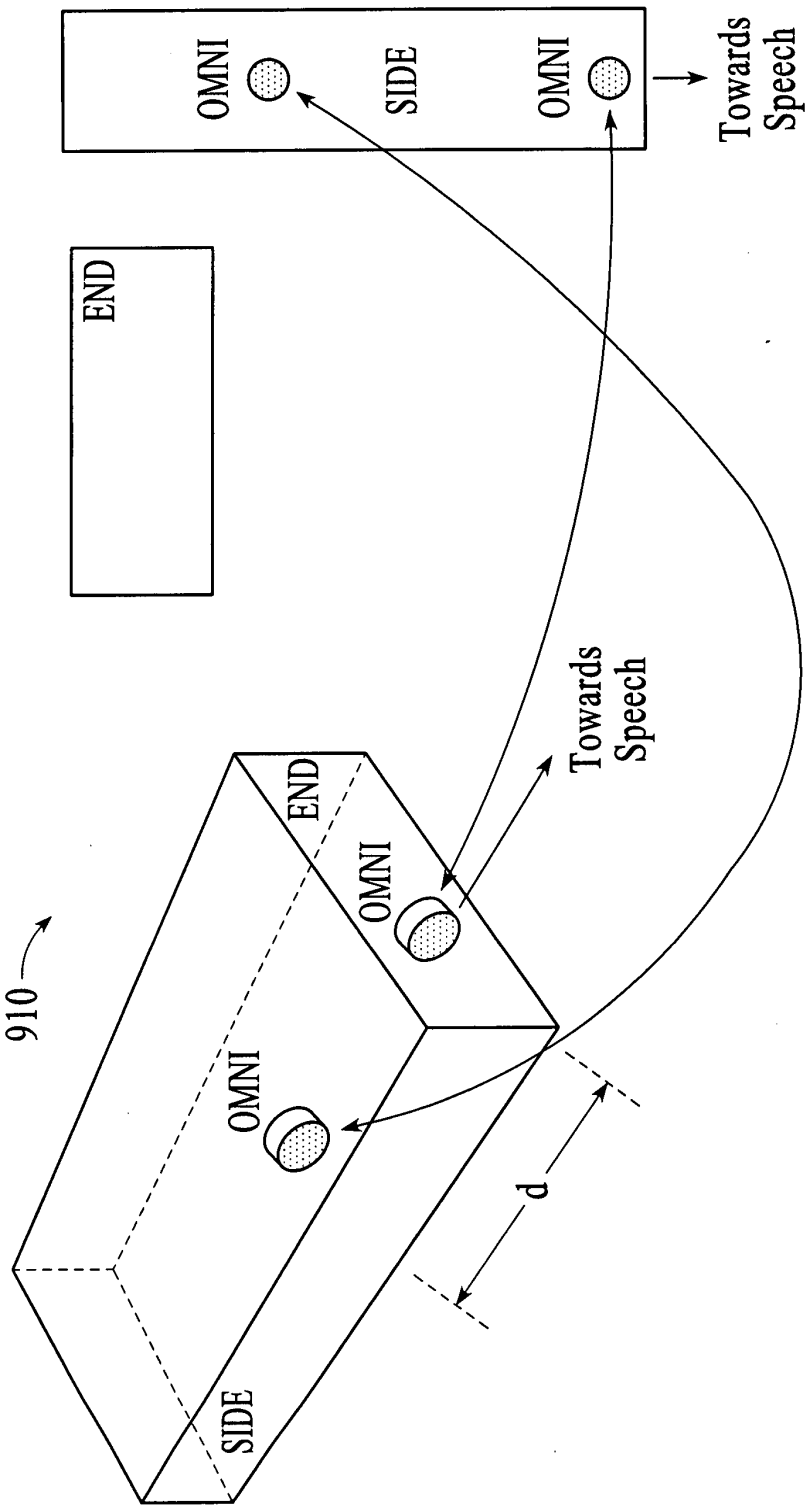

OMNI
SIDE
OMNI
Towards Speech
END
Towards Speech
END
OMNI
910
OMNI
d
SIDE
Handset

FIG.9B

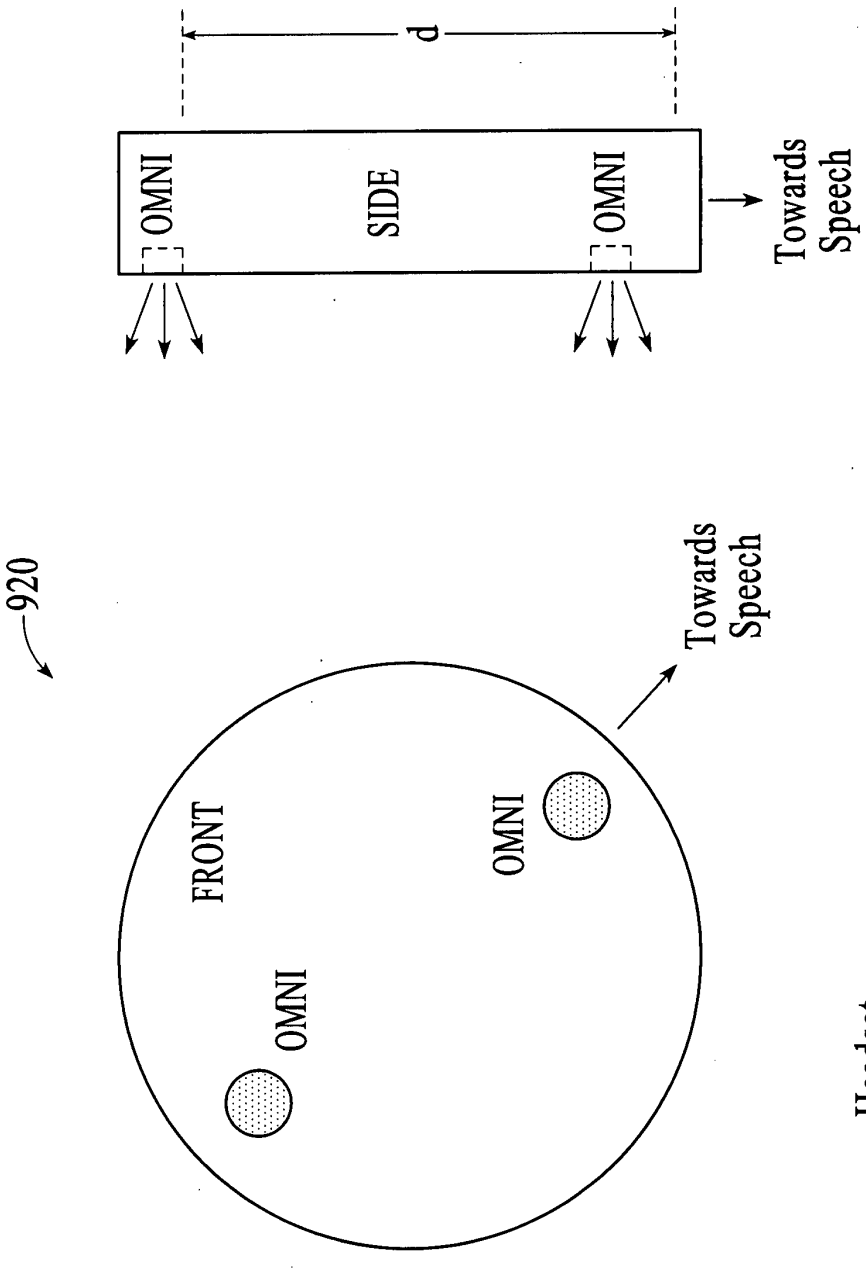

d
OMNI
SIDE
OMNI
Towards Speech
920
Towards Speech
FRONT
OMNI
OMNI
Headset

FIG.9C

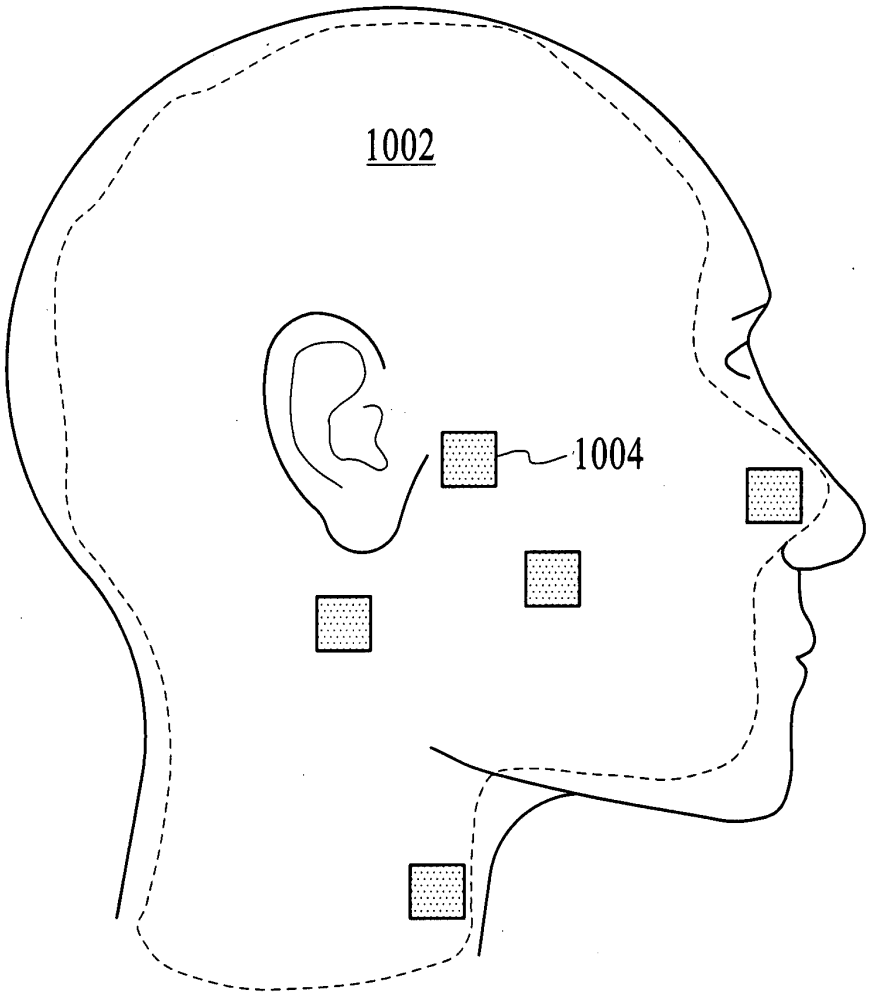


FIG.10A

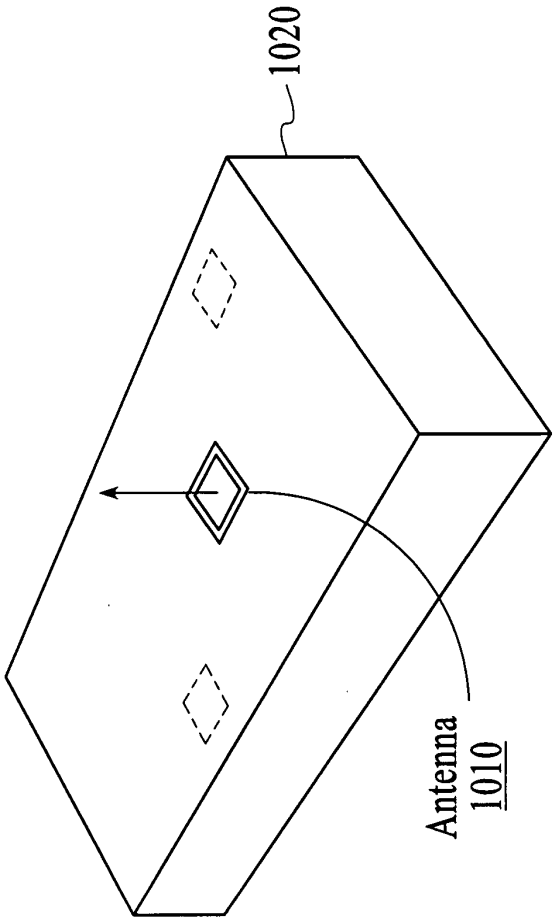


FIG.10B

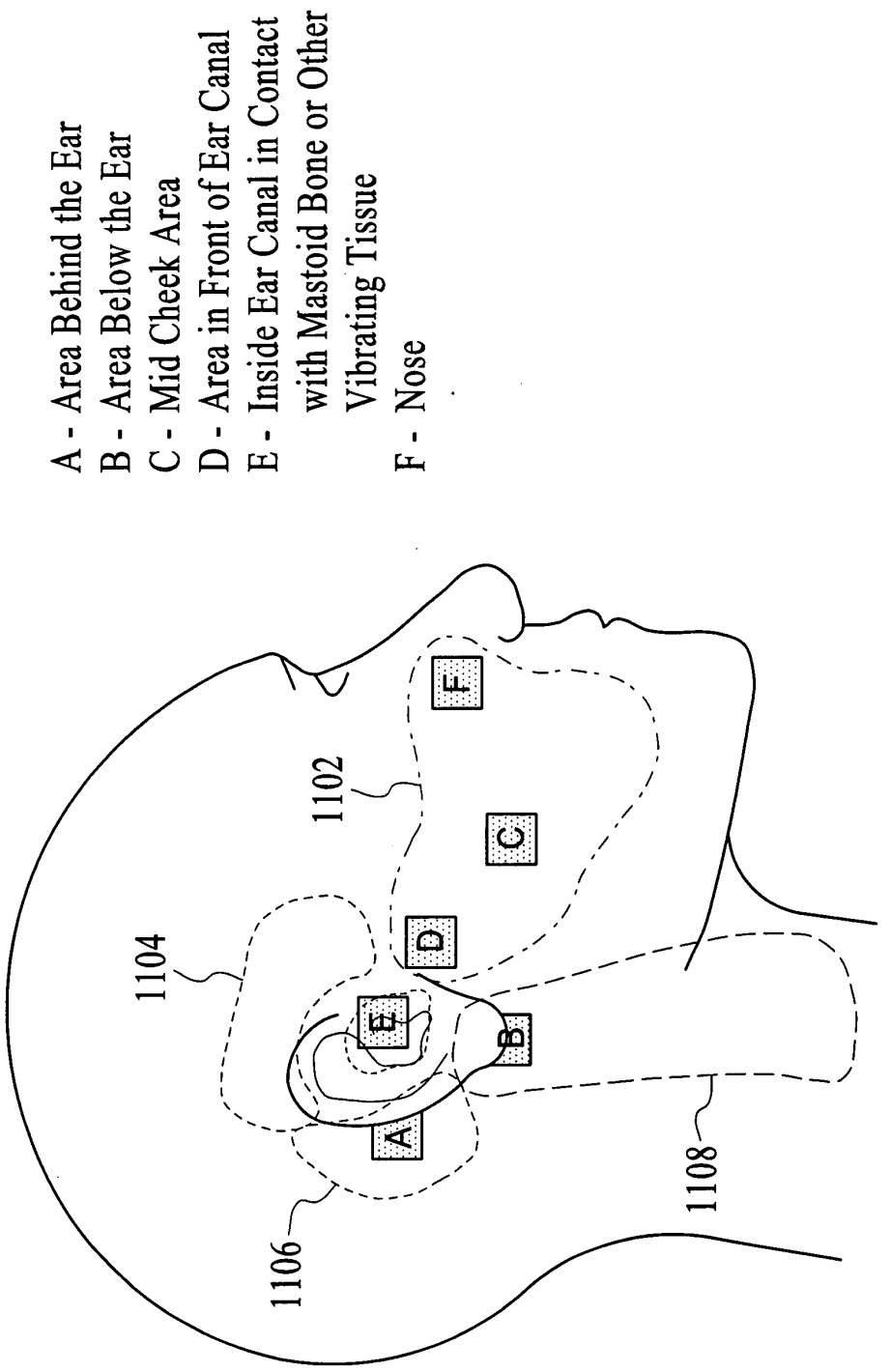

A - Area Behind the Ear
B - Area Below the Ear
C - Mid Cheek Area
D - Area in Front of Ear Canal
E - Inside Ear Canal in Contact with Mastoid Bone or Other Vibrating Tissue
F - Nose
1102
1104
1106
1108
A
B
C
D
E
F

FIG.11A

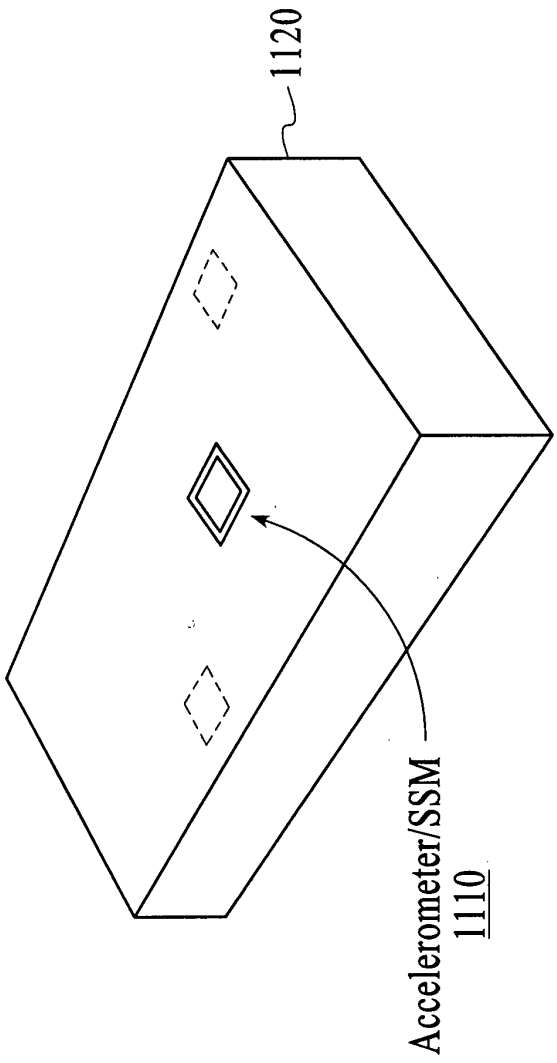


FIG.11B

07-26-07

2615



EXPRESS MAIL CERTIFICATE OF MAILING

Express Mail" mailing label number: EV 708 402 415 US
Date of Deposit: July 25, 2007
I hereby certify that I am causing the paper(s) and/or fee(s) indicated below to be deposited with the United States Postal Service "Express Mail Post Office to Addressee" service on the date indicated above and that the paper(s) and/or fee(s) have been addressed to **Mail Stop Amendment, Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450**.

Jerry Donnard
(Typed or printed name of person mailing paper(s) or fee(s))

(Signature of person mailing paper or fee)

7-25-2007
(Date signed)

Serial/Patent No.: 10/400,282 Filing/Issue Date: March 27, 2003 Client: AliphCom
Title: Microphone and Voice Activity Detection (VAD) Configurations for Use With Communication Systems

Atty. Docket No.: ALPH.P020 Date Mailed: July 25, 2007

The following has been received in the U.S. Patent & Trademark Office on the date stamped hereon:

- ☐ Amendment/Response (pgs.)
- ☐ Preliminary Amendment (pgs.)
- ☐ Application - Utility (pgs.)
- ☐ Application - Rule 1.53(b) Contin. (pgs.)
- ☐ Application - Rule 1.53(b) Divis. (pgs.)
- ☐ Application - Rule 1.53(b) CIP (pgs.)
- ☐ Application - Rule 1.53(d) CPA (pgs.)
- ☐ Application - PCT (pgs.)
- ☐ Application - Provisional (pgs.)
- ☑ Drawings (Replacement, 29 sheets)
- ☐ Declaration & Power of Attorney (pgs.)
- ☐ Assignment & Cover Sheet (pgs.)
- ☐ Power of Attorney by Assignee (pgs.)
- ☐ Nonpublication Request (35 USC 122(b))
- ☑ Other Copy of Annotated Sheet for Figure 11A
- ☐ Petition for Extension of Time (month(s))
- ☐ Information Disclosure Statement & PTO/SB/08A
- ☐ Issue Fee Transmittal
- ☑ Submission of Supplemental Amendment
- ☐ Notice of Appeal
- ☐ Appeal Brief (pgs. in triplicate)
- ☐ Reply Brief
- ☐ Response to Notice of Missing Parts
- ☐ Utility Patent Application Transmittal
- ☐ Fee Transmittal (in duplicate)
- ☑ Itemized Postcard
- ☑ Express Mail Certificate of Mailing
- ☑ Express Mail No. **EV 708 402 415 US**
- ☐ Authorization to Charge Credit Card Amt $

PATENT APPLICATION FEE DETERMINATION RECORD
Effective January 1, 2003

Application or Docket Number: 10400282

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	39	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	39 minus 20=	* 19
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☑	RATE	FEE	OR	OTHER THAN SMALL ENTITY	RATE	FEE
	BASIC FEE	375.00	OR		BASIC FEE	750.00
	XS 9=	171	OR		XS18=	
	X42=		OR		X84=	
	+140=		OR		+280=	
	TOTAL	546	OR		TOTAL	

6/4/07

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 40	Minus	** 39	= 1
Independent	* 7	Minus	*** 3	= 4
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY	RATE	ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY	RATE	ADDITIONAL FEE
	X25=	25	OR		XS18=	
	X100=	400	OR		X84=	
	+140=		OR		+280=	
	TOTAL ADDIT. FEE	425	OR		TOTAL ADDIT. FEE	

7/25/07

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

Same

	RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
	X$ 9=		OR	X$18=	
	X42=		OR	X84=	
	+140=		OR	+280=	
	TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

	RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
	X$ 9=		OR	X$18=	
	X42=		OR	X84=	
	+140=		OR	+280=	
	TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 2 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 number found in the appropriate box in column 1.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1602	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/18 14:18
S1	150	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S3	850	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S4	641	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S5	6	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:28
S6	6	("5136577" | "5329587" | "5544080" | "5887059" | "6070137" | "6487295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/15 15:33
S7	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S8	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:32
S9	1	("5406622").PN.	USPAT	OR	OFF	2007/10/16 10:24
S10	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:38
S11	0	EP-1483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:37

EAST Search History

S12	0	EP-2001483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S13	0	EP-483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S14	0	WO-20030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S15	0	WO-030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:39
S16	194	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:40
S17	33	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:04
S18	7	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (unidirectional)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S19	1	burnett.in. and microphone and ((voice near2 activity) same (manual$2 near2 activat$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:20
S20	1	"381"/$.ccls. and (manuall$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S21	1	"381"/$.ccls. and (manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:41

EAST Search History

S22	3	(manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S23	10	(manual$3 near2 (operat$3 activat$3)) same (VAD)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S24	2	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) same (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S25	7	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S26	5	burnett.in. and microphone and ((voice near2 activity) same subsystem)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:54
S27	35	("20020039425" | "3789166" | "4006318" | "4591668" | "4653102" | "4777649" | "4901354" | "5097515" | "5212764" | "5400409" | "5406622" | "5414776" | "5473702" | "5515865" | "5517435" | "5539859" | "5590241" | "5633935" | "5649055" | "5664052" | "5684460" | "5729694" | "5754665" | "5835608" | "5853005" | "5917921" | "5966090" | "5986600" | "6006175" | "6009396" | "6069963" | "6191724" | "6233551" | "6266422" | "6430295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/16 18:19
S28	1	(glottal near2 electromagnetic near2 sensor$1) with antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S29	6	burnett.in. and microphone and (voice near2 activity) and glottal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 15:59

EAST Search History

S30	12	(glottal near2 electromagnetic near2 micropower near2 sensor$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S31	1	burnett.in. and microphone and (voice near2 activity) and (transceiver same headset)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S32	1	burnett.in. and microphone and (voice near2 activity) and transceiver	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S33	2	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:17
S34	29	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S35	6	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver) and (headset headphone$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S36	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S37	1	S36 and headset	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:23
S38	0	headset same transceiver same (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:23
S39	0	(headset same transceiver) and (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S40	5	(headset same transceiver) and (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24

EAST Search History

S41	35	(headset same transceiver) and (noise near2 (suppress$3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S42	1	(headset same transceiver) same (noise near2 (suppress$3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:25
S43	35	(headset same transceiver) and (noise near2 (suppress$3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020	1397

53186 7590 10/30/2007
COURTNEY STANIFORD & GREGORY LLP
P.O. BOX 9686
SAN JOSE, CA 95157

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2615	

MAIL DATE	DELIVERY MODE
10/30/2007	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	Devona E. Faulk	2615	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *25 July 2007*.

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

3)☐ 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

4)☒ Claim(s) *1-7,9-23,25-37 and 39-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-23,25-37 and 39-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

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

Application Papers

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

10)☒ The drawing(s) filed on *7/25/2007* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Remarks

1. Claims 8,9,15,24,25,31,38 and 39 were objected to being dependent upon a rejected based claim and indicated as allowable if rewritten in independent form. .

2. Claim 8 was rejected, so it was mistakenly included in the list of objected to claims.

3. The indicated allowability of claims 9,15,24,25,31,38 and 39 is withdrawn in view of the newly discovered reference(s) to *In re Venner* and Yoshida. Rejections based on the newly cited reference(s) follow.

4. Claims 40-43 are new.

Drawings

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the headset, transceiver and handset must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

6. Claims 1-7,9-17,18-23,25-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 18 recite "..the voice detection subsystem comprises two unidirectional microphones separated by a distance and having an angle between maximums of spatial response curve of each microphone, wherein the distance is approximately in the range of 0 to 15 centimeters and wherein the angle is approximately in the range of zero to 180 degrees; and at least one voice activity detector...". The specification discloses that the communications system comprises two unidirectional microphones, a denoising

subsystem and a voice detection system. The claim as recited seems to recite that the voice detection subsystem includes the denoising system, however the denoising system is not part of the voice detection subsystem, it is part of the communications system. Furthermore, the claim language recites that both the voice detection subsystem and the denoising subsystem include two unidirectional microphones. The specification only discloses two microphones, not four as the claim would seem to indicate. The claim language as recited does not comply to the written description.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-7,9-17,18-23,25-37,39-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1,18,34,40 and 41 recite "... two microphones separated by a distance and having an angle between maximums..". The angle between maximums language is confusing. Clarity is needed with regards to what this means. The examiner has just interpreted this as having an angle between the two microphones.

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-4, 6,7,40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376).

Regarding claim 1, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals, the voice detection system (Figure 4) comprising,

two microphones (Figures 1 and 4) and

at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals (300 Figure 4; column 8, lines 14-20); and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including **two** microphones, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform

estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25.

Yoshida fails to disclose that the microphones are unidirectional and separated by a distance and having an angle between maximums of a spatial response curve of each microphone. Oh discloses a system for improved speech acquisition for a hands-free system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone and that the two microphones are unidirectional (column 7, lines 14-25). It would have been obvious to modify Yoshida by having the microphones be unidirectional for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

separated by a distance and having an angle between maximums of a spatial response curve of each microphone

Regarding the recited claim language of "..wherein the distance is approximately in the range of 0 to 15 centimeters and wherein the angle is approximately in the range of 0 to 180 degrees..." , in view of the prior art, it would have been obvious to try to have the microphones separated at a distance in the range of 0 to 15 centimeters and having an angle that in the range of 0 to 180 degrees, with a reasonable expectation of success. All elements of claims 2,3, and 7 are comprehended by the rejection of claim 1.

Regarding claims 4 and 6, the examiner takes official notice that it was well known in the art at the time of the invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of

ordinary skill in the art to modify Yoshida as modified to use such sensors in the place of the microphones for the purpose of improving the voice detection performance.

Claim 40 is rejected using Yoshida and Oh as applied above to claim 1. Regarding the ".. manually activated.." language of **claims 9 and 40**, the examiner asserts that per *In re Venner* the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376) in further view of Park et al. (US 5,590,241).

Regarding claim 5, Yoshida as modified fails to disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park discloses a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the Yoshida as modified to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

12. Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376) in further view of Housni (US 6,795,713).

Regarding claim 10, Yoshida as modified by Oh fails to disclose that the system includes a portable handset that includes the microphones. Yoshida teaches of a two microphone system. Housni discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al as modified in a portable handset for the purpose of improving wireless speech communication.

Regarding claims 11 and 15, the modified Yoshida as modified provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset

Regarding claim 12, the portable handset 1 of Housni includes a speaker 4.

Regarding claims 13 and 14, the portable handset of Housni inherently couples to another wireless phone via wireless couplings.

All elements of claims 16 and 17 are comprehended by the rejection of claim 12.

13. Claims 18-21,23,25,34,35,39,41,42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376) in further view of Ouyang et al. (US 2003/0044025).

Regarding claim 18, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals, wherein the voice detection system (Figure 4) further comprises:

two microphones (Figures 1 and 4) and

at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals (300 Figure 4; column 8, lines 14-20); and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including **two** microphones, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25.
Yoshida fails to disclose that the microphones are unidirectional and separated by a distance and having an angle between maximums of a spatial response curve of each microphone. Oh discloses a system for improved speech acquisition for a hands-free

system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone (column 7, lines 14-25). It would have been obvious to modify Yoshida by having the microphones separated by a distance and having an angle between maximums for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

Yoshida as modified does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida as modified by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Regarding the recited claim language of "..wherein the distance is approximately in the range of 0 to 15 centimeters and wherein the angle is approximately in the range of 0 to 180 degrees..." , in view of the prior art, it would have been obvious to try to have the microphones separated at a distance in the range of 0 to 15 centimeters and having an angle that in the range of 0 to 180 degrees, with a reasonable expectation of success.

All elements of claims 19 and 20 are comprehended by the rejection of claim 18.

Regarding claims 21 and 23, the examiner takes official notice that it was well known in the art at the time of the invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of ordinary skill in the art to modify Yoshida as modified to use such sensors in the place of the microphones for the purpose of improving the voice detection performance.

Regarding claim 25, the examiner asserts that per In re Venner the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD

Regarding claim 34, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (Figure 4) and :

two microphones (Figures 1 and 4) and

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (300 Figure 4; column 8, lines 14-20); and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the

microphones including **a first and second** microphone separated by distance and having an angle between maximums of a spatial response curve of each microphone, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida fails to discloses that the microphones are separated by a distance and having an angle between maximums of a spatial response curve of each microphone. Oh discloses a system for improved speech acquisition for a hands-free system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone and that the two microphones are unidirectional (column 7, lines 14-25). It would have been obvious to modify Yoshida by having the microphones separated by a distance and having an angle between maximums for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

Yoshida as modified fails to disclose a transceiver that couples information between the communications network and a user via a headset.

Turnbull discloses a transceiver that couples information between the communications network and a user via a headset (transceiver 185, column 28, lines 53-65). It would have been obvious to modify Yoshida as modified in order to allow for wireless transmission.

All elements of claim 35 are comprehended by the rejection of claim 34.

Regarding claim 39, the examiner takes official notice that a headset having two microphones was well known in the art at the time of the invention. It would have been obvious to modify Yoshida as modified so that the headset includes the microphones in order to improve voice detection.

Claim 41 is rejected using Yoshida as modified by Oh and Turnbull as applied to claim 34 above.

Claim 42 is rejected using Yoshida, Oh and Ouyang as applied above to claim 18. Regarding the ".. manually activated.." language, the examiner asserts that per In re Venner the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD.

14. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376) in further view of Ouyang et al. (US 2003/0044025) in further view of Park et al. (US 5,590,241).

Regarding claim 22, Yoshida as modified fails to disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park discloses a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the Yoshida as modified to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

15. Claims 26-33,36,37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376) in further view of Ouyang et al. (US 2003/0044025) in further view of Housni (US 6,795,713).
Regarding claims 26 and 36, Yoshida as modified by Oh fails to disclose that the system includes a portable handset that includes the two microphones. Yoshida teaches of a two microphone system. Housni discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al as modified in a portable handset for the purpose of improving wireless speech communication.

Regarding claims 27 and 31, modified Yoshida as modified provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset

Regarding claim 28, the portable handset 1 of Housni includes a speaker 4.

Regarding claims 29 and 30, the portable handset of Housni inherently couples to another wireless phone via wireless couplings.

All elements of claims 32 and 33 are comprehended by the rejection of claim 28.

Regarding claim 37, Yoshida as modified discloses a portable transceiver having microphones 3 and 12 and an antinoise circuit (see Housni as applied to claims 26 and 36).

16. Claims 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in further view of Turnbull et al. (US 6,980,092).

Regarding claim 43, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (300, Figure 4; column 8, lines 14-20) and :

two microphones (Figures 1 and 4) and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of

the microphones including two microphones separated by distance, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida as modified by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Yoshida as modified fails to disclose a portable headset that includes the microphones along with at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular phones, satellite telephones, portable telephones, wireline telephones, internet telephones,

wireless transceivers, wireless communication radio, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Turnbull discloses a portable headset that couples to a cellular phone (column 28, lines 53-65). It would have been obvious to modify Yoshida as modified in order to allow for wireless transmission.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 571-272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DEF

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner Devona E. Faulk	Art Unit 2615	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,353,376	10-1994	Oh et al.	704/233
*	B	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	C	US-5,590,241	12-1996	Park et al.	704/227
*	D	US-2003/0044025	03-2003	Ouyang et al.	381/92
*	E	US-6,795,713	09-2004	Housni, Jamal	455/550.1
*	F	US-6,980,092	12-2005	Turnbull et al.	340/425.5
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	**Art Unit**
	Pendleton, Brian T	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	O	-							
	9	O	✓							
	10	✓	✓							
	11	✓	✓							
	12	✓	✓							
	13	✓	✓							
	14	✓	✓							
	15	O	✓							
	16	✓	✓							
	17	✓	✓							
	18	✓	✓							
	19	✓	✓							
	20	✓	✓							
	21	✓	✓							
	22	✓	✓							
	23	✓	✓							
	24	O	-							
	25	O	✓							
	26	✓	✓							
	27	✓	✓							
	28	✓	✓							
	29	✓	✓							
	30	✓	✓							
	31	O	✓							
	32	✓	✓							
	33	✓	✓							
	34	✓	✓							
	35	✓	✓							
	36	✓	✓							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	Pendleton, Brian T	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007							
	37	✓	✓							
	38	O	-							
	39	O	✓							
	40		✓							
	41		✓							
	42		✓							
	43		✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	Pendleton, Brian T	2615

SEARCHED

Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF

SEARCH NOTES

Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

Atty. Docket No. ALPH.P020 *PATENT*

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:	)	
	)	Examiner: Devona E. Faulk
Gregory C. Burnett, et al.	)	Art Unit: 2615
	)	
Application No.: 10/400,282	)	
	)	
Filed: March 27, 2003	)	
	)	
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	)	

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

RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. § 1.111

Sir:

This is in response to the Office action mailed October 30, 2007. Please enter and consider the following amendments and Remarks.

IN THE CLAIMS

1. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals~~, the voice detection subsystem comprising,~~; and

~~two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone, wherein the distance is approximately in the range of zero (0) to 15 centimeters and wherein the angle is approximately in the range of zero (0) to 180 degrees; and~~

~~at least one voice activity detector (VAD) algorithm for processing the voice activity signals and generating the control signals; and~~

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem ~~including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone~~ comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

Claims 2 and 3 (Canceled).

4. (Original) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Original) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Original) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. (Original) The system of claim 1, wherein the voice detection subsystem receives voice activity signals via couplings with the microphones.

Claim 8 (Canceled).

9. (Original) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Original) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Original) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Original) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Original) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Original) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Original) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Original) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Original) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

Claims 18-40 (Canceled).

41. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem ~~including microphones coupled to provide acoustic signals of an environment to components of the denoising subsystem, a configuration of the microphones including two unidirectional microphones separated by a distance and having an angle between maximums of a spatial response curve of each microphone~~ comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the

denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise; and

a portable headset comprising the microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Claims 42-43 (Canceled).

44. (New) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (New) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (New) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 180 degrees.

47. (New) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 135 degrees.

48. (New) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 90 degrees.

49. (New) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (New) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (New) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (New) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (New) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (New) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (New) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

REMARKS

Claims 1-7, 9-23, 25-37, and 39-43 are pending in the application. Claims 1 and 41 are amended herein. Claims 2, 3, and 18-23, 25-37, 39, 40, 42, and 43 are canceled herein without prejudice. New claims 44-55 are added herein. Applicants respectfully request entry of the foregoing amendments and allowance of the application as amended.

Petition for extension of time

A petition for a three month extension of time under 37 C.F.R. § 1.136(a) is included herewith, as well as the fee under 37 C.F.R. § 1.117(a)(3).

Drawings

The drawings are objected to under 37 CFR 1.83(a). Applicants submit that the drawings currently show every feature of the invention specified in the claims. Applicants respectfully direct the examiner to the following figures and the corresponding description as support for the headset: Figure 3C, element 320; Figure 4C, element 420; Figure 5C, element 520; Figure 6C, element 620; Figure 7C, element 720; Figure 8C, element 820; Figure 9C, element 920; Figure 10B, element 1020; and Figure 11B, element 1120. Applicants respectfully direct the examiner to the following figures and the corresponding description as support for the handset: Figure 3B, element 310; Figure 4B, element 410; Figure 5B, element 510; Figure 6B, element 610; Figure 7B, element 710; Figure 8B, element 810; Figure 9B, element 910; Figure 10B, element 1020; and Figure 11B, element 1120. Consequently, as the drawings currently show every feature of the invention specified in the claims, Applicants request withdrawal of this objection. The application does not currently include any claims directed to a transceiver, thus no drawings showing a transceiver are required.

Rejections under 35 U.S.C. § 112

Applicants respectfully submit that the amendments presented herein overcome the rejections under 35 U.S.C. § 112, first paragraph and second paragraph. Applicants respectfully request withdrawal of the rejection.

Rejections under 35 U.S.C. § 103

Applicants respectfully submit that the amendments presented herein overcome the rejection of claims 1-4, 6, 7, and 40 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida, US patent number 5,473,702 (hereinafter "Yoshida"), in view of Oh, US patent number 5,353,376 (hereinafter "Oh"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that the amendments presented herein overcome the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Oh and in further view of Park et al., US patent number 5,590,241 (hereinafter "Park"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that the amendments presented herein overcome the rejection of claims 10-17 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Oh and in further view of Housni, US patent number 6,795,713 (hereinafter "Housni"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that the amendments presented herein overcome the rejection of claims 18-21, 23, 25, 34, 35, 39, 41, and 42 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Oh and in further view of Ouyang, US patent application publication number 2003/0044025 (hereinafter "Ouyang"). Applicants respectfully traverse the rejection.

Applicants respectfully submit that the amendments presented herein overcome the rejection of claim 22 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Oh, in further view of Ouyang, in further view of Park. Applicants respectfully traverse the rejection.

Applicants respectfully submit that the amendments presented herein overcome the rejection of claim 43 under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang, in further view of Turnbull et al., US patent number 6,980,092 (hereinafter "Turnbull"). Applicants respectfully traverse the rejection.

Regarding the rejections under 35 U.S.C. § 103(a) addressed herein, Applicants respectfully submit that none of Yoshida, Oh, Park, Housni, Ouyang, and/or Turnbull, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Thus, Applicants submit that claims 1, 4-7, 9-17, 41, and 44-55 are patentable over Yoshida, Oh, Park, Housni, Ouyang, and/or Turnbull, alone or in any combination,

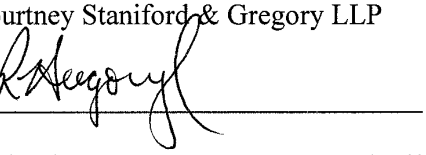
Conclusion

In view of the foregoing amendments and Remarks, Applicants respectfully submit that any objections and rejections have been overcome, and the claims are now allowable. Prompt allowance of the application is earnestly solicited. Examiner Faulk is respectfully requested telephone the undersigned to facilitate resolution of any issues remaining prior to allowance of the application.

AUTHORIZATION TO CHARGE DEPOSIT ACCOUNT

If there are any fees due and unpaid in this application, please charge our Deposit Account No. 503616 for these fees (Attorney Docket number ALPH.P020).

Respectfully submitted,
Courtney Staniford & Gregory LLP



Date: April 30, 2008

Richard L. Gregory, Jr., Reg. No. 42,607
Tel. 408-342-1900
Fax. 408-342-1909

Courtney Staniford & Gregory LLP
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San Jose CA 95157

PTO/SB/22 (01-08)
Approved for use through 01/31/2008. OMB 0651-0031
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2008** ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) ALPH.P020
Application Number 10/400,282	Filed March 27, 2003
For Microphone and Voice Activity Detection (VAD) Configurations for Use With Communication Systems	
Art Unit 2615	Examiner Devona E. Faulk

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$120	$60	$
☐	Two months (37 CFR 1.17(a)(2))	$460	$230	$
☑	Three months (37 CFR 1.17(a)(3))	$1050	$525	$ 1050
☐	Four months (37 CFR 1.17(a)(4))	$1640	$820	$
☐	Five months (37 CFR 1.17(a)(5))	$2230	$1115	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☑ Payment by credit card.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____. I have enclosed a duplicate copy of this sheet.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 42,607

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____



Signature — April 30, 2008 (Date)

Richard L. Gregory, Jr. (Typed or printed name) — 408-342-1900 (Telephone Number)

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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.

Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Richard L. Gregory/Jerry Donnard
Attorney Docket Number:	ALPH.P020
Filed as Large Entity	

Utility Filing Fees

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:				
Extension - 3 months with $0 paid	1253	1	1050	1050

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**1050**

Electronic Acknowledgement Receipt

EFS ID:	3235732
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	53186
Filer:	Richard L. Gregory/Jerry Donnard
Filer Authorized By:	Richard L. Gregory
Attorney Docket Number:	ALPH.P020
Receipt Date:	30-APR-2008
Filing Date:	27-MAR-2003
Time Stamp:	17:43:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1050
RAM confirmation Number	3522
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)

1		Amendment_Response_ALPHP020.pdf	995351 fc3e937502c478d99d169ea9f19094db70811837	yes	13

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Amendment - After Non-Final Rejection	2	12
	Extension of Time	13	13

Warnings:

Information:

2	Fee Worksheet (PTO-06)	fee-info.pdf	8196 e3911a79625be38467014a7bf7fbeaa866c7eae3	no	2

Warnings:

Information:

Total Files Size (in bytes):	1003547

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.

Attorney Docket No. ALPH.P020 Patent

Transmittal of Documents

Certification Under 37 C.F.R. §1.8(a)

Transmitted via **USPTO EFS**

April 30, 2008
Date of Transmission

I hereby certify that this document, and any other accompanying documents referred to herein are being transmitted to the United States Patent Office via EFS in accordance with 37 C.F.R. §1.6(a)(4) on the date indicated above.

Jerry Donnard
(Print Name of Person Transmitting Documents)

(Signature of Person Transmitting Documents)

Amendment and Response Under 37 C.F.R. §1.111;
Petition for Extension of Time;
Electronic payment of filing fee.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/400,282	03/27/2003	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/30/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 27	Minus	** 40	= 0	X $25 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***7	= 0	X $105 =	0	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	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/WANDA D. MITCHELL/

This collection of information is required by 37 CFR 1.16. 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 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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020	1397

53186 7590 08/18/2008
COURTNEY STANIFORD & GREGORY LLP
P.O. BOX 9686
SAN JOSE, CA 95157

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2615	
MAIL DATE	DELIVERY MODE
08/18/2008	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	DEVONA E. FAULK	2615	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *30 April 2008*.

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

3)☐ 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

4)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

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

Application Papers

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

10)☒ The drawing(s) filed on *7/25/07* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 4/30/08, regarding the 103 rejections, have been fully considered but they are not persuasive.

2. The applicant has amended the claims but only asserts that the prior art fails to disclose the newly recited claim language. There is no discussion as to why the prior art fails to read on the newly recited claim language. Furthermore, the examiner asserts that the newly recited claim language is implicit.

3. Applicant's arguments, filed 4/30/08, with respect to the drawing objection have been fully considered and are persuasive. The drawing objection has been withdrawn.

4. Claims 2,3,8,18-40,42,43 are cancelled.

5. Claims 44-55 are new.

Claim Objections

6. Claims 1 and 41 are objected to because of the following informalities: Claims 1 and 41 recite ".comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising system". The specification discloses on page 12, lines 23-30, that

"With reference to FIG. 1, in this configuration the UNI microphone is used as the speech microphone 103 and an OMNI is used as the noise microphone 104. They are normally used within a few centimeters of each other, but can be located 15 or more centimeters apart and still function adequately. FIG. 3A shows a general configuration 300 using a unidirectional speech microphone and an omnidirectional noise microphone, under an embodiment. **The relative angle f between a vector normal to the face of the microphones is approximately in the range of 60 to 135 degrees. The distances d1 and d2 are each approximately in the range of zero (0) to 15 centimeters.** "

The specification only discloses that a vector(s) is (are) normal to the face of the microphones. Appropriate correction is required.

Specification

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required. Claims 1 and 41 recite ".comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising system". The specification discloses on page 12, lines 23-30, that

"With reference to FIG. 1, in this configuration the UNI microphone is used as the speech microphone 103 and an OMNI is used as the noise microphone 104. They are normally used within a few centimeters of each other, but can be located 15 or more centimeters apart and still function adequately. FIG. 3A shows a general configuration 300 using a unidirectional speech microphone and an omnidirectional noise microphone, under an embodiment. **The relative angle .function. between a vector**

normal to the face of the microphones is approximately in the range of 60 to 135 degrees. The distances d.sub.1 and d.sub.2 are each approximately in the range of zero (0) to 15 centimeters. "

The specification only discloses that a vector(s) is (are) normal to the face of the microphones.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376).

Regarding claim 1, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative

to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25.

All elements of claim 7 are comprehended by the rejection of claim 1.

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 4, 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702).

Regarding claims 4 and 6, the examiner takes official notice that it was well known in the art at the time of the invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of

ordinary skill in the art to modify Yoshida as modified to use such sensors in the place of the microphones for the purpose of improving the voice detection performance.

Regarding claim 9, the examiner asserts that per In re Venner the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376) in further view of Park et al. (US 5,590,241).

Regarding claim 5, Yoshida as modified fails to disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park discloses a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the Yoshida as modified to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

13. Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Housni (US 6,795,713).

Regarding claim 10, Yoshida fails to disclose that the system includes a portable handset that includes the microphones. Yoshida teaches of a two microphone system. Housni discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al in a portable handset for the purpose of improving wireless speech communication.

Regarding claims 11 and 15, the modified Yoshida as modified provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset .

Regarding claim 12, the portable handset 1 of Housni includes a speaker 4.

Regarding claims 13 and 14, the portable handset of Housni inherently couples to another wireless phone via wireless couplings.

All elements of claims 16 and 17 are comprehended by the rejection of claim 12.

14. Claims 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Turnbull et al. (US 6,980,092).

Regarding claim 43, Yoshida discloses a communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (300, Figure 4; column 8, lines 14-20) ; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4), components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida fails to disclose a portable headset that includes the microphones along with at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular phones, satellite telephones, portable telephones, wireline telephones, internet telephones, wireless transceivers, wireless communication radio, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Turnbull discloses a portable headset that couples to a cellular phone (column 28, lines 53-65). It would have been obvious to modify Yoshida in order to allow for wireless transmission.

15. Claims 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in further view of Oh et al. (US 5,353,376).
Yoshida fails to disclose that the microphones are unidirectional and separated by a distance and having an angle between maximums of a spatial response curve of each microphone. Oh discloses a system for improved speech acquisition for a hands-free system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone and that the two microphones are unidirectional (column 7, lines 14-25). It would have been obvious to modify Yoshida by having the microphones be unidirectional for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

Regarding claim 45, Yoshida as modified discloses that the microphones are separated . Yoshida as modified fails to disclose that the separation distanceis in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 46-48, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

16. Claims 49-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in further view of Ouyang et al. (US 2003/0044025).

Regarding claims 49 and 54, Yoshida does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Regarding claims 50 and 55, Yoshida as modified discloses that the microphones are separated . Yoshida as modified fails to disclose that the separation distance is in a

range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 51-53, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA E. FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUYEN D. LE/
Primary Examiner, Art Unit 2615

/Devona E. Faulk/
Examiner, Art Unit 2615

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner DEVONA E. FAULK	Art Unit 2615	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,353,376	10-1994	Oh et al.	704/233
*	B	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	C	US-2003/0044025	03-2003	Ouyang et al.	381/92
*	D	US-6,980,092	12-2005	Turnbull et al.	340/425.5
*	E	US-6,795,713	09-2004	Housni, Jamal	455/550.1
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	8	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:09
L2	0	burnett.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:11
L3	11	burnett.in. and microphone and array	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:12
L4	174	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
L5	926	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
L6	700	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
L7	1729	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
L8	0	L3 and vector near10 normal near10 mouth near10 user	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:42
L9	0	L3 and (vector near10 normal near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43

L10	0	L3 and (vector near10 (normal perpendicu$3) near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
L11	3	L3 and (vector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S1	150	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S3	850	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S4	641	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S5	6	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:28
S6	6	("5136577" | "5329587" | "5544080" | "5887059" | "6070137" | "6487295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/15 15:33
S7	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")). PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S8	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S9	1	("5406622").PN.	USPAT	OR	OFF	2007/10/16 10:24
S10	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:38

S11	0	EP-1483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:37
S12	0	EP-2001483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S13	0	EP-483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S14	0	WO-20030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S15	0	WO-030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:39
S16	194	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:40
S17	33	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:04
S18	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (unidirectional)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S19	1	burnett.in. and microphone and ((voice near2 activity) same (manual$2 near2 activat $3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:20
S20	1	"381"/$.ccls. and (manuall$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40

S21	1	"381"/$.ccls. and (manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:41
S22	3	(manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect $3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S23	10	(manual$3 near2 (operat$3 activat$3)) same (VAD)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S24	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) same (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S25	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S26	5	burnett.in. and microphone and ((voice near2 activity) same subsystem)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:54
S27	35	("20020039425" | "3789166" | "4006318" | "4591668" | "4653102" | "4777649" | "4901354" | "5097515" | "5212764" | "5400409" | "5406622" | "5414776" | "5473702" | "5515865" | "5517435" | "5539859" | "5590241" | "5633935" | "5649055" | "5664052" | "5684460" | "5729694" | "5754665" | "5835608" | "5853005" | "5917921" | "5966090" | "5986600" | "6006175" | "6009396" | "6069963" | "6191724" | "6233551" | "6266422" | "6430295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/16 18:19

S28	1	(glottal near2 electromagnetic near2 sensor $1) with antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S29	6	burnett.in. and microphone and (voice near2 activity) and glottal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 15:59
S30	12	(glottal near2 electromagnetic near2 micropower near2 sensor$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S31	1	burnett.in. and microphone and (voice near2 activity) and (transceiver same headset)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S32	1	burnett.in. and microphone and (voice near2 activity) and transceiver	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S33	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:17
S34	29	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S35	6	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver) and (headset headphone$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S36	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")). PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S37	1	S36 and headset	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:23
S38	0	headset same transceiver same (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:23

S39	0	(headset same transceiver) and (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S40	5	(headset same transceiver) and (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S41	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S42	1	(headset same transceiver) same (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:25
S43	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S44	1602	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/18 14:18
S45	1	burnett.in. and microphone and (voice near2 activity) and (angle same maximums)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S46	173	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S47	923	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S48	1468	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59

S49	1720	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S50	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S51	79	burnett.in. and microphone $1 and (voice)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S52	12	burnett.in. and microphone $1 and (voice) and VAD	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:00
S53	6	burnett.in. and microphone $1 and (voice) and VAD and (correlat$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:33

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008						
	1	✓	✓	✓						
	2	✓	✓	-						
	3	✓	✓	-						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	✓						
	7	✓	✓	✓						
	8	O	-	-						
	9	O	✓	✓						
	10	✓	✓	✓						
	11	✓	✓	✓						
	12	✓	✓	✓						
	13	✓	✓	✓						
	14	✓	✓	✓						
	15	O	✓	✓						
	16	✓	✓	✓						
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	26	✓	✓	-						
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	33	✓	✓	-						
	34	✓	✓	-						
	35	✓	✓	-						
	36	✓	✓	-						

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
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	55			✓						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

SEARCHED			
Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF
381	71.6,94.1,94.7	7/29/08, 8/14/08	DEF
704	226,233	7/29/08,8/14/08	DEF

SEARCH NOTES		
Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF
additonal search	7/29/08, 8/14/08	DEF

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (12-08)
Approved for use through 01/31/2009. 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	10400282	Filing Date	2003-03-27	Docket Number (if applicable)	ALPH.P020	Art Unit	2615
First Named Inventor	Gregory C. Burnett			Examiner Name	Devona E. Faulk		

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 503616

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (12-08)
Approved for use through 01/31/2009. 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.

Signature of Registered U.S. Patent Practitioner			
Signature	/Richard L. Gregory, Jr./	Date (YYYY-MM-DD)	2009-02-18
Name	Richard L. Gregory, Jr.	Registration Number	42607

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.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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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.

Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Richard L. Gregory/Jerry Donnard
Attorney Docket Number:	ALPH.P020

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 3 months with $0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**1920**

Electronic Acknowledgement Receipt

EFS ID:	4814598
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	53186
Filer:	Richard L. Gregory/Jerry Donnard
Filer Authorized By:	Richard L. Gregory
Attorney Docket Number:	ALPH.P020
Receipt Date:	18-FEB-2009
Filing Date:	27-MAR-2003
Time Stamp:	15:16:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1920
RAM confirmation Number	553
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		Amendment_Response_ALPHP020.pdf	1686084 5c186b23735b723c4543ce394d0ef780149c8d11	yes	19

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Miscellaneous Incoming Letter	1	1
Amendment After Final	2	18
Extension of Time	19	19

Warnings:

Information:

2	Request for Continued Examination (RCE)	RCE_ALPHP020.pdf	768073 edc2bbcab62bf58361a189486e65018b27e22814	no	3

Warnings:

Information:

3	Fee Worksheet (PTO-06)	fee-info.pdf	32135 e4f9aa50b14a61689b5f5365af3d7b67e6955730	no	2

Warnings:

Information:

Total Files Size (in bytes):	2486292

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.

Attorney Docket No. ALPH.P020 Patent

Transmittal of Documents

Certification Under 37 C.F.R. §1.8(a)

Transmitted via **February 18, 2009**
Date of Transmission

USPTO EFS

I hereby certify that this document, and any other accompanying documents referred to herein are being transmitted to the United States Patent Office via EFS in accordance with 37 C.F.R. §1.6(a)(4) on the date indicated above.

Jerry Donnard
(Print Name of Person Transmitting Documents)

(Signature of Person Transmitting Documents)

Amendment and Response;
Petition for Extension of Time;
Request for Continued Examination;
Electronic payment of filing fees.

Atty. Docket No. ALPH.P020 *PATENT*

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:	)	
	)	Examiner: Devona E. Faulk
Gregory C. Burnett, et al.	)	Art Unit: 2615
	)	
Application No.: 10/400,282	)	
	)	
Filed: March 27, 2003	)	
	)	
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	)	

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

RESPONSE TO OFFICE ACTION

Sir:

Applicant respectfully requests continued examination and consideration of the following amendments and remarks contained herein in response to the final Office Action mailed August 18, 2008. This response is accompanied by a Request for Continued Examination under 37 C.F.R. 1.114 and the required fee.

Please enter the following amendments to the claims and consider the following remarks addressing all points raised by the Office Action as follows.

IN THE SPECIFICATION

Please amend the paragraph on page 12, line 23 to page 13, line 3 as follows:

With reference to **Figure 1**, in this configuration the UNI microphone is used as the speech microphone 103 and an OMNI is used as the noise microphone 104. They are normally used within a few centimeters of each other, but can be located 15 or more centimeters apart and still function adequately. **Figure 3A** shows a general configuration 300 using a unidirectional speech microphone and an omnidirectional noise microphone, under an embodiment. The relative angle *f* between a vector normal to the face of the microphones (a vector normal to UNI microphone is line labeled "TOWARDS SPEECH", and a vector normal to OMNI microphone is line labeled "AWAY FROM SPEECH") is approximately in the range of 60 to 135 degrees. The distances d_1 and d_2 are each approximately in the range of zero (0) to 15 centimeters. **Figure 3B** shows a general configuration 310 in a handset using a unidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 3A. **Figure 3C** shows a general configuration 320 in a headset using a unidirectional speech microphone and an omnidirectional noise microphone, under the embodiment of Figure 3A.

IN THE CLAIMS

1. (Previously presented) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

Claims 2 and 3 (Canceled).

4. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. (Previously presented) The system of claim 1, wherein the voice detection subsystem receives voice activity signals via couplings with the microphones.

Claim 8 (Canceled).

9. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Previously presented) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Previously presented) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Previously presented) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Previously presented) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Previously presented) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Previously presented) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Previously presented) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Previously presented) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

Claims 18-40 (Canceled).

41. (Previously presented) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise; and

a portable headset comprising the microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Claims 42-43 (Canceled).

44. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (Previously presented) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 180 degrees.

47. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 135 degrees.

48. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 90 degrees.

49. (Previously presented) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (Previously presented) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (Previously presented) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

REMARKS

Claims 1, 4-7, 9-17, 41, and 44-55 are pending in the application. Claims 1, 4-7, 9-17, 41, and 44-55 are rejected. Applicants respectfully request entry of the foregoing amendments and allowance of the application as amended.

Petition for extension of time

A petition for a three month extension of time under 37 C.F.R. § 1.136(a) is included herewith, as well as the fee under 37 C.F.R. § 1.117(a)(3).

Claim Objections

Claims 1 and 41 are objected to because of informalities. Regarding the informality described in the office action at pages 2 and 3, Applicant herein amends the portion of the specification on pages 12 and 13 relating to Figure 3A to clarify the description of the vectors normal to the face of each of the two microphones, as follows:

> **Figure 3A** shows a general configuration 300 using a unidirectional speech microphone and an omnidirectional noise microphone, under an embodiment. The relative angle *f* between a vector normal to the face of the microphones (vector normal to UNI microphone is line labeled "TOWARDS SPEECH", and vector normal to OMNI microphone is line labeled "AWAY FROM SPEECH") is approximately in the range of 60 to 135 degrees. The distances d_1 and d_2 are each approximately in the range of zero (0) to 15 centimeters (as amended herein).

The amendment herein to the specification does not add any new material. Applicant further reminds Examiner Faulk that the definition of "normal" according to Webster's Third New International Dictionary of the English Language Unabridged is "a line perpendicular to the tangent line to a curve at a point of the curve." It is shown in Figure 3A of the instant application that the line labeled "TOWARDS SPEECH" is a vector or a line perpendicular to a tangent line to the face of the UNI microphone at a point on the face of the UNI microphone where the line labeled "TOWARDS

SPEECH" intersects the face of the UNI microphone. Figure 3A also shows that the line labeled "AWAY FROM SPEECH" is a vector or line perpendicular to a tangent line to the face of the OMNI microphone at a point on the face of the OMNI microphone where the line labeled "AWAY FROM SPEECH" intersects the face of the OMNI microphone. Figure 3A also shows the relative angle "f" between the TOWARDS SPEECH vector and the AWAY FROM SPEECH vector.

Applicant submits that the amendment to the specification herein overcomes the objection to claims 1 and 41 and requests withdrawal of the objection. More particularly, with reference to claims 1 and 41, and in view of the above remarks, the first microphone of the array (e.g., UNI microphone) has a first vector (e.g., TOWARDS SPEECH vector) normal to a front of the first microphone, the first vector (e.g., TOWARDS SPEECH vector) defining the axis to be toward a mouth of a user, and the second microphone (e.g., OMNI microphone) of the array has a second vector (e.g., AWAY FROM SPEECH vector) normal to a front of the second microphone, wherein the second vector (e.g., AWAY FROM SPEECH vector) forms an angle (e.g., angle f) relative to the first vector (e.g., TOWARDS SPEECH vector). Thus, the specification discloses, with reference to at least Figure 3A, that a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, as claimed in claims 1 and 41. For at least these reasons, Applicant respectfully requests withdrawal of the objection to claims 1 and 41.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. Applicant herein amends the portion of the specification on pages 12 and 13 relating to Figure 3A to clarify the description of the vectors normal to the face of each of the two microphones, as follows:

> **Figure 3A** shows a general configuration 300 using a unidirectional speech microphone and an omnidirectional noise microphone, under an embodiment. The relative angle *f* between a vector normal to the face of the microphones (a vector normal to UNI microphone is line labeled "TOWARDS SPEECH", and a vector normal to OMNI microphone is line labeled "AWAY FROM SPEECH") is approximately in the range of 60 to 135 degrees. The distances d_1 and d_2 are each approximately in the range of zero (0) to 15 centimeters (as amended herein).

The amendment herein to the specification does not add any new material. Applicant further reminds Examiner Faulk that the definition of "normal" according to Webster's Third New International Dictionary of the English Language Unabridged is "a line perpendicular to the tangent line to a curve at a point of the curve." It is shown in Figure 3A of the instant application that the line labeled "TOWARDS SPEECH" is a vector or a line perpendicular to the tangent line to the face of the UNI microphone at a point on the face of the UNI microphone where the line labeled "TOWARDS SPEECH" intersects the face of the UNI microphone. Figure 3A also shows that the line labeled "AWAY FROM SPEECH" is a vector or line perpendicular to the tangent line to the face of the OMNI microphone at a point on the face of the OMNI microphone where the line labeled "AWAY FROM SPEECH" intersects the face of the UNI microphone. Figure 3A also shows the relative angle f between the TOWARDS SPEECH vector and the AWAY FROM SPEECH vector.

Rejections under 35 U.S.C. § 102

Claims 1 and 7 are rejected under 35 U.S.C. § 102(b) as being anticipated by Yoshida et al., US patent number 5,473,702 (hereinafter "Yoshida"), in view of Oh et al., US patent number 5,353,376 (hereinafter "Oh"). Applicant notes that a proper rejection under 35 U.S.C. § 102(b) can only make use of a single reference; thus, Applicant assumes in the response that follows that the Examiner has rejected claims 1 and 7 using only Yoshida and not using any portion of Oh. Applicants respectfully traverse the rejection.

Applicant respectfully submits that the claims as presented herein are patentably distinct from Yoshida. Moreover, Yoshida fails to teach each and every element of claim 1 as presented herein.

To be proper, an anticipation rejection requires that a cited reference teach each and every element of the rejected claim(s). As discussed below, it is clearly apparent that Yoshida does not teach each and every element of claim 1 as presented herein.

Regarding claim 1, Applicants submit that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added).

The office action, at pages 4 and 5, references Yoshida, Figure 4 (elements 1 and 2) in support of the contention that Yoshida discloses all elements of claim 1. Figures 1 and 4 of Yoshida show two microphones 1 and 2. Yoshida discloses that microphone 1 is disposed relatively close to a voice source and picks up both voice input and background noise (column 3, lines 10-13). Yoshida discloses that microphone 2 is disposed relatively far from the voice source and picks up mainly noise (column 3, lines 16-18). However, Yoshida includes no further description regarding the relative positioning of the two microphones. Therefore, while Yoshida shows a system having two microphones, Yoshida does not show or describe a first microphone of an array having a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, and a second microphone of the array having a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added).

For at least these reasons, Applicant respectfully submits that claim 1 is not anticipated by Yoshida.

As claim 7 depends from claim 1 and includes further limitations thereon, and since claim 1 is not anticipated by Yoshida, Applicant submits that claim 7 is not anticipated by Yoshida.

Rejections under 35 U.S.C. § 103

Claims 4, 6, and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida. Applicants respectfully traverse the rejection.

Regarding claim 1, Applicants submit that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added).

The office action, at pages 4 and 5, references Yoshida, Figure 4 (elements 1 and 2) in support of the contention that Yoshida discloses all elements of claim 1. Figures 1 and 4 of Yoshida show two microphones 1 and 2. Yoshida discloses that microphone 1 is disposed relatively close to a voice source and picks up both voice input and background noise (column 3, lines 10-13). Yoshida discloses that microphone 2 is disposed relatively far from the voice source and picks up mainly noise (column 3, lines 16-18). However, Yoshida includes no further description regarding the relative positioning of the two microphones. Therefore, while Yoshida shows a system having two microphones, Yoshida does not show or describe a first microphone of an array having a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, and a second microphone of the array having a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added).

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over Yoshida.

As claims 4, 6, and 9 depend from claim 1 and include further limitations thereon, and since claim 1 is not anticipated by Yoshida, Applicant submits that claims 4, 6, and 9 are not anticipated by Yoshida.

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Oh and in further view of Park et al., US patent number 5,590,241 (hereinafter "Park"). Applicants respectfully traverse the rejection.

Regarding claim 1, Applicants submit that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added). Furthermore, none of Yoshida, Oh, and/or Park, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added).

As claim 5 depends from claim 1 and includes further limitations thereon, and since claim 1 is not anticipated by Yoshida, Oh, and/or Park, Applicant submits that claim 5 is not anticipated by Yoshida, Oh, and/or Park.

Claims 10-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Housni, US patent number 6,795,713 (hereinafter "Housni"). Applicants respectfully traverse the rejection.

Applicants submit that claim 1 is not anticipated by Yoshida in view of Housni, as described above. Furthermore, none of Yoshida and/or Housni, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added).

As claims 10-17 depend from claim 1 and include further limitations thereon, and since claim 1 is not anticipated by Yoshida and/or Housni, Applicant submits that claims 10-17 are not anticipated by Yoshida and/or Housni.

Claim 41 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Turnbull et al., US patent number 6,980,092 (hereinafter "Turnbull"). Applicants respectfully traverse the rejection.

Regarding claim 41, and as described in detail above, Applicants submit that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added). Additionally, Turnbull does not disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the

microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Thus, Applicant submits that claim 41 is not anticipated by Yoshida and/or Turnbull.

Claims 44-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Oh. Applicants respectfully traverse the rejection.

Applicants submit that claim 1 is not anticipated by Yoshida, as described above. Furthermore, none of Yoshida and/or Oh, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Therefore, claim 1 is not anticipated by Yoshida and/or Oh, alone and/or in any combination.

As claims 44-48 depend from claim 1 and include further limitations thereon, and since claim 1 is not anticipated by Yoshida and/or Oh, Applicant submits that claims 44-48 are not anticipated by Yoshida and/or Oh.

Claims 49-55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang et al., US Patent Application Publication 2003/0044025 ("Ouyang"). Applicants respectfully traverse the rejection.

Applicants submit that claim 1 is not anticipated by Yoshida, as described above. Furthermore, none of Yoshida and/or Ouyang, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the

microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Therefore, claim 1 is not anticipated by Yoshida and/or Ouyang, alone and/or in any combination.

As claims 49-55 depend from claim 1 and include further limitations thereon, and since claim 1 is not anticipated by Yoshida and/or Ouyang, Applicant submits that claims 49-55 are not anticipated by Yoshida and/or Ouyang.

Conclusion

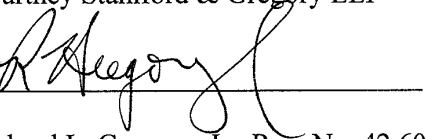
In view of the foregoing amendments and Remarks, Applicants respectfully submit that any objections and rejections have been overcome, and the claims are now allowable. Prompt allowance of the application is earnestly solicited. Examiner Faulk is respectfully requested telephone the undersigned to facilitate resolution of any issues remaining prior to allowance of the application.

AUTHORIZATION TO CHARGE DEPOSIT ACCOUNT

If there are any fees due and unpaid in this application, please charge our Deposit Account No. 503616 for these fees (Attorney Docket No. ALPH.P020).

Respectfully submitted,
Courtney Staniford & Gregory LLP

Date: February 18, 2009



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PTO/SB/22 (10-08)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) ALPH.P020
Application Number 10/400,282	Filed March 27, 2003
For Microphone and Voice Activity Detection (VAD) Configurations for Use With Communication Systems	
Art Unit 2615	Examiner Devona E. Faulk

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$130	$65	$
☐	Two months (37 CFR 1.17(a)(2))	$490	$245	$
☑	Three months (37 CFR 1.17(a)(3))	$1110	$555	$ 1110
☐	Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐	Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☑ Payment by credit card.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 42,607

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____



Signature — February 18, 2009 (Date)

Richard L. Gregory, Jr. (Typed or printed name) — 408-342-1900 (Telephone Number)

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 10/400,282	Filing Date 03/27/2003	☒ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	02/18/2009	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 27	Minus	** 40	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***7	= 0	X $110 =	0	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	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/NICHELE PETERSON/

This collection of information is required by 37 CFR 1.16. 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 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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020	1397

53186 7590 03/16/2009
COURTNEY STANIFORD & GREGORY LLP
P.O. BOX 9686
SAN JOSE, CA 95157

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2614	
MAIL DATE	DELIVERY MODE
03/16/2009	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	DEVONA E. FAULK	2614	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *18 February 2009*.

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

3)☐ 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

4)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

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

Application Papers

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

10)☒ The drawing(s) filed on *25 July 2007* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/18/09 has been entered.

Response to Arguments

1. Applicant's arguments, filed 2/18/09 with respect to the rejection(s) of claim(s) 1,4-7,9-17,41 and 44-55 under 102(b) and 103 (a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Ouyang.

2. Claims 2,3,8,18-40,42-43 are cancelled.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (US 5,473,702) in view of Oh et al. (US 5,353,376).

Regarding claim 1, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25.

All elements of claim 7 are comprehended by the rejection of claim 1.

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1,7 and 49-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025). Regarding claim 1, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector wherein a second microphone of the array has a second vector, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the

acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25.

Yoshida fails to explicitly disclose wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector. Yoshida does not teach what types of microphones are used. Ouyang teaches of using an omnidirectional microphone (20, Figure 1) and a uni-directional microphone (12, Figure 1). The examiner asserts that

Furthermore, MPEP 2114....states that while features of an apparatus may be recited either structurally or functionally, claims <directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Yoshida as modified by Ouyang clearly has the structural limitations of the claim and the intended use of the lumens cannot differentiate the claimed apparatus from the prior art.

All elements of claim 7 are comprehended by the rejection of claim 1.

Regarding claims 49 and 54, Yoshida does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising

omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Regarding claims 50 and 55, Yoshida as modified discloses that the microphones are separated . Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 51-53, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

5. Claims 4, 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025).

Regarding claims 4 and 6, the examiner takes official notice that it was well known in the art at the time of the invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of ordinary skill in the art to modify Yoshida as modified to use such sensors in the place of the microphones for the purpose of improving the voice detection performance.

Regarding claim 9, the examiner asserts that per In re Venner the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in further view of Park et al. (US 5,590,241).

Regarding claim 5, Yoshida as modified fails to disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park discloses a speech processing system comprising accelerometer 34 and noise

microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the Yoshida as modified to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

7. Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in view of Housni (US 6,795,713).

Regarding claim 10, Yoshida fails to disclose that the system includes a portable handset that includes the microphones. Yoshida teaches of a two microphone system. Housni discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al in a portable handset for the purpose of improving wireless speech communication.

Regarding claims 11 and 15,Yoshida as modified provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset .

Regarding claim 12, the portable handset 1 of Housni includes a speaker 4.

Regarding claims 13 and 14, the portable handset of Housni inherently couples to another wireless phone via wireless couplings.

All elements of claims 16 and 17 are comprehended by the rejection of claim 12.

8. Claims 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in view of Turnbull et al. (US 6,980,092).

Regarding claim 41, Yoshida discloses a communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (300, Figure 4; column 8, lines 14-20) ; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector wherein a second microphone of the array has a second vector, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida fails to explicitly disclose wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector. Yoshida does not teach what types of microphones are used. Ouyang teaches of using an omnidirectional microphone (20, Figure 1) and a uni-directional microphone (12, Figure 1). The examiner asserts that

Furthermore, MPEP 2114....states that while features of an apparatus may be recited either structurally or functionally, claims <directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Yoshida as modified by Ouyang clearly has the structural limitations of the claim and the intended use of the lumens cannot differentiate the claimed apparatus from the prior art.

Yoshida as modified fails to disclose a portable headset that includes the microphones along with at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular phones, satellite telephones, portable telephones, wireline telephones, internet telephones, wireless transceivers, wireless communication radio, personal digital assistants (PDAs),

personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Turnbull discloses a portable headset that couples to a cellular phone (column 28, lines 53-65). It would have been obvious to modify Yoshida as modified in order to allow for wireless transmission.

9. Claims 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in further view of Oh et al. (US 5,353,376).

Regarding claim 44, Yoshida as modified fails to disclose that the microphones are unidirectional. Oh discloses a system for improved speech acquisition for a hands-free system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone and that the two microphones are unidirectional (column 7, lines 14-25). It would have been obvious to modify Yoshida as modified by having the microphones be unidirectional for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

Regarding claim 45, Yoshida as modified discloses that the microphones are separated. Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice.

It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 46-48, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA E. FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devona E. Faulk/
Examiner, Art Unit 2614

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner DEVONA E. FAULK	Art Unit 2614	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,353,376	10-1994	Oh et al.	704/233
*	B	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	C	US-5,590,241	12-1996	Park et al.	704/227
*	D	US-2003/0044025	03-2003	Ouyang et al.	381/92
*	E	US-6,795,713	09-2004	Housni, Jamal	455/550.1
*	F	US-6,980,092	12-2005	Turnbull et al.	340/425.5
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009					
	1	✓	✓	✓	✓					
	2	✓	✓	-	-					
	3	✓	✓	-	-					
	4	✓	✓	✓	✓					
	5	✓	✓	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	O	-	-	-					
	9	O	✓	✓	✓					
	10	✓	✓	✓	✓					
	11	✓	✓	✓	✓					
	12	✓	✓	✓	✓					
	13	✓	✓	✓	✓					
	14	✓	✓	✓	✓					
	15	O	✓	✓	✓					
	16	✓	✓	✓	✓					
	17	✓	✓	✓	✓					
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	24	O	-	-	-					
	25	O	✓	-	-					
	26	✓	✓	-	-					
	27	✓	✓	-	-					
	28	✓	✓	-	-					
	29	✓	✓	-	-					
	30	✓	✓	-	-					
	31	O	✓	-	-					
	32	✓	✓	-	-					
	33	✓	✓	-	-					
	34	✓	✓	-	-					
	35	✓	✓	-	-					
	36	✓	✓	-	-					

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009					
	37	✓	✓	-	-					
	38	O	-	-	-					
	39	O	✓	-	-					
	40		✓	-	-					
	41		✓	✓	✓					
	42		✓	-	-					
	43		✓	-	-					
	44			✓	✓					
	45			✓	✓					
	46			✓	✓					
	47			✓	✓					
	48			✓	✓					
	49			✓	✓					
	50			✓	✓					
	51			✓	✓					
	52			✓	✓					
	53			✓	✓					
	54			✓	✓					
	55			✓	✓					

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

SEARCHED			
Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF
381	71.6,94.1,94.7	7/29/08, 8/14/08	DEF
704	226,233	7/29/08,8/14/08	DEF
381	71.7,94.1,94.7,110,92	3/12/09	DEF

SEARCH NOTES		
Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF
additonal search	7/29/08, 8/14/08	DEF
additional search	3/12/09	DEF

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

/DEVONA E FAULK/ Examiner.Art Unit 2614	

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
L2	4	L1 and $4direction$2	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
L3	1	L1 and uni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
L4	1	L1 and omni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
L5	192	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
L6	990	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
L7	769	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S1	150	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S3	850	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S4	641	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S5	6	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:28

S6	6	("5136577" | "5329587" | "5544080" | "5887059" | "6070137" | "6487295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/15 15:33
S7	5	((("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S8	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S9	1	("5406622").PN.	USPAT	OR	OFF	2007/10/16 10:24
S10	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:38
S11	0	EP-1483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:37
S12	0	EP-2001483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S13	0	EP-483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S14	0	WO-20030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S15	0	WO-030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:39
S16	194	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:40

S17	33	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:04
S18	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (unidirectional)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S19	1	burnett.in. and microphone and ((voice near2 activity) same (manual$2 near2 activat $3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:20
S20	1	"381"/$.ccls. and (manuall$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S21	1	"381"/$.ccls. and (manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:41
S22	3	(manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect $3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S23	10	(manual$3 near2 (operat$3 activat$3)) same (VAD)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S24	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) same (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S25	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S26	5	burnett.in. and microphone and ((voice near2 activity) same subsystem)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:54

S27	35	("20020039425" | "3789166" | "4006318" | "4591668" | "4653102" | "4777649" | "4901354" | "5097515" | "5212764" | "5400409" | "5406622" | "5414776" | "5473702" | "5515865" | "5517435" | "5539859" | "5590241" | "5633935" | "5649055" | "5664052" | "5684460" | "5729694" | "5754665" | "5835608" | "5853005" | "5917921" | "5966090" | "5986600" | "6006175" | "6009396" | "6069963" | "6191724" | "6233551" | "6266422" | "6430295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/16 18:19
S28	1	(glottal near2 electromagnetic near2 sensor $1) with antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S29	6	burnett.in. and microphone and (voice near2 activity) and glottal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 15:59
S30	12	(glottal near2 electromagnetic near2 micropower near2 sensor$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S31	1	burnett.in. and microphone and (voice near2 activity) and (transceiver same headset)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S32	1	burnett.in. and microphone and (voice near2 activity) and transceiver	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S33	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:17

S34	29	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S35	6	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver) and (headset headphone$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S36	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S37	1	S36 and headset	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:23
S38	0	headset same transceiver same (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:23
S39	0	(headset same transceiver) and (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S40	5	(headset same transceiver) and (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S41	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S42	1	(headset same transceiver) same (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:25
S43	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S44	1602	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/18 14:18

S45	1	burnett.in. and microphone and (voice near2 activity) and (angle same maximums)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S46	173	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S47	923	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S48	1468	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S49	1720	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S50	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S51	79	burnett.in. and microphone $1 and (voice)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S52	12	burnett.in. and microphone $1 and (voice) and VAD	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:00
S53	6	burnett.in. and microphone $1 and (voice) and VAD and (correlat$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:33
S54	8	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:09

S55	0	burnett.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:11
S56	11	burnett.in. and microphone and array	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:12
S57	174	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S58	926	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S59	700	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S60	1729	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S61	0	S56 and vector near10 normal near10 mouth near10 user	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:42
S62	0	S56 and (vector near10 normal near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S63	0	S56 and (vector near10 (normal perpendicu$3) near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S64	3	S56 and (vector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43

3/12/2009 11:56:11 PM
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Attorney Docket No. ALPH.P020

PATENT

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:	)	
	)	Examiner: Devona E. Faulk
Gregory C. Burnett, et al.	)	Art Unit: 2614
	)	
Application No.: 10/400,282	)	
	)	
Filed: March 27, 2003	)	
	)	
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	)	

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

RESPONSE TO OFFICE ACTION

Sir:

This is in response to the Office action mailed March 16, 2009. Please enter and consider the following Amendments and Remarks addressing all points raised by the Office Action as follows.

AMENDMENTS

IN THE CLAIMS

1. (Previously presented) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

Claims 2 and 3 (Canceled).

4. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. (Previously presented) The system of claim 1, wherein the voice detection subsystem receives voice activity signals via couplings with the microphones.

Claim 8 (Canceled).

9. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Previously presented) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Previously presented) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Previously presented) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Previously presented) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Previously presented) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Previously presented) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Previously presented) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Previously presented) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

Claims 18-40 (Canceled).

41. (Previously presented) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise; and

a portable headset comprising the microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Claims 42-43 (Canceled).

44. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (Previously presented) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 180 degrees.

47. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 135 degrees.

48. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 90 degrees.

49. (Previously presented) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (Previously presented) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (Previously presented) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

REMARKS

Claims 1, 4-7, 9-17, 41, and 44-55 are pending in the application. Claims 1, 4-7, 9-17, 41, and 44-55 are rejected. Applicants respectfully request entry of the remarks herein and allowance of the application.

Petition for extension of time

A petition for a three (3) month extension of time under 37 C.F.R. § 1.136(a) is included herewith, as well as the fee under 37 C.F.R. § 1.117(a)(3).

Rejections under 35 U.S.C. § 102

Claims 1 and 7 are rejected under 35 U.S.C. § 102(b) as being anticipated by Yoshida et al., US patent number 5,473,702 (hereinafter "Yoshida"), in view of Oh et al., US patent number 5,353,376 (hereinafter "Oh"). Applicant fails to understand this rejection in view of the statements in the "Response to Arguments" section of this Office Action, which states the following at page 2:

> "Applicant's arguments, filed 2/18/09 with respect to the rejection(s) of claim(s) 1, 4-7, 9-17, 41, and 44-45 under 102(b) and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Ouyang."

In spite of this statement in the "Response to Arguments" section, the rejection of claims 1 and 7 under 35 U.S.C. § 102(b) as being anticipated by Yoshida in view of Oh appears to be an exact duplicate of the same rejection used in the preceding office action mailed August 18, 2008. Therefore, while the current Office Action states the previous rejection has been withdrawn, the rejection is included in this current Office Action.

Additionally, Applicant notes that a proper rejection under 35 U.S.C. § 102(b) can only make use of a single reference only. Thus, Applicant submits the rejection of claims 1 and 7 under 35 U.S.C. § 102(b) as being anticipated by Yoshida in view of Oh

is improper and should be withdrawn. Applicant respectfully demands withdrawal of this rejection.

Assuming, arguendo, that the rejection of claims 1 and 7 under 35 U.S.C. § 102(b) as being anticipated by Yoshida in view of Oh was proper, Applicant respectfully submits that the claims as presented herein are patentably distinct from Yoshida in view of Oh. Moreover, Yoshida and/or Oh each fails to teach each and every element of claim 1 as presented herein.

To be proper, an anticipation rejection requires that a cited reference teach each and every element of the rejected claim(s). As discussed below, it is clearly apparent that neither Yoshida nor Oh teaches each and every element of claim 1 as presented herein.

Regarding claim 1, Applicants submit that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added).

The office action, at page 3, references Yoshida, Figure 4 (elements 1 and 2) in support of the contention that Yoshida discloses all elements of claim 1. Figures 1 and 4 of Yoshida show two microphones 1 and 2. Yoshida discloses that microphone 1 is disposed relatively close to a voice source and picks up both voice input and background noise (column 3, lines 10-13). Yoshida discloses that microphone 2 is disposed relatively far from the voice source and picks up mainly noise (column 3, lines 16-18). However, Yoshida includes no further description regarding the relative positioning of the two microphones. Therefore, while Yoshida shows a system having two microphones, Yoshida does not show or describe a first microphone of an array having a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, and a second microphone of the array having a

second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added).

In addition to the reasons states above, the Office Action states, at page 5, that "Yoshida fails to explicitly disclose wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector." Therefore, Examiner Faulk is apparently in agreement that claim 1 is not anticipated by Yoshida.

For at least these reasons, Applicant respectfully submits that claim 1 is not anticipated by Yoshida.

As claim 7 depends from claim 1 and includes further limitations thereon, and since claim 1 is not anticipated by Yoshida, Applicant submits that claim 7 is not anticipated by Yoshida.

Applicant also does not find any teaching in Oh that describes a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Thus, for at least these reasons, Applicant respectfully submits that claim 1 is not anticipated by Oh.

As claim 7 depends from claim 1 and includes further limitations thereon, and since claim 1 is not anticipated by Oh, Applicant submits that claim 7 is not anticipated by Oh.

Rejections under 35 U.S.C. § 103

Claims 1, 7, and 49-55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang et al., US Patent Application Publication number US 2003/0044025 ("Ouyang"). Applicants respectfully traverse the rejection.

As described in detail above, Applicant submits that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector.

Furthermore, the Office Action states, at page 5, that "Yoshida fails to explicitly disclose wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector." Applicant agrees with this statement.

Furthermore, Applicant submits that Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector.

The Office Action states the following, at page 5:

> "Ouyang teaches of using an omnidirectional microphone (20, Figure 1) and a uni-directional microphone (12, Figure 1). The examiner asserts that Furthermore, MPEP 2114 ... states that while features of an apparatus may be recited either structurally or functionally, claims <directed to >an< apparatus must

> be distinguished from the prior art in terms of structure rather than function. Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex Parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).
>
> Yoshida as modified by Ouyang clearly has the structural limitations of the claim and the intended use of the lumens cannot differentiate the claimed apparatus from the prior art."

Applicant submits that claim 1 does not include a limitation of "an omnidirectional microphone and a uni-directional microphone", so the description in Ouyang of an omnidirectional microphone and a uni-directional microphone does not overcome the deficiencies of Yoshida and, thus, does not make claim 1 unpatentable.

The Examiner asserts that claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Applicant respectfully submits that claim 1 is distinguished from the prior art in terms of structure rather than function. For example, claim 1 recites structure in the limitation "the denoising subsystem comprising a microphone array including a plurality of microphones and an axis"; a microphone array including a plurality of microphones and an axis is clearly structure and not function.

The structure of the microphone array recited in claim 1 is further defined in claim 1 using language that describes a relative orientation of microphones of the microphone array (see claim 1, "a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector"). A description of a relative orientation between components of an array is clearly structure, and thus not a functional limitation. Therefore, Applicant submits that claim 1 includes numerous structural limitations not found in the combination of Yoshida and Ouyang, where the structural limitations of

claim 1 describe a microphone array and a relative orientation of microphones of the microphone array.

The Examiner also asserts that a claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim. Applicant is of the opinion that this assertion by the Examiner does not apply to claim 1 because none of the conditions of this assertion are met by claim 1. As a first point, the prior art does not teach all the structural limitations of the claim because Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector.

Further, the novel structural limitations of claim 1 recite nothing of the manner in which the claimed apparatus is intended to be employed. As described above, the limitations of claim 1 missing from the combination of Yoshida and Ouyang are structural limitations (see claim 1, "a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector"). Consequently, because the limitations of claim 1 missing from the combination of Yoshida and Ouyang are structural limitations, the structural limitations recite nothing of the manner in which the claimed apparatus is intended to be employed.

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over Yoshida in view of Ouyang.

As claims 4, 6, 7, 9, and 49-55 depend from claim 1 and include further limitations thereon, and since claim 1 is not anticipated by Yoshida in view of Ouyang, Applicant submits that claims 4, 6, 7, 9, and 49-55 are patentable over Yoshida in view of Ouyang.

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and in further view of Park et al., US patent number 5,590,241 (hereinafter "Park"). Applicants respectfully traverse the rejection.

Regarding claim 1, Applicants submit that Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added). Furthermore, none of Yoshida, Ouyang, and/or Park, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added).

As claim 5 depends from claim 1 and includes further limitations thereon, and since claim 1 is not anticipated by Yoshida, Ouyang, and/or Park, Applicant submits that claim 5 is not anticipated by Yoshida, Oh, and/or Park.

Claims 10-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Housni, US patent number 6,795,713 (hereinafter "Housni"). Applicants respectfully traverse the rejection.

Regarding claim 1, Applicants submit that Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added). Furthermore, none of Yoshida, Ouyang, and/or Housni, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added).

As claims 10-17 depend from claim 1 and include further limitations thereon, and since claim 1 is not anticipated by Yoshida, Ouyang and/or Housni, Applicant submits that claims 10-17 are not anticipated by Yoshida, Ouyang and/or Housni.

Claim 41 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Turnbull et al., US patent number 6,980,092 (hereinafter "Turnbull"). Applicants respectfully traverse the rejection.

Regarding claim 41, and as described in detail above, Applicants submit that Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector (emphasis added).

Additionally, Turnbull does not disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Thus, Applicant submits that claim 41 is not anticipated by Yoshida, Ouyang and/or Turnbull.

Claims 44-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Oh. Applicants respectfully traverse the rejection.

Applicants submit that claim 1 is not anticipated by Yoshida in view of Ouyang, as described above. Furthermore, none of Yoshida, Ouyang and/or Oh, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Therefore, claim 1 is not anticipated by Yoshida, Ouyang and/or Oh, alone and/or in any combination.

As claims 44-48 depend from claim 1 and include further limitations thereon, and since claim 1 is not anticipated by Yoshida, Ouyang and/or Oh, Applicant submits that claims 44-48 are not anticipated by Yoshida, Ouyang and/or Oh.

Conclusion

In view of the foregoing Amendments and Remarks, Applicants respectfully

submit that any objections and rejections have been overcome, and the claims are now allowable. Prompt allowance of the application is earnestly solicited. Examiner Faulk is respectfully requested telephone the undersigned to facilitate resolution of any issues remaining prior to allowance of the application.

Authorization to Charge Deposit Account

If there are any fees due and unpaid in this application, please charge our Deposit Account No. 503616 for these fees (Attorney Docket No. ALPH.P020).

Respectfully submitted,
Courtney Staniford & Gregory LLP

Date: September 16, 2009

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PTO/SB/22 (01-09)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** *(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)*	Docket Number (Optional) ALPH.P020
Application Number 10/400,282	Filed March 27, 2003
For Microphone and Voice Activity Detection (VAD) Configurations for Use with Communication Systems	
Art Unit 2614	Examiner Devona E. Faulk

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$130	$65	$
☐	Two months (37 CFR 1.17(a)(2))	$490	$245	$
☑	Three months (37 CFR 1.17(a)(3))	$1110	$555	$ 1110
☐	Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐	Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☑ Payment by credit card.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

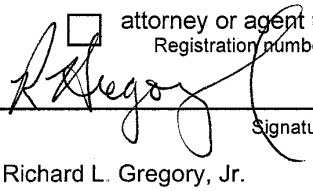
I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 42,607

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____



Signature — September 16, 2009 (Date)

Richard L. Gregory, Jr. (Typed or printed name) — 408-342-1900 (Telephone Number)

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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.**

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Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Richard L. Gregory/Rob Rathbun
Attorney Docket Number:	ALPH.P020

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 3 months with $0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**1110**

Electronic Acknowledgement Receipt

EFS ID:	6083432
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	53186
Filer:	Richard L. Gregory/Rob Rathbun
Filer Authorized By:	Richard L. Gregory
Attorney Docket Number:	ALPH.P020
Receipt Date:	16-SEP-2009
Filing Date:	27-MAR-2003
Time Stamp:	14:26:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1110
RAM confirmation Number	396
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		Amendment_Response_ALPHP020.pdf	1695964 cf48ae1d7b4a95aaecc0b655b7ac0ab5bcf42b48	yes	19

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	18
	Extension of Time	19	19

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	30304 895d15b42b83d23a9a7f14e9741388f5c73807b3	no	2

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Total Files Size (in bytes):	1726268

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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.

Attorney Docket No. ALPH.P020 Patent

Transmittal of Documents

Certification Under 37 C.F.R. §1.8(a)

Transmitted via **September 16, 2009**
Date of Transmission

USPTO EFS

I hereby certify that this document, and any other accompanying documents referred to herein are being transmitted to the United States Patent Office via EFS in accordance with 37 C.F.R. §1.6(a)(4) on the date indicated above.

Rob Rathbun _____

(Print Name of Person Transmitting Documents) (Signature of Person Transmitting Documents)

Amendment and Response;
Petition for three months extension of time under 37 CFR § 1.136(a);
Electronic payment of filing fees.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 10/400,282	Filing Date 03/27/2003	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	09/16/2009	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 27	Minus	** 40	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***7	= 0	X $110 =	0	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	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/MARQUITA D. JONES/

This collection of information is required by 37 CFR 1.16. 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 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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020	1397

53186 7590 12/09/2009

COURTNEY STANIFORD & GREGORY LLP
10001 N. De Anza Blvd., Suite 300
Cupertino, CA 95014

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2614	

MAIL DATE	DELIVERY MODE
12/09/2009	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	DEVONA E. FAULK	2614	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *16 September 2009*.

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

3)☐ 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

4)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

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

Application Papers

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

10)☒ The drawing(s) filed on *25 July 2007* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, regarding the 102 rejections, filed 9/16/09, with respect to claims 1 and 7 have been fully considered and are persuasive. The 102 rejection of claims 1 and 7 has been withdrawn. The examiner asserts that the examiner copied the previous rejection into that action before completing it and neglected to delete that section. The 102 rejection was in error as obvious by the use of two references. The examiner is maintaining the 103 rejections of the claims.

2. Applicant's arguments, regarding the 103 rejections, filed 9/16/09 have been fully considered but they are not persuasive. The applicant asserts that Ouyang does not disclose " a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector. " The applicant further asserts that claim 1 is distinguished from the prior art in terms of structure rather than function. For example, claim 1 recites structure in the limitation "the denoising subsystem comprising a microphone array including a plurality of microphones and an axis"; a microphone array including a plurality of microphones and an axis is clearly structure and not function.

The examiner asserts that Yoshida discloses the structure, two microphones and there is implicitly an axis (Figure 1).

The applicant further essentially asserts that the structure of the microphone array recited in claim 1 is further defined in claim 1 using language that describes a relative orientation of microphones of the microphone array (see claim 1, "a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector"). A description of a relative orientation between components of an array is clearly structure, and thus not a functional limitation. Therefore, Applicant submits that claim 1 includes numerous structural limitations not found in the combination of Yoshida and Ouyang, where the structural limitations of claim 1 describe a microphone array and a relative orientation of microphones of the microphone array. The examiner asserts that the vector language is implicit. Furthermore, the examiner maintains that the vector language is not structural but functional. There is no physical structure that represents or defines the vectors in the communication system. There is a line that represents the vector in the figures to best illustrate what is meant by the claim language but in actuality there is are no lines that physically represent the vectors in the communication system.

The examiner is making this a non-final to correct some mistakes in the previous rejection.

3. Claims 2,3,8,18-40,42,43 are cancelled.

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1,7 and 49-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025). Regarding claim 1, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector wherein a second microphone of the array has a second vector, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic

signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25.

Yoshida fails to explicitly disclose wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector. The examiner asserts that this in implicit.

Furthermore, the MPEP 2114....states that while features of an apparatus may be recited either structurally or functionally, claims <directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Yoshida as modified by Ouyang clearly has the structural limitations of the claim and the intended use of the lumens cannot differentiate the claimed apparatus from the prior art.

All elements of claim 7 are comprehended by the rejection of claim 1.

Regarding claims 49 and 54, Yoshida does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression

circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Regarding claims 50 and 55, Yoshida as modified discloses that the microphones are separated . Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 51-53, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

6. Claims 4, 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025).

Regarding claims 4 and 6, the examiner takes official notice that it was well known in the art at the time of the invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of ordinary skill in the art to modify Yoshida as modified to use such sensors in the place of the microphones for the purpose of improving the voice detection performance.

Regarding claim 9, the examiner asserts that per In re Venner the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in further view of Park et al. (US 5,590,241).

Regarding claim 5, Yoshida as modified fails to disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park discloses a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the Yoshida as modified to have an accelerometer coupled to the

power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

8. Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in view of Housni (US 6,795,713).

Regarding claim 10, Yoshida fails to disclose that the system includes a portable handset that includes the microphones. Yoshida teaches of a two microphone system. Housni discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al in a portable handset for the purpose of improving wireless speech communication.

Regarding claims 11 and 15,Yoshida as modified provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset .

Regarding claim 12, the portable handset 1 of Housni includes a speaker 4.

Regarding claims 13 and 14, the portable handset of Housni inherently couples to another wireless phone via wireless couplings.

All elements of claims 16 and 17 are comprehended by the rejection of claim 12.

9. Claims 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in view of Turnbull et al. (US 6,980,092).

Regarding claim 41, Yoshida discloses a communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (300, Figure 4; column 8, lines 14-20) ; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array has a first vector wherein a second microphone of the array has a second vector, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida fails to explicitly disclose wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second

vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector. The examiner asserts that this in implicit.

Furthermore, the MPEP 2114....states that while features of an apparatus may be recited either structurally or functionally, claims <directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).
Yoshida as modified by Ouyang clearly has the structural limitations of the claim and the intended use of the lumens cannot differentiate the claimed apparatus from the prior art.

Yoshida as modified fails to disclose a portable headset that includes the microphones along with at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular phones, satellite telephones, portable telephones, wireline telephones, internet telephones, wireless transceivers, wireless communication radio, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Turnbull discloses a portable headset that couples to a cellular phone (column 28, lines 53-65). It would have been obvious to modify Yoshida as modified in order to allow for wireless transmission.

10. Claims 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in further view of Oh et al. (US 5,353,376).

Regarding claim 44, Yoshida as modified fails to disclose that the microphones are unidirectional. Oh discloses a system for improved speech acquisition for a hands-free system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone and that the two microphones are unidirectional (column 7, lines 14-25). It would have been obvious to modify Yoshida as modified by having the microphones be unidirectional for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

Regarding claim 45, Yoshida as modified discloses that the microphones are separated. Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 46-48, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The

examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA E. FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devona E. Faulk/
Primary Examiner, Art Unit 2614

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner DEVONA E. FAULK	Art Unit 2614	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,353,376	10-1994	Oh et al.	704/233
*	B	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	C	US-5,590,241	12-1996	Park et al.	704/227
*	D	US-2003/0044025	03-2003	Ouyang et al.	381/92
*	E	US-6,795,713	09-2004	Housni, Jamal	455/550.1
*	F	US-6,980,092	12-2005	Turnbull et al.	340/425.5
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009				
	1	✓	✓	✓	✓	✓				
	2	✓	✓	-	-	-				
	3	✓	✓	-	-	-				
	4	✓	✓	✓	✓	✓				
	5	✓	✓	✓	✓	✓				
	6	✓	✓	✓	✓	✓				
	7	✓	✓	✓	✓	✓				
	8	O	-	-	-	-				
	9	O	✓	✓	✓	✓				
	10	✓	✓	✓	✓	✓				
	11	✓	✓	✓	✓	✓				
	12	✓	✓	✓	✓	✓				
	13	✓	✓	✓	✓	✓				
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	15	O	✓	✓	✓	✓				
	16	✓	✓	✓	✓	✓				
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	30	✓	✓	-	-	-				
	31	O	✓	-	-	-				
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	36	✓	✓	-	-	-				

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009				
	37	✓	✓	-	-	-				
	38	O	-	-	-	-				
	39	O	✓	-	-	-				
	40		✓	-	-	-				
	41		✓	✓	✓	✓				
	42		✓	-	-	-				
	43		✓	-	-	-				
	44			✓	✓	✓				
	45			✓	✓	✓				
	46			✓	✓	✓				
	47			✓	✓	✓				
	48			✓	✓	✓				
	49			✓	✓	✓				
	50			✓	✓	✓				
	51			✓	✓	✓				
	52			✓	✓	✓				
	53			✓	✓	✓				
	54			✓	✓	✓				
	55			✓	✓	✓				

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

SEARCHED

Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF
381	71.6,94.1,94.7	7/29/08, 8/14/08	DEF
704	226,233	7/29/08,8/14/08	DEF
381	71.7,94.1,94.7,110,92	3/12/09	DEF
381	71.6,94.1,94.7,110,92,111	12/7/09	DEF

SEARCH NOTES

Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF
additonal search	7/29/08, 8/14/08	DEF
additional search	3/12/09	DEF

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

	/DEVONA E FAULK/ Primary Examiner.Art Unit 2614

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	215	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
L2	1050	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
L3	1660	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
S1	150	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S3	850	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S4	641	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S5	6	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:28
S6	6	("5136577" | "5329587" | "5544080" | "5887059" | "6070137" | "6487295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/15 15:33
S7	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22

S8	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S9	1	("5406622").PN.	USPAT	OR	OFF	2007/10/16 10:24
S10	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:38
S11	0	EP-1483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:37
S12	0	EP-2001483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S13	0	EP-483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S14	0	WO-20030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S15	0	WO-030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:39
S16	194	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:40
S17	33	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:04

S18	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (unidirectional)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S19	1	burnett.in. and microphone and ((voice near2 activity) same (manual$2 near2 activat $3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:20
S20	1	"381"/$.ccls. and (manuall$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S21	1	"381"/$.ccls. and (manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:41
S22	3	(manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect $3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S23	10	(manual$3 near2 (operat$3 activat$3)) same (VAD)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S24	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) same (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S25	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S26	5	burnett.in. and microphone and ((voice near2 activity) same subsystem)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:54

S27	35	("20020039425" | "3789166" | "4006318" | "4591668" | "4653102" | "4777649" | "4901354" | "5097515" | "5212764" | "5400409" | "5406622" | "5414776" | "5473702" | "5515865" | "5517435" | "5539859" | "5590241" | "5633935" | "5649055" | "5664052" | "5684460" | "5729694" | "5754665" | "5835608" | "5853005" | "5917921" | "5966090" | "5986600" | "6006175" | "6009396" | "6069963" | "6191724" | "6233551" | "6266422" | "6430295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/16 18:19
S28	1	(glottal near2 electromagnetic near2 sensor $1) with antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S29	6	burnett.in. and microphone and (voice near2 activity) and glottal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 15:59
S30	12	(glottal near2 electromagnetic near2 micropower near2 sensor$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S31	1	burnett.in. and microphone and (voice near2 activity) and (transceiver same headset)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S32	1	burnett.in. and microphone and (voice near2 activity) and transceiver	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S33	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:17

S34	29	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S35	6	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver) and (headset headphone$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S36	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S37	1	S36 and headset	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:23
S38	0	headset same transceiver same (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:23
S39	0	(headset same transceiver) and (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S40	5	(headset same transceiver) and (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S41	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S42	1	(headset same transceiver) same (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:25
S43	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S44	1602	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/18 14:18

S45	1	burnett.in. and microphone and (voice near2 activity) and (angle same maximums)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S46	173	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S47	923	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S48	1468	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S49	1720	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S50	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S51	79	burnett.in. and microphone $1 and (voice)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S52	12	burnett.in. and microphone $1 and (voice) and VAD	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:00
S53	6	burnett.in. and microphone $1 and (voice) and VAD and (correlat$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:33
S54	8	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:09

S55	0	burnett.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:11
S56	11	burnett.in. and microphone and array	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:12
S57	174	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S58	926	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S59	700	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S60	1729	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S61	0	S56 and vector near10 normal near10 mouth near10 user	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:42
S62	0	S56 and (vector near10 normal near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S63	0	S56 and (vector near10 (normal perpendicu$3) near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S64	3	S56 and (vector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43

S65	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
S66	4	S65 and $4direction$2	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
S67	1	S65 and uni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
S68	1	S65 and omni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
S69	192	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S70	990	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S71	769	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S72	20	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:36
S73	20	burnett.in. and microphone and (voice near2 (detect$3 activity))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:45
S74	17	burnett.in. and microphone and (voice near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:45
S75	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters) and axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/30 16:06
S76	13	burnett.in. and microphone and (voice near2 (detect$3 activity)) and axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/30 16:07

EAST Search History (Interference)

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12/7/2009 9:15:02 AM
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Attorney Docket No. ALPH.P020

PATENT

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:	)	
	)	Examiner: Devona E. Faulk
Gregory C. Burnett, et al.	)	Art Unit: 2614
	)	
Application No.: 10/400,282	)	
	)	
Filed: March 27, 2003	)	
	)	
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	)	

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

RESPONSE TO OFFICE ACTION

Sir:

This is a response to the Office Action mailed December 9, 2009. Applicant respectfully requests entry of the following Amendments and consideration of the Remarks.

AMENDMENTS

IN THE CLAIMS

1. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones ~~and an axis~~, wherein a first microphone of the array ~~has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector~~is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

Claims 2 and 3 (Canceled).

4. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. (Previously presented) The system of claim 1, wherein the voice detection subsystem receives voice activity signals via couplings with the microphones.

Claim 8 (Canceled).

9. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Previously presented) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Previously presented) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Previously presented) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Previously presented) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Previously presented) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Previously presented) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Previously presented) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Previously presented) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

Claims 18-40 (Canceled).

41. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones ~~and an axis~~, wherein a first microphone of the array ~~has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector~~is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic

signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise; and

a portable headset comprising the microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Claims 42-43 (Canceled).

44. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (Previously presented) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 180 degrees.

47. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 135 degrees.

48. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately zero (0) degrees to 90 degrees.

49. (Previously presented) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (Previously presented) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (Previously presented) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

REMARKS

Claims 1, 4-7, 9-17, 41, and 44-55 are pending in the application. Claims 1, 4-7, 9-17, 41, and 44-55 are rejected. Claims 1 and 41 are amended herein. No new material is added by the amendments herein.

Petition for extension of time

A petition for a three (3) month extension of time under 37 C.F.R. §1.136(a) is included herewith, as well as the fee under 37 C.F.R. §1.117(a)(3).

Rejections under 35 U.S.C. § 103

Claims 1, 7, and 49-55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang et al., US Patent Application Publication number US 2003/0044025 ("Ouyang"). Applicants respectfully traverse the rejection.

Regarding claim 1, as amended, Applicants submit that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (emphasis added).

Applicant submits that Yoshida shows two microphones 1 and 2 (Figures 1 and 2). Yoshida discloses that microphone 1 is disposed relatively close to a voice source and picks up both voice input and background noise (column 3, lines 10-13). Yoshida discloses that microphone 2 is disposed relatively far from the voice source and picks up mainly noise (column 3, lines 16-18). However, Yoshida includes no further description regarding the relative positioning of the two microphones. Therefore, while Yoshida shows a system having two microphones, Yoshida does not show or describe a first microphone of an array fixed at a first position relative to a mouth of a

user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (emphasis added).

Additionally, the Office Action states, at page 5, that "Yoshida fails to explicitly disclose wherein a first microphone of the array has a first vector normal to a front of the first microphone, the first vector defining the axis to be toward a mouth of a user, wherein a second microphone of the array has a second vector normal to a front of the second microphone, wherein the second vector forms an angle relative to the first vector." Applicant agrees with this statement.

The Office Action also states, at page 5, that "Yoshida as modified by Ouyang clearly has the structural limitations of the claim and the intended use of the lumens cannot differentiate the claimed apparatus from the prior art." Applicant does not understand this statement as the invention as claimed in amended claim 1 does not include "lumens" and, furthermore, Applicant finds no teaching relating to "lumens" in Ouyang. Consequently, Applicant finds no support or reference in the Office Action to any portion of Ouyang that overcomes the deficient teaching of Yoshida in view of amended claim 1.

In further support of this opinion, Applicant submits Ouyang teaches a microphone circuit that includes a uni-directional microphone, an omni-directional microphone, and a background noise suppression circuit (paragraph 0034). The omni-directional microphone is located in close physical proximity to the uni-directional microphone such that an acoustic source is approximately equal distance from both the omni-directional microphone and the uni-directional microphone (paragraph 0037). Ouyang teaches a single embodiment of the microphone circuit as a desk top speaker phone that embodies the microphone circuit (paragraph 0047). In the desk top speaker phone, the uni-directional microphone and the omni-directional microphone are positioned in a front-facing region of a housing in close proximity to each other such that an acoustic source spaced apart from the speaker phone is approximately the same

distance from each of the omni-directional microphone and the uni-directional microphone (paragraph 48; figure 3).

The embodiment taught in Ouyang therefore describes two microphones positioned in a face of a housing surface such that the two microphones face in the same direction outward from the housing surface and, as such, position the microphones such that an acoustic source is approximately equal distance from a face of both microphones. Consequently, Applicant submits that Ouyang does not disclose a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (emphasis added).

The Examiner asserts that claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Applicant respectfully submits that amended claim 1 is distinguished from the prior art in terms of structure rather than function. For example, amended claim 1 recites structure in the limitation "the denoising subsystem comprising a microphone array including a plurality of microphones"; a microphone array including a plurality of microphones is clearly structure and not function.

The structure of the microphone array recited in amended claim 1 is further defined in amended claim 1 using language that describes a relative orientation of microphones of the microphone array (see amended claim 1, "a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position"). A description of a relative orientation between components of an array is clearly structure, and thus not a functional limitation. Therefore, Applicant submits that amended claim 1 includes

numerous structural limitations not found in the combination of Yoshida and Ouyang, where the structural limitations of amended claim 1 describe a microphone array and a relative orientation of microphones of the microphone array.

The Examiner also asserts that a claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim. Applicant is of the opinion that this assertion by the Examiner does not apply to amended claim 1 because none of the conditions of this assertion are met by amended claim 1. As a first point, the prior art does not teach all the structural limitations of the claim because Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position.

Further, the novel structural limitations of amended claim 1 recite nothing of the manner in which the claimed apparatus is intended to be employed. As described above, the limitations of amended claim 1 missing from the combination of Yoshida and Ouyang are structural limitations (see amended claim 1, "a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position"). Consequently, because the limitations of amended claim 1 missing from the combination of Yoshida and Ouyang are structural limitations, the structural limitations recite nothing of the manner in which the claimed apparatus is intended to be employed.

For at least these reasons, Applicant respectfully submits that amended claim 1 is patentable over Yoshida in view of Ouyang.

As claims 4, 6, 7, 9, and 49-55 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is not anticipated by Yoshida in view of Ouyang, Applicant submits that claims 4, 6, 7, 9, and 49-55 are patentable over Yoshida in view of Ouyang.

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and in further view of Park et al., US patent number 5,590,241 (hereinafter "Park"). Applicants respectfully traverse the rejection.

Regarding amended claim 1, Applicants submit that Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (emphasis added). Furthermore, none of Yoshida, Ouyang, and/or Park, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added).

As claim 5 depends from amended claim 1 and includes further limitations thereon, and since amended claim 1 is not anticipated by Yoshida, Ouyang, and/or Park, Applicant submits that claim 5 is not anticipated by Yoshida, Oh, and/or Park.

Claims 10-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Housni, US patent number 6,795,713 (hereinafter "Housni"). Applicants respectfully traverse the rejection.

Regarding amended claim 1, Applicants submit that Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (emphasis added). Furthermore, none of Yoshida, Ouyang, and/or Housni, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added).

As claims 10-17 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is not anticipated by Yoshida, Ouyang and/or Housni, Applicant submits that claims 10-17 are not anticipated by Yoshida, Ouyang and/or Housni.

Claim 41 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Turnbull et al., US patent number 6,980,092 (hereinafter "Turnbull"). Applicants respectfully traverse the rejection.

Regarding claim 41, as amended herein, and as described in detail above, Applicants submit that Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (emphasis added). Additionally, Turnbull does not disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones and an axis, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Thus, Applicant submits that amended claim 41 is not anticipated by Yoshida, Ouyang and/or Turnbull.

Claims 44-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Oh. Applicants respectfully traverse the rejection.

Applicants submit that amended claim 1 is not anticipated by Yoshida in view of Ouyang, as described above. Furthermore, none of Yoshida, Ouyang and/or Oh, alone or in any combination, disclose a communications system, comprising a denoising subsystem including a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second

position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, the microphone array providing acoustic signals of an environment to components of the denoising subsystem (emphasis added). Therefore, amended claim 1 is not anticipated by Yoshida, Ouyang and/or Oh, alone and/or in any combination.

As claims 44-48 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is not anticipated by Yoshida, Ouyang and/or Oh, Applicant submits that claims 44-48 are not anticipated by Yoshida, Ouyang and/or Oh.

Conclusion

In view of the foregoing Amendments and Remarks, Applicant respectfully submits that the rejections under 35 U.S.C. §103, have been overcome, and their withdrawal is respectfully requested. Applicant submits that claims 1, 4-7, 9-17, 41, and 44-55 are in condition for allowance. The allowance of the claims is earnestly requested. If in the opinion of Examiner FAULK a telephone conference would expedite the prosecution of the subject application, or if there are any issues that remain to be resolved prior to allowance of the claims, Examiner FAULK is encouraged to call Rick Gregory at (408) 342-1900.

Authorization to Charge Deposit Account

If there are any fees due and unpaid in this application, please charge our Deposit Account No. 503616 for these fees (Attorney Docket No. ALPH.P020).

Respectfully submitted,
Courtney Staniford & Gregory LLP

Date: June 9, 2010

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PTO/SB/22 (01-09)
Approved for use through 02/28/2009. OMB 0651-0031
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) ALPH.P020
Application Number 10/400,282	Filed March 27, 2003
For Microphone and Voice Activity Detection (VAD) Configurations for Use with Communication Systems	
Art Unit 2614	Examiner Devona E. Faulk

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$130	$65	$
☐	Two months (37 CFR 1.17(a)(2))	$490	$245	$
☑	Three months (37 CFR 1.17(a)(3))	$1110	$555	$ 1110
☐	Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐	Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☑ Payment by credit card.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 42,607

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Richard L. Gregory, Jr./	June 09, 2010
Signature	Date
Richard L. Gregory, Jr.	408-342-1900
Typed or printed name	Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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.**

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Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Richard L. Gregory/Rob Rathbun
Attorney Docket Number:	ALPH.P020

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 3 months with $0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**1110**

Electronic Acknowledgement Receipt

EFS ID:	7776791
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	53186
Filer:	Richard L. Gregory/Rob Rathbun
Filer Authorized By:	Richard L. Gregory
Attorney Docket Number:	ALPH.P020
Receipt Date:	09-JUN-2010
Filing Date:	27-MAR-2003
Time Stamp:	13:10:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1110
RAM confirmation Number	9826
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		Amendment_Response_ALPHP020.pdf	2382659 776fe1ec4f0a04143a6ad55b72dac62a73961ff0	yes	18

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	17
	Extension of Time	18	18

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	30302 0ffdd145ad8c1b7a11b2b2652bb4d154189acfc4	no	2

Warnings:

Information:

Total Files Size (in bytes):	2412961

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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.

Attorney Docket No. ALPH.P020 Patent

Transmittal of Documents

Certification Under 37 C.F.R. §1.8(a)

Transmitted via **June 9, 2010** Date of Transmission

USPTO EFS

I hereby certify that this document, and any other accompanying documents referred to herein are being transmitted to the United States Patent Office via EFS in accordance with 37 C.F.R. §1.6(a)(4) on the date indicated above.

Rob Rathbun _____

(Print Name of Person Transmitting Documents) (Signature of Person Transmitting Documents)

Amendment and Response;
Petition for three months extension of time under 37 CFR § 1.136(a);
Electronic payment of filing fees.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/400,282	03/27/2003	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	06/09/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 27	Minus	** 40	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***7	= 0	X $110 =	0	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	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/phyllis canty/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020	1397

53186 7590 08/17/2010
COURTNEY STANIFORD & GREGORY LLP
PO Box 9807
San Jose, CA 95157

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2614	
MAIL DATE	DELIVERY MODE
08/17/2010	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	DEVONA E. FAULK	2614	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *09 June 2010*.

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

3)☐ 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

4)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

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

Application Papers

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

10)☒ The drawing(s) filed on *7/25/07* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/9/10 have been fully considered but they are not persuasive. The applicant has amended the claims and essentially asserts that the prior art fails to read on the amended claim language. The examiner disagrees. Although the applicant asserts that the prior art fails to read on the amended claim language, the applicant admits that prior art Yoshida teach of two microphones, one microphone disposed relatively close to a voice source and the other disposed relatively far from the voice source (page 8). The examiner agrees and asserts additionally that the Yoshida reads on the " such that the second position forms an angle relative to the first position" language. The examiner asserts that implicitly some angle is formed relative to the first position.

2. Claims 2,3,8,18-40,42-43 are cancelled.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (US 5,473,702).

Regarding claim 1, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (Figure 4); and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array **is fixed at a first position** relative to a mouth of user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (microphone 1 reads on first microphone and microphone 2 reads on second microphone, Figures 1 and 2; column 3, lines 10-18; the angle formed is implicit),

the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic

signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

All elements of claim 7 are comprehended by the rejection of claim 1.

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 49-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025).

Regarding claims 49 and 54, Yoshida does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Regarding claims 50 and 55, Yoshida as modified discloses that the microphones are separated . Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 51-53, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

7. Claims 4, 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702).

Regarding claims 4 and 6, the examiner takes official notice that it was well known in the art at the time of the invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of ordinary skill in the art to modify Yoshida to use such sensors in the place of the microphones for the purpose of improving the voice detection performance.

Regarding claim 9, the examiner asserts that per In re Venner the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Park et al. (US 5,590,241).

Regarding claim 5, Yoshida fails to disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park discloses a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

9. Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Housni (US 6,795,713).

Regarding claim 10, Yoshida fails to disclose that the system includes a portable handset that includes the microphones. Yoshida teaches of a two microphone system. Housni discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida et al in a portable handset for the purpose of improving wireless speech communication.

Regarding claims 11 and 15,Yoshida as modified provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset .

Regarding claim 12, the portable handset 1 of Housni includes a speaker 4.

Regarding claims 13 and 14, the portable handset of Housni inherently couples to another wireless phone via wireless couplings.

All elements of claims 16 and 17 are comprehended by the rejection of claim 12.

10. Claims 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in view of Turnbull et al. (US 6,980,092).

Regarding claim 41, Yoshida discloses a communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (300, Figure 4; column 8, lines 14-20) ; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality

of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position (microphone 1 reads on first microphone and microphone 2 reads on second microphone, Figures 1 and 2; column 3, lines 10-18; the angle formed is implicit),

, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida as modified fails to disclose a portable headset that includes the microphones along with at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular phones, satellite telephones, portable telephones, wireline telephones, internet telephones,

wireless transceivers, wireless communication radio, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Turnbull discloses a portable headset that couples to a cellular phone (column 28, lines 53-65). It would have been obvious to modify Yoshida as modified in order to allow for wireless transmission.

11. Claims 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Ouyang et al. (US 2003/0044025) in further view of Oh et al. (US 5,353,376).

Regarding claim 44, Yoshida as modified fails to disclose that the microphones are unidirectional. Oh discloses a system for improved speech acquisition for a hands-free system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone and that the two microphones are unidirectional (column 7, lines 14-25). It would have been obvious to modify Yoshida as modified by having the microphones be unidirectional for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

Regarding claim 45, Yoshida as modified discloses that the microphones are separated. Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice.

It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 46-48, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA E. FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devona E. Faulk/
Primary Examiner, Art Unit 2614

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner DEVONA E. FAULK	Art Unit 2614	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,353,376	10-1994	Oh et al.	704/233
*	B	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	C	US-5,590,241	12-1996	Park et al.	704/227
*	D	US-2003/0044025	03-2003	Ouyang et al.	381/92
*	E	US-6,795,713	09-2004	Housni, Jamal	455/550.1
*	F	US-6,980,092	12-2005	Turnbull et al.	340/425.5
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010			
	1	✓	✓	✓	✓	✓	✓			
	2	✓	✓	-	-	-	✓			
	3	✓	✓	-	-	-	✓			
	4	✓	✓	✓	✓	✓	✓			
	5	✓	✓	✓	✓	✓	✓			
	6	✓	✓	✓	✓	✓	✓			
	7	✓	✓	✓	✓	✓	✓			
	8	O	-	-	-	-	-			
	9	O	✓	✓	✓	✓	✓			
	10	✓	✓	✓	✓	✓	✓			
	11	✓	✓	✓	✓	✓	✓			
	12	✓	✓	✓	✓	✓	✓			
	13	✓	✓	✓	✓	✓	✓			
	14	✓	✓	✓	✓	✓	✓			
	15	O	✓	✓	✓	✓	✓			
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	23	✓	✓	-	-	-	-			
	24	O	-	-	-	-	-			
	25	O	✓	-	-	-	-			
	26	✓	✓	-	-	-	-			
	27	✓	✓	-	-	-	-			
	28	✓	✓	-	-	-	-			
	29	✓	✓	-	-	-	-			
	30	✓	✓	-	-	-	-			
	31	O	✓	-	-	-	-			
	32	✓	✓	-	-	-	-			
	33	✓	✓	-	-	-	-			
	34	✓	✓	-	-	-	-			
	35	✓	✓	-	-	-	-			
	36	✓	✓	-	-	-	-			

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010			
	37	✓	✓	-	-	-	-			
	38	O	-	-	-	-	-			
	39	O	✓	-	-	-	-			
	40		✓	-	-	-	-			
	41		✓	✓	✓	✓	✓			
	42		✓	-	-	-	-			
	43		✓	-	-	-	-			
	44			✓	✓	✓	✓			
	45			✓	✓	✓	✓			
	46			✓	✓	✓	✓			
	47			✓	✓	✓	✓			
	48			✓	✓	✓	✓			
	49			✓	✓	✓	✓			
	50			✓	✓	✓	✓			
	51			✓	✓	✓	✓			
	52			✓	✓	✓	✓			
	53			✓	✓	✓	✓			
	54			✓	✓	✓	✓			
	55			✓	✓	✓	✓			

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

SEARCHED			
Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF
381	71.6,94.1,94.7	7/29/08, 8/14/08	DEF
704	226,233	7/29/08,8/14/08	DEF
381	71.7,94.1,94.7,110,92	3/12/09	DEF
381	71.6,94.1,94.7,110,92,111	12/7/09	DEF

SEARCH NOTES		
Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF
additonal search	7/29/08, 8/14/08	DEF
additional search	3/12/09	DEF
reviewed applicant's arguments/ applied same art to claims	8/13/10	DEF

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

	/DEVONA E FAULK/ Primary Examiner.Art Unit 2614

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	9	burnett.in. and (microphone near10 mouth) and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2010/08/13 14:25
L2	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2010/08/13 15:05
S1	150	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S3	850	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S4	641	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S5	6	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:28
S6	6	("5136577" | "5329587" | "5544080" | "5887059" | "6070137" | "6487295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/15 15:33
S7	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S8	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S9	1	("5406622").PN.	USPAT	OR	OFF	2007/10/16 10:24

S10	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:38
S11	0	EP-1483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:37
S12	0	EP-2001483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S13	0	EP-483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S14	0	WO-20030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S15	0	WO-030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:39
S16	194	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:40
S17	33	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:04
S18	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (unidirectional)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S19	1	burnett.in. and microphone and ((voice near2 activity) same (manual$2 near2 activat $3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:20

S20	1	"381"/$.ccls. and (manuall$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S21	1	"381"/$.ccls. and (manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:41
S22	3	(manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect $3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S23	10	(manual$3 near2 (operat$3 activat$3)) same (VAD)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S24	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) same (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S25	7	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S26	5	burnett.in. and microphone and ((voice near2 activity) same subsystem)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:54
S27	35	("20020039425" | "3789166" | "4006318" | "4591668" | "4653102" | "4777649" | "4901354" | "5097515" | "5212764" | "5400409" | "5406622" | "5414776" | "5473702" | "5515865" | "5517435" | "5539859" | "5590241" | "5633935" | "5649055" | "5664052" | "5684460" | "5729694" | "5754665" | "5835608" | "5853005" | "5917921" | "5966090" | "5986600" | "6006175" | "6009396" | "6069963" | "6191724" | "6233551" | "6266422"	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/16 18:19

		"6430295").PN.				
S28	1	(glottal near2 electromagnetic near2 sensor $1) with antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S29	6	burnett.in. and microphone and (voice near2 activity) and glottal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 15:59
S30	12	(glottal near2 electromagnetic near2 micropower near2 sensor$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S31	1	burnett.in. and microphone and (voice near2 activity) and (transceiver same headset)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S32	1	burnett.in. and microphone and (voice near2 activity) and transceiver	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S33	2	"381"/$.ccls. and (voice near2 activity near2 detect $3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:17
S34	29	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S35	6	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver) and (headset headphone$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S36	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")). PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S37	1	S36 and headset	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:23

S38	0	headset same transceiver same (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:23
S39	0	(headset same transceiver) and (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S40	5	(headset same transceiver) and (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S41	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S42	1	(headset same transceiver) same (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:25
S43	35	(headset same transceiver) and (noise near2 (suppress $3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S44	1602	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/18 14:18
S45	1	burnett.in. and microphone and (voice near2 activity) and (angle same maximums)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S46	173	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S47	923	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59

S48	1468	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S49	1720	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S50	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S51	79	burnett.in. and microphone $1 and (voice)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S52	12	burnett.in. and microphone $1 and (voice) and VAD	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:00
S53	6	burnett.in. and microphone $1 and (voice) and VAD and (correlat$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:33
S54	8	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:09
S55	0	burnett.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:11
S56	11	burnett.in. and microphone and array	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:12
S57	174	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14

S58	926	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S59	700	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S60	1729	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S61	0	S56 and vector near10 normal near10 mouth near10 user	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:42
S62	0	S56 and (vector near10 normal near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S63	0	S56 and (vector near10 (normal perpendicu$3) near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S64	3	S56 and (vector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S65	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
S66	4	S65 and $4direction$2	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
S67	1	S65 and uni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
S68	1	S65 and omni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
S69	192	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55

S70	990	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S71	769	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S72	20	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:36
S73	20	burnett.in. and microphone and (voice near2 (detect$3 activity))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:45
S74	17	burnett.in. and microphone and (voice near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:45
S75	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters) and axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/30 16:06
S76	13	burnett.in. and microphone and (voice near2 (detect$3 activity)) and axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/30 16:07
S77	215	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
S78	1050	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
S79	1660	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14

EAST Search History (Interference)

<This search history is empty>

8/13/2010 3:46:59 PM
C:\Documents and Settings\dfaulk\My Documents\EAST\Workspaces\10400282.wsp

PTO/SB/80 (11-08)
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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: 98195

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: 98195

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

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		Date	03/10/10
Name	Gregory C. BURNETT	Telephone	502-251-4761
Title	Chief Scientist		

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.**

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: ALIPHCOM, Inc.

Application No./Patent No.: 10/400,282 Filed/Issue Date: March 27, 2003

Titled:

ALIPHCOM, Inc. , a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

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 013928, Frame 0808, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. 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.

2. From: _____ To: _____

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☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(b)(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.

/Richard L. Gregory, Jr./ February 16, 2011

Signature Date

Richard L. Gregory, Jr. Attorney of Record

Printed or Typed Name Title

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.**

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Electronic Acknowledgement Receipt	
EFS ID:	9462228
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	53186
Filer:	Richard L. Gregory/Rob Rathbun
Filer Authorized By:	Richard L. Gregory
Attorney Docket Number:	ALPH.P020
Receipt Date:	16-FEB-2011
Filing Date:	27-MAR-2003
Time Stamp:	18:18:02
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		ALPHP020_POA.pdf	520262 21d7951c14b03d29411d5026b2b8d5d67ba96b90	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Power of Attorney	2	2
	Assignee showing of ownership per 37 CFR 3.73(b).	3	3
Warnings:			
Information:			
	Total Files Size (in bytes):	520262	

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.

Attorney Docket No. ALPH.P020 Patent

Transmittal of Documents

Certification Under 37 C.F.R. §1.8(a)

February 16, 2011
Date of Transmission

Transmitted via

USPTO EFS

I hereby certify that this document, and any other accompanying documents referred to herein are being transmitted to the United States Patent Office via EFS in accordance with 37 C.F.R. §1.6(a)(4) on the date indicated above.

Rob Rathbun
(Print Name of Person Transmitting Documents)

(Signature of Person Transmitting Documents)

Power of Attorney;
Statement Under 37 CFR 3.73(b).

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (12-08)
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	10400282	Filing Date	2003-03-27	Docket Number (if applicable)	ALPH.P020	Art Unit	2614
First Named Inventor	Gregory C. Burnett			Examiner Name	Devona E. Faulk		

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 _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (12-08)
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Signature of Registered U.S. Patent Practitioner			
Signature	/Richard L. Gregory, Jr./	Date (YYYY-MM-DD)	2011-02-17
Name	Richard L. Gregory, Jr.	Registration Number	42607

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

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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.

Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Richard L. Gregory/Rob Rathbun
Attorney Docket Number:	ALPH.P020

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 3 months with $0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**1920**

Electronic Acknowledgement Receipt	
EFS ID:	9471980
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	53186
Filer:	Richard L. Gregory/Rob Rathbun
Filer Authorized By:	Richard L. Gregory
Attorney Docket Number:	ALPH.P020
Receipt Date:	17-FEB-2011
Filing Date:	27-MAR-2003
Time Stamp:	18:23:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1920
RAM confirmation Number	4815
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		ALPHP020_Amendment_Response.pdf	2684297 a258ad8ff0464f57ab1ccf0c767379a9e451bcc8	yes	20

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Amendment After Final	2	19
	Extension of Time	20	20

Warnings:

Information:

2	Request for Continued Examination (RCE)	ALPHP020_RCE.pdf	700078 be5926b27449f2414d0c92e3cbc15c0a2b6fd079	no	3

Warnings:

Information:

3	Fee Worksheet (PTO-875)	fee-info.pdf	32193 104000f09eeae7308d8cb92682b5e8b9e79b9d49	no	2

Warnings:

Information:

Total Files Size (in bytes):	3416568

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<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.

Attorney Docket No. ALPH.P020 Patent

Transmittal of Documents

Certification Under 37 C.F.R. §1.8(a)

Transmitted via **February 17, 2011**
Date of Transmission

USPTO EFS

I hereby certify that this document, and any other accompanying documents referred to herein are being transmitted to the United States Patent Office via EFS in accordance with 37 C.F.R. §1.6(a)(4) on the date indicated above.

Rob Rathbun _____

(Print Name of Person Transmitting Documents) (Signature of Person Transmitting Documents)

Amendment and Response;
Petition for Three (3) Months Extension of Time;
Request for Continued Examination (RCE);
Electronic payment of filing fees.

Attorney Docket No. ALPH.P020

PATENT

IN THE UNITED STATES PATENT OFFICE

In Re Patent Application of:	)	
	)	Examiner: Devona E. Faulk
Gregory C. Burnett, et al.	)	Art Unit: 2614
	)	
Application No.: 10/400,282	)	
	)	
Filed: March 27, 2003	)	
	)	
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	)	

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

RESPONSE TO OFFICE ACTION

Sir:

This is a response to the Office Action mailed August 17, 2010. Applicant respectfully requests entry of the following Amendments and consideration of the Remarks.

AMENDMENTS

IN THE CLAIMS

1. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise.

Claims 2 and 3 (Canceled).

4. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin of a user for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. (Previously presented) The system of claim 1, wherein the voice detection subsystem receives voice activity signals via couplings with the microphones.

Claim 8 (Canceled).

9. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Previously presented) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline

telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Previously presented) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Previously presented) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Previously presented) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Previously presented) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Previously presented) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Previously presented) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Previously presented) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones,

satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

Claims 18-40 (Canceled).

41. (Currently amended) A communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise; and

a portable headset comprising the microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios,

personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Claims 42-43 (Canceled).

44. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (Previously presented) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (Currently amended) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees ~~to~~ and one of equal to and less than 180 degrees.

47. (Currently amended) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees ~~to~~ and one of equal to and less than 135 degrees.

48. (Currently amended) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees ~~to~~ and one of equal to and greater than 90 degrees.

49. (Previously presented) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (Previously presented) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (Previously presented) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

REMARKS

Claims 1, 4-7, 9-17, 41, and 44-55 are pending in the application. Claims 1, 4-7, 9-17, 41, and 44-55 are rejected. Claims 1, 41, and 46-48 are amended herein. No new material is added by the amendments herein.

Request for Continued Examination under 37 C.F.R. 1.114

This response is accompanied by a Request for Continued Examination under 37 C.F.R. 1.114 and the required fee.

Petition for extension of time

A petition for a three (3) month extension of time under 37 C.F.R. §1.136(a) is included herewith, as well as the fee under 37 C.F.R. §1.117(a)(3).

Rejections under 35 U.S.C. § 102

Claims 1 and 7 are rejected under 35 U.S.C. § 102(b) as being unpatentable over Yoshida et al., United States (US) Patent Number 5,473,702 ("Yoshida"). Applicant respectfully submits that the claims as presented herein are patentably distinct from Yoshida. Moreover, and as supported below, Yoshida fails to teach each and every element of claims 1 and 7 as presented herein.

Regarding claim 1, as amended, Applicant submits that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

Applicant submits that Yoshida shows two microphones 1 and 2 (Figures 1 and 2). Yoshida discloses that microphone 1 is disposed relatively close to a voice source

and picks up both voice input and background noise (column 3, lines 10-13). Yoshida discloses that microphone 2 is disposed relatively far from the voice source and picks up mainly noise (column 3, lines 16-18). However, Yoshida includes no further description regarding the relative positioning of the two microphones. Therefore, while Yoshida shows a system having two microphones, Yoshida does not show or describe a first microphone of an array fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

The Office Action states at page 2 that Yoshida reads on the "such that the second position forms an angle relative to the first position" language, and that "implicitly some angle is formed relative to the first position." Applicant disagrees with this statement. Applicant submits that Yoshida does describe a configuration in which a first microphone is disposed relatively close to a voice source and a second microphone is disposed relatively far from the voice source (emphasis added). However, a physical relationship between a voice source and each of two microphones described in Yoshida is different than a physical relationship between the front of two microphones as claimed in claim 1. More specifically, Applicant submits that, while the physical relationship between a voice source and each of two microphones described in Yoshida may imply generic information about a difference in angles between the voice source and each of two microphones, the physical relationship between each microphone and a voice source does not describe or even imply any information about the physical relationship between the front of the two microphones (emphasis added).

Furthermore, Applicant reminds the examiner that all limitations of the claim are to be considered. To that point, Yoshida does not describe a microphone array in which a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the

mouth (emphasis added). Additionally, Yoshida does not describe a microphone array in which a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth (emphasis added). Furthermore, Yoshida does not describe a relationship between a first microphone and a second microphone in which a second position of a second microphone forms an angle relative to a first position of a first microphone, wherein the angle is greater than zero degrees (emphasis added).

For at least these reasons, Applicant respectfully submits that amended claim 1 is not anticipated by Yoshida.

As claim 7 depends from amended claim 1 and includes further limitations thereon, and since amended claim 1 is not anticipated by Yoshida, Applicant submits that claim 7 is not anticipated by Yoshida.

Rejections under 35 U.S.C. § 103

Claims 49-55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida et al., United States (US) Patent Number 5,473,702 ("Yoshida") in view of Ouyang et al., US Patent Application Publication number US 2003/0044025 ("Ouyang"). Applicant respectfully traverses the rejection.

Regarding claim 1, as amended, Applicant submits that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

Applicant submits that Yoshida shows two microphones 1 and 2 (Figures 1 and 2). Yoshida discloses that microphone 1 is disposed relatively close to a voice source and picks up both voice input and background noise (column 3, lines 10-13). Yoshida

discloses that microphone 2 is disposed relatively far from the voice source and picks up mainly noise (column 3, lines 16-18). However, Yoshida includes no further description regarding the relative positioning of the two microphones. Therefore, while Yoshida shows a system having two microphones, Yoshida does not show or describe a microphone array in which a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth (emphasis added). Additionally, Yoshida does not describe a microphone array in which a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth (emphasis added). Furthermore, Yoshida does not describe a relationship between a first microphone and a second microphone in which a second position of a second microphone forms an angle relative to a first position of a first microphone, wherein the angle is greater than zero degrees (emphasis added).

The Office Action states at page 4 that, regarding claims 49 and 54, Yoshida does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Applicant agrees with this statement. The Office Action states however that it would have been obvious to modify Yoshida by substituting the microphone configuration of Ouyang. Applicant disagrees with this assertion.

Applicant submits Ouyang teaches a microphone circuit that includes a uni-directional microphone, an omni-directional microphone, and a background noise suppression circuit (paragraph 0034). The omni-directional microphone is located in close physical proximity to the uni-directional microphone such that an acoustic source is approximately equal distance from both the omni-directional microphone and the uni-directional microphone (paragraph 0037). Ouyang teaches a single embodiment of the microphone circuit as a desk top speaker phone that embodies the microphone circuit (paragraph 0047). In the desk top speaker phone, the uni-directional microphone and the omni-directional microphone are positioned in a front-facing region of a housing in close proximity to each other such that an acoustic source spaced

apart from the speaker phone is approximately the same distance from each of the omni-directional microphone and the uni-directional microphone (paragraph 48; figure 3).

The embodiment taught in Ouyang therefore describes two microphones positioned in a face of a housing surface such that the two microphones face in the same direction outward from the housing surface and, as such, position the microphones such that an acoustic source is approximately equal distance from a face of both microphones. Consequently, Ouyang does not show or describe a microphone array in which a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth (emphasis added). Additionally, Ouyang does not describe a microphone array in which a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth (emphasis added). Furthermore, Ouyang does not describe a relationship between a first microphone and a second microphone in which a second position of a second microphone forms an angle relative to a first position of a first microphone, wherein the angle is greater than zero degrees (emphasis added).

Therefore, Applicant submits that Ouyang does not disclose a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added). Therefore, Ouyang does not overcome the deficiencies of Yoshida with regard to claim 1.

As claims 49-55 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is not anticipated by Yoshida in view of Ouyang, Applicant submits that claims 49-55 are not anticipated by Yoshida in view of Ouyang.

The Office Action states at page 5 that, regarding claims 50 and 55, while Yoshida in view of Ouyang is silent as to separation distance, separation distance is a matter of design choice. Applicant disagrees and officially challenges this assertion, and further submits that this rejection is improper. Applicant submits that in any signal collection and processing system all elements of a configuration collectively affect operation of the system. As neither Yoshida nor Ouyang describe a first microphone and the second microphone separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters, Applicant requests the examiner provide a reference that describes this configuration. Therefore, Applicant submits that claims 50 and 55 are patentable over Yoshida in view of Ouyang.

The Office Action states at page 5 that, regarding claims 51-53, while Yoshida in view of Ouyang is silent as to relative angle between the fronts of two microphones, relative angle is a matter of design choice. Applicant disagrees and officially challenges this assertion, and further submits that this rejection is improper. Applicant submits that in any signal collection and processing system all elements of a configuration collectively affect operation of the system. As neither Yoshida nor Ouyang describe any configuration in which an angle is approximately in a range of 30 degrees to 180 degrees, an angle is approximately in a range of 60 degrees to 180 degrees, and an angle is approximately in a range of 90 degrees to 180 degrees, Applicant requests the examiner provide a reference that describes this configuration. Therefore, Applicant submits that claims 51-53 are patentable over Yoshida in view of Ouyang.

Claims 4, 6, and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida. Applicant respectfully traverses the rejection.

Regarding claim 1, and as described in detail above, Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the

mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

As claims 4, 6, and 9 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is not anticipated by Yoshida, Applicant submits that claims 4, 6, and 9 are not anticipated by Yoshida.

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Park et al., US patent number 5,590,241 (hereinafter "Park"). Applicant respectfully traverses the rejection.

Regarding amended claim 1, Applicant submits that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

Furthermore, Yoshida and Park, alone or in any combination, do not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

As claim 5 depends from amended claim 1 and includes further limitations thereon, and since amended claim 1 is not anticipated by Yoshida and/or Park, Applicant submits that claim 5 is not anticipated by Yoshida and/or Park.

Claims 10-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Housni, US patent number 6,795,713 (hereinafter "Housni"). Applicant respectfully traverses the rejection.

Regarding amended claim 1, and as described in detail above, Applicant submits that Yoshida does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

Furthermore, Yoshida and Housni, alone or in any combination, do not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

As claims 10-17 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is not anticipated by Yoshida and/or Housni, Applicant submits that claims 10-17 are not anticipated by Yoshida and/or Housni.

Claim 41 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Turnbull et al., US patent number 6,980,092 (hereinafter "Turnbull"). Applicant respectfully traverses the rejection.

Regarding claim 41, as amended herein, and as described in detail above with reference to claim 1, Applicant submits that Yoshida in view of Ouyang does not disclose a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added).

Additionally, Turnbull does not disclose a communications system, comprising a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added). Thus, Applicant submits that amended claim 41 is not anticipated by Yoshida, Ouyang and/or Turnbull.

Claims 44-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Ouyang and further in view of Oh et al., US Patent Number 5,353,376 ("Oh"). Applicant respectfully traverses the rejection.

Applicant submits that amended claim 1 is not anticipated by Yoshida in view of Ouyang, as described in detail above. Furthermore, none of Yoshida, Ouyang

and/or Oh, alone or in any combination, disclose a communications system, comprising a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of a user, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees (emphasis added). Therefore, amended claim 1 is not anticipated by Yoshida, Ouyang and/or Oh, alone and/or in any combination.

As claims 44-48 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is not anticipated by Yoshida, Ouyang and/or Oh, Applicant submits that claims 44-48 are not anticipated by Yoshida, Ouyang and/or Oh.

Conclusion

In view of the foregoing Amendments and Remarks, Applicant respectfully submits that the rejections under 35 U.S.C. §102 and §103 have been overcome, and their withdrawal is respectfully requested. Applicant submits that claims 1, 4-7, 9-17, 41, and 44-55 are in condition for allowance. The allowance of the claims is earnestly requested. If in the opinion of Examiner FAULK a telephone conference would expedite the prosecution of the subject application, or if there are any issues that remain to be resolved prior to allowance of the claims, Examiner FAULK is encouraged to email Rick Gregory at rick@gregorymartensen.com or call (408) 676-8080.

Respectfully submitted,
Gregory & Martensen, LLP

Date: February 17, 2011

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PTO/SB/22 (01-09)
Approved for use through 02/28/2009. OMB 0651-0031
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) ALPH.P020
Application Number 10/400,282	Filed March 27, 2003
For Microphone and Voice Activity Detection (VAD) Configurations for Use with Portable Communication Systems	
Art Unit 2614	Examiner Devona E. Faulk

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$130	$65	$_____
☐	Two months (37 CFR 1.17(a)(2))	$490	$245	$_____
☑	Three months (37 CFR 1.17(a)(3))	$1110	$555	$1110
☐	Four months (37 CFR 1.17(a)(4))	$1730	$865	$_____
☐	Five months (37 CFR 1.17(a)(5))	$2350	$1175	$_____

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☑ Payment by credit card.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 42,607

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Richard L. Gregory, Jr./ — Signature

February 17, 2011 — Date

Richard L. Gregory, Jr. — Typed or printed name

408-676-8080 — Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/400,282	03/27/2003	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	02/17/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 27	Minus	** 40	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***7	= 0	X $110 =	0	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	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/MARQUITA D. JONES/

This collection of information is required by 37 CFR 1.16. 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 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.**
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United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020

CONFIRMATION NO. 1397

98195
Gregory & Martensen LLP
2018 Bissonnet Street
Houston, TX 77005

POA ACCEPTANCE LETTER

OC000000046128991

Date Mailed: 02/25/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/16/2011.

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.

/sleutchit/

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020

CONFIRMATION NO. 1397

53186
COURTNEY STANIFORD & GREGORY LLP
PO Box 9807
San Jose, CA 95157

POWER OF ATTORNEY NOTICE

OC000000046128956

Date Mailed: 02/25/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/16/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sleutchit/

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020	1397

98195 7590 06/23/2011

Gregory & Martensen LLP
2018 Bissonnet Street
Houston, TX 77005

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2614	

NOTIFICATION DATE	DELIVERY MODE
06/23/2011	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):

rick@gregorymartensen.com
mike@gregorymartensen.com
vlad@gregorymartensen.com

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	DEVONA FAULK	2614	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *17 February 2011*.

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

3)☐ 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

4)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-7,9-17,41 and 44-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

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

Application Papers

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

10)☒ The drawing(s) filed on *7/25/07* 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/17/11 has been entered.

Response to Arguments

2. Applicant's arguments, regarding a first position oriented towards the mouth and the other position away from the mouth, filed 2/17/11, with respect to the rejection(s) of claim(s) 1, 4-7,9-17,41,44-55 -under 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Vaudrey et al.

3. Claims 2,3,8,18-40,42-43 are cancelled.

4. The examiner contacted the applicant's representative to see if prosecution could be expedited but no response was received from the applicant's representative.

5. The applicant's representative is welcome to contact the examiner to see if prosecution can be expedited.

Claim Rejections - 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1,4,6,7, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Vaudrey et al. (US 6,963,649).

Regarding claim 1, Yoshida discloses a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (Figure 4); and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of user, wherein the first position orients a front of the first microphone, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone such that the second position forms an angle relative to the first position (microphone 1 reads on first microphone and microphone 2 reads on second microphone, Figures 1 and 2; column 3, lines 10-18; the angle formed is implicit),

the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals

using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida teaches of two microphones being oriented in a position.

Yoshida fails to explicitly teaches wherein the first position orients a front of the first microphone towards the mouth, wherein the second position orients a front of the second microphone away from the mouth. Vaudrey teaches of a first position orients a front of the first microphone towards the mouth, wherein the second position orients a front of the second microphone away from the mouth (column 4, lines 27-35; column 10, claims 6 and 13). It would have been obvious to modify Yoshida so that one microphone is oriented towards the mouth and the other away from the mouth for the benefit of improved noise cancelation.

Yoshida as modified teaches of an angle. Yoshida as modified fails to disclose that the angle is greater than zero. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is greater than zero to provide improved noise cancelation.

All elements of claim 7 are comprehended by the rejection of claim 1.

Regarding claims 4 and 6, the examiner takes official notice that it was well known in the art at the time of the invention to use glottal electromagnetic sensors and skin microphones to generate voice signals. It would have been obvious to one of ordinary skill in the art to modify Yoshida to use such sensors in the place of the microphones for the purpose of improving the voice detection performance.

Regarding claim 9, the examiner asserts that per In re Venner the court held that providing an automatic means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. Therefore, the examiner asserts that the opposite is true as well that providing a manual means to replace an automatic means is not sufficient to overcome the prior art. It would have been obvious to modify Yoshida as modified so that the VAD is manually operated to give the user more control over when the VAD.

8. Claims 49-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Vaudrey et al. (US 6,963,649) in further view of Ouyang et al. (US 2003/0044025).

Regarding claims 49 and 54, Yoshida as modified does not disclose one omnidirectional microphone and one unidirectional microphone, the microphones separated by a distance. Ouyang et al teach a microphone system for a speakerphone comprising omnidirectional microphone 20 and unidirectional microphone 12 and noise suppression circuit 11 (denoising system). The system advantageously determines the source of noise and suppresses it using the unidirectional microphone as a reference. It

would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida as modified by substituting the microphone configuration of Ouyang et al, for the microphones 1 and 2 for the purpose of improving the performance of the noise cancellation system.

Regarding claims 50 and 55, Yoshida as modified discloses that the microphones are separated . Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 51-53, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately 0 to either of 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of meeting a design specification

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Vaudrey et al. (US 6,963,649) in further view of Park et al. (US 5,590,241).

Regarding claim 5, Yoshida as modified fails to disclose that the voice detection subsystem comprises an accelerometer sensor in contact with the skin of the user and a voice activity detector for processing the accelerometer sensor voice activity signals. Park discloses a speech processing system comprising accelerometer 34 and noise microphone 31. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Yoshida as modified to have an accelerometer coupled to the power monitoring circuit 300 (voice activity detector), for the purpose of generating voice activity signals directly from the source.

10. Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Vaudrey et al. (US 6,963,649) view of Housni (US 6,795,713).

Regarding claim 10, Yoshida as modified fails to disclose that the system includes a portable handset that includes the microphones. Yoshida as modified teaches of a two microphone system (Yoshida). Housni discloses a portable handset 1 which includes microphones 3 and 12 for wireless communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the circuitry of Yoshida as modified in a portable handset for the purpose of improving wireless speech communication.

Regarding claims 11 and 15, Yoshida as modified provides a voice detection subsystem and denoising subsystem in the anti-noise circuitry of the portable handset .

Regarding claim 12, the portable handset 1 of Housni includes a speaker 4.

Regarding claims 13 and 14, the portable handset of Housni inherently couples to another wireless phone via wireless couplings.

All elements of claims 16 and 17 are comprehended by the rejection of claim 12.

11. Claims 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Vaudrey et al. (US 6,963,649) in further view of Turnbull et al. (US 6,980,092).

Regarding claim 41, Yoshida discloses a communications system, comprising:

a voice detection subsystem receiving voice activity signals that include information of human voicing activity and automatically generating control signals using information of the voice activity signals (300, Figure 4; column 8, lines 14-20) ; and

a denoising subsystem coupled to the voice detection subsystem (20, Figure 4) , the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth of user, wherein the first position orients a front of the first microphone, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone such that the second position forms an angle relative to the first position (microphone 1 reads on first microphone and microphone 2 reads on second microphone, Figures 1 and 2; column 3, lines 10-18; the angle formed is implicit),

, the microphone array providing acoustic signals of an environment to components of the denoising system (microphones 1 and 2, Figure 4),

components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise (column 3, lines 22-26 and 39-45; column 7, line 65- column 8, line 25).

Yoshida teaches of two microphones being oriented in a position.

Yoshida fails to explicitly teaches wherein the first position orients a front of the first microphone towards the mouth, wherein the second position orients a front of the second microphone away from the mouth. Vaudrey teaches of a first position orients a front of the first microphone towards the mouth, wherein the second position orients a front of the second microphone away from the mouth (column 4, lines 27-35; column 10, claims 6 and 13). It would have been obvious to modify Yoshida so that one microphone is oriented towards the mouth and the other away from the mouth for the benefit of improved noise cancelation.

Yoshida as modified fails to disclose a portable headset that includes the microphones along with at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular phones, satellite telephones, portable telephones, wireline telephones, internet telephones,

wireless transceivers, wireless communication radio, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

Turnbull discloses a portable headset that couples to a cellular phone (column 28, lines 53-65). It would have been obvious to modify Yoshida as modified in order to allow for wireless transmission.

Yoshida as modified teaches of an angle. Yoshida as modified fails to disclose that the angle is greater than zero. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is greater than zero to provide improved noise cancelation.

12. Claims 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,473,702) in view of Vaudrey et al. (US 6,963,649) in further view of Oh et al. (US 5,353,376).

Regarding claim 44, Yoshida as modified fails to disclose that the microphones are unidirectional. Oh discloses a system for improved speech acquisition for a hands-free system in a noise environment comprising unidirectional microphones that are separated by a distance and having an angle between maximums of a spatial response curve of each microphone and that the two microphones are unidirectional (column 7, lines 14-25). It would have been obvious to modify Yoshida as modified by having the microphones be unidirectional for the purpose of improving the performance of the noise cancellation system (Oh; column 7, lines 22-25).

Regarding claim 45, Yoshida as modified discloses that the microphones are separated. Yoshida as modified fails to disclose that the separation distance is in a range of approximately 0 to 15 cm. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the separation distance is in the range of 0 to 15 cm in order to meet a certain design specification.

Regarding claims 46-48, Yoshida as modified discloses that a second vector forms an angle relative to a first vector (implicit). Yoshida as modified fails to disclose that the angle is in a range of approximately greater than 0 and one of equal to and less than 180,135 and 90 degrees. The examiner asserts that this is a matter of design choice. It would have been obvious to modify Yoshida as modified so that the angle is in a range as claimed for the benefit of improved noise cancelation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devona E. Faulk/
Primary Examiner, Art Unit 2614

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner DEVONA FAULK	Art Unit 2614	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	B	US-6,963,649	11-2005	Vaudrey et al.	381/94.7
*	C	US-5,353,376	10-1994	Oh et al.	704/233
*	D	US-5,590,241	12-1996	Park et al.	704/227
*	E	US-6,795,713	09-2004	Housni, Jamal	455/550.1
*	F	US-6,980,092	12-2005	Turnbull et al.	340/425.5
*	G	US-2003/0044025	03-2003	Ouyang et al.	381/92
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA FAULK	2614

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010	06/06/2011		
	1	✓	✓	✓	✓	✓	✓	✓		
	2	✓	✓	-	-	-	-	-		
	3	✓	✓	-	-	-	-	-		
	4	✓	✓	✓	✓	✓	✓	✓		
	5	✓	✓	✓	✓	✓	✓	✓		
	6	✓	✓	✓	✓	✓	✓	✓		
	7	✓	✓	✓	✓	✓	✓	✓		
	8	O	-	-	-	-	-	✓		
	9	O	✓	✓	✓	✓	✓	✓		
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	15	O	✓	✓	✓	✓	✓	✓		
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	22	✓	✓	-	-	-	-	-		
	23	✓	✓	-	-	-	-	-		
	24	O	-	-	-	-	-	-		
	25	O	✓	-	-	-	-	-		
	26	✓	✓	-	-	-	-	-		
	27	✓	✓	-	-	-	-	-		
	28	✓	✓	-	-	-	-	-		
	29	✓	✓	-	-	-	-	-		
	30	✓	✓	-	-	-	-	-		
	31	O	✓	-	-	-	-	-		
	32	✓	✓	-	-	-	-	-		
	33	✓	✓	-	-	-	-	-		
	34	✓	✓	-	-	-	-	-		
	35	✓	✓	-	-	-	-	-		
	36	✓	✓	-	-	-	-	-		

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	DEVONA FAULK	2614

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010	06/06/2011		
	37	✓	✓	-	-	-	-	-		
	38	O	-	-	-	-	-	-		
	39	O	✓	-	-	-	-	-		
	40		✓	-	-	-	-	-		
	41		✓	✓	✓	✓	✓	✓		
	42		✓	-	-	-	-	-		
	43		✓	-	-	-	-	-		
	44			✓	✓	✓	✓	✓		
	45			✓	✓	✓	✓	✓		
	46			✓	✓	✓	✓	✓		
	47			✓	✓	✓	✓	✓		
	48			✓	✓	✓	✓	✓		
	49			✓	✓	✓	✓	✓		
	50			✓	✓	✓	✓	✓		
	51			✓	✓	✓	✓	✓		
	52			✓	✓	✓	✓	✓		
	53			✓	✓	✓	✓	✓		
	54			✓	✓	✓	✓	✓		
	55			✓	✓	✓	✓	✓		

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

SEARCHED

Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF
381	71.6,94.1,94.7	7/29/08, 8/14/08	DEF
704	226,233	7/29/08,8/14/08	DEF
381	71.7,94.1,94.7,110,92	3/12/09	DEF
381	71.6,94.1,94.7,110,92,111	12/7/09	DEF
381	71.6,94.1,94.7,110,92,11	6/1,3,18/11	DEF
704	226,233	6/1,3,18/11	DEF

SEARCH NOTES

Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF
additonal search	7/29/08, 8/14/08	DEF
additional search	3/12/09	DEF
reviewed applicant's arguments/ applied same art to claims	8/13/10	DEF
additional search	6/1,3,18/11	DEF

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

	/DEVONA E FAULK/ Primary Examiner.Art Unit 2614

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L7	4351	(381/94.1-94.7,110,71.6,92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2011/06/18 20:31
L8	2244	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2011/06/18 20:31
S1	150	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S3	850	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S4	641	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:27
S5	6	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/15 15:28
S6	6	("5136577" | "5329587" | "5544080" | "5887059" | "6070137" | "6487295").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/15 15:33
S7	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S8	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S9	1	("5406622").PN.	USPAT	OR	OFF	2007/10/16 10:24

S10	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:38
S11	0	EP-1483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:37
S12	0	EP-2001483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S13	0	EP-483591-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S14	0	WO-20030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:38
S15	0	WO-030906031-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:39
S16	194	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress $3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 10:40
S17	33	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:04
S18	7	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (unidirectional)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40
S19	1	burnett.in. and microphone and ((voice near2 activity) same (manual $2 near2 activat$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:20
S20	1	"381"/$.ccls. and (manuall$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:40

S21	1	"381"/$.ccls. and (manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:41
S22	3	(manual$3 near2 (operat$3 activat$3)) same (voice near2 activity near2 detect $3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S23	10	(manual$3 near2 (operat$3 activat$3)) same (VAD)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:42
S24	2	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) same (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S25	7	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (headset earphon$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:44
S26	5	burnett.in. and microphone and ((voice near2 activity) same subsystem)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 15:54
S27	35	("20020039425" | "3789166" | "4006318" | "4591668" | "4653102" | "4777649" | "4901354" | "5097515" | "5212764" | "5400409" | "5406622" | "5414776" | "5473702" | "5515865" | "5517435" | "5539859" | "5590241" | "5633935" | "5649055" | "5664052" | "5684460" | "5729694" | "5754665" | "5835608" | "5853005" | "5917921" | "5966090" | "5986600" | "6006175" | "6009396" | "6069963" | "6191724" | "6233551" | "6266422" | "6430295"). PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/10/16 18:19
S28	1	(glottal near2 electromagnetic near2 sensor$1) with antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S29	6	burnett.in. and microphone and (voice near2 activity) and glottal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 15:59

S30	12	(glottal near2 electromagnetic near2 micropower near2 sensor$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/16 18:22
S31	1	burnett.in. and microphone and (voice near2 activity) and (transceiver same headset)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S32	1	burnett.in. and microphone and (voice near2 activity) and transceiver	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:02
S33	2	"381"/$.ccls. and (voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress$3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:17
S34	29	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress $3)) and (transceiver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S35	6	(voice near2 activity near2 detect$3) same (noise near2 (reduct$3 suppress $3)) and (transceiver) and (headset headphone$2)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:20
S36	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:22
S37	1	S36 and headset	US-PGPUB; USPAT	OR	OFF	2007/10/17 16:23
S38	0	headset same transceiver same (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:23
S39	0	(headset same transceiver) and (voice near2 activity near2 detect3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S40	5	(headset same transceiver) and (voice near2 activity near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:24
S41	35	(headset same transceiver) and (noise near2 (suppress$3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59

S42	1	(headset same transceiver) same (noise near2 (suppress$3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 16:25
S43	35	(headset same transceiver) and (noise near2 (suppress$3 reduct$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/17 18:59
S44	1602	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/18 14:18
S45	1	burnett.in. and microphone and (voice near2 activity) and (angle same maximums)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2007/10/25 09:51
S46	173	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S47	923	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S48	1468	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S49	1720	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S50	11	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S51	79	burnett.in. and microphone$1 and (voice)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 09:59
S52	12	burnett.in. and microphone$1 and (voice) and VAD	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:00

S53	6	burnett.in. and microphone$1 and (voice) and VAD and (correlat$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/07/29 10:33
S54	8	brennan.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:09
S55	0	burnett.in. and VAD and (filterbank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:11
S56	11	burnett.in. and microphone and array	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:12
S57	174	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S58	926	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S59	700	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S60	1729	(704/226,233).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:14
S61	0	S56 and vector near10 normal near10 mouth near10 user	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:42
S62	0	S56 and (vector near10 normal near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S63	0	S56 and (vector near10 (normal perpendicu$3) near10 mouth)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43

S64	3	S56 and (vector)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2008/08/14 10:43
S65	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
S66	4	S65 and $4direction$2	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:17
S67	1	S65 and uni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
S68	1	S65 and omni	US-PGPUB; USPAT	OR	OFF	2009/03/12 23:39
S69	192	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S70	990	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S71	769	(381/92).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/03/12 23:55
S72	20	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:36
S73	20	burnett.in. and microphone and (voice near2 (detect$3 activity))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:45
S74	17	burnett.in. and microphone and (voice near2 detect$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/23 15:45
S75	2	burnett.in. and microphone and (voice near2 activity) and ("15" near2 centimeters) and axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/30 16:06
S76	13	burnett.in. and microphone and (voice near2 (detect$3 activity)) and axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/11/30 16:07

S77	215	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
S78	1050	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
S79	1660	(381/92,111,122).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2009/12/07 09:14
S80	9	burnett.in. and (microphone near10 mouth) and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2010/08/13 14:25
S81	5	(("5473702") or ("5353376") or ("20030044025") or ("5590241") or ("6795713")).PN.	US-PGPUB; USPAT	OR	OFF	2010/08/13 15:05
S82	242	(381/71.6).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2010/08/13 15:46
S83	1128	(381/94.1,94.7,110).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2010/08/13 15:46
S93	27	burnett.in. and microphone and (voice near2 activity)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2011/06/01 11:02
S94	26	burnett.in. and microphone and (voice near2 activity) and $2nois$3 and frequency and speech	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2011/06/01 11:03
S95	19	burnett.in. and microphone and (voice near2 activity) and $2nois$3 and frequency and speech and angle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2011/06/01 11:04
S96	237	"L3" and (toward$1 direct$2 away) near5 mouth	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	OFF	2011/06/03 17:19

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1909	(704/226,233).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/18 19:42
L2	3533	(381/94.1-94.7,110,71.6,92,111,122).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/18 19:42
L3	11	L2 and ((microphone sensor) near5 toward$2 near5 mouth) and ((microphone sensor) near5 away near5 mouth)	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/18 19:43
L4	0	burnett.in. and microphone and (voice near2 activity) and denois$3 and (angle near5 (great$2 larg$2) near5 (zero "0"))	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/18 19:47
L5	2	burnett.in. and microphone and (voice near2 activity) and denois$3 and (angle near5 (zero "0"))	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/18 19:47
L6	0	L2 and ((microphone sensor) near5 toward$2 near5 mouth) and ((microphone sensor) near5 away near5 mouth) and (angle near5 (zero "0"))	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/18 19:52
S84	1851	(704/226,233).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:34
S85	3426	(381/94.1-94.7,110,71.6,92,111,122).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:34
S86	11	S85 and ((microphone sensor) near5 toward$2 near5 mouth) and ((microphone sensor) near5 away near5 mouth)	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:36
S87	2	S84 and ((microphone sensor) near5 toward$2 near5 mouth) and ((microphone sensor) near5 away near5 mouth)	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:36
S88	25	burnett.in. and microphone and (voice near2 activity) and denois$3	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:38
S89	8	petit.in. and microphone and (voice near2 activity) and denois$3	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:38

S90	4	asseily.in. and microphone and (voice near2 activity) and denois$3	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:38
S91	3	einaudi.in. and microphone and (voice near2 activity) and denois$3	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:39
S92	1	aliphcom.AS. and microphone and (voice near2 activity) and denois$3	US-PGPUB; USPAT; UPAD	OR	OFF	2011/03/17 14:39
S97	1897	(704/226,233).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:17
S98	3513	(381/94.1-94.7,110,71.6,92,111,122).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:17
S99	1	("5473702").PN.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:17
S100	141	"L3" and (toward$1 direct$2 away) near5 mouth	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:19
S101	0	S99 and (toward$1 direct$2 away) near5 mouth	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:20
S102	35	S97 and (toward$1 direct$2 away) near5 mouth	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:20
S103	94	S98 and (microphone sensor) near10 (toward$1 direct$2 away) near5 mouth	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:20
S104	24	S97 and (microphone sensor) near10 (toward$1 direct$2 away) near5 mouth	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:20
S105	15	S104 and subtract$3	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 17:28
S106	3513	(381/94.1-94.7,110,71.6,92,111,122).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 18:36

S107	0	S106 and (calculat$3 determin$3) near10 noise near10 (each every) near10 subband near10 (voice speech)	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 18:36
S108	1897	(704/226,233).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 18:36
S109	0	S108 and (calculat$3 determin$3) near10 noise near10 (each every) near10 subband near10 (voice speech)	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/03 18:36

6/18/2011 8:32:11 PM
C:\Documents and Settings\dfaulk\My Documents\EAST\Workspaces\10400282.wsp

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
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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: 15516

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: 15516

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

AliphCom, Inc.
410 Jessie Street, Unit 601
San Francisco, CA 94103

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		Date	11-21-2011
Name	Michael Edward Smith Luna	Telephone	(877) 254-7426
Title	Chief Technology Officer, AliphCom, Inc.		

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.**

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Gregory C. Burnett; Nicolas J. Petit; Alexander M. Asseily; Andrew E. Einaudi

Application No./Patent No.: 10/400,282 Filed/Issue Date: March 27, 2003

Titled: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

AliphCom, Inc. , a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

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 013928, Frame 0808, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. 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.

2. 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.

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☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(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.

/Scott S. Kokka/	November 30, 2011
Signature	Date
Scott S. Kokka	Attorney of Record
Printed or Typed Name	Title

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.**

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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:

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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).
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.

Electronic Acknowledgement Receipt

EFS ID:	11517026
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	98195
Filer:	Scott Susumu Kokka
Filer Authorized By:	
Attorney Docket Number:	ALPH.P020
Receipt Date:	30-NOV-2011
Filing Date:	27-MAR-2003
Time Stamp:	23:59:22
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		ALI-049_GPOA_and_Stmt_37CFR373b_asfiled.pdf	925881 d31e0abe1109677fe087fe01016ce862a593f4cd	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73(b).	2	3
Warnings:			
Information:			
	Total Files Size (in bytes):	925881	

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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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020

CONFIRMATION NO. 1397

15516
Kokka & Backus, PC
703 Hight Street
Palo Alto, CA 94301

POA ACCEPTANCE LETTER

OC000000051341599

Date Mailed: 12/13/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/30/2011.

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.

/atesfai/

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

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/400,282	03/27/2003	Gregory C. Burnett	ALPH.P020

CONFIRMATION NO. 1397

98195
Gregory & Sawrie LLP
2018 Bissonnet Street
Houston, TX 77005

POWER OF ATTORNEY NOTICE

OC000000051341584

Date Mailed: 12/13/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/30/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/atesfai/

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Burnett et al. Application Serial No.: 10/400,282 Filing Date: March 27, 2003 For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	Confirmation No.: 1397 Examiner: FAULK, Devona E. Group Art Unit: 2614 Date: December 21, 2011 Atty. Docket No.: ALI-049

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being deposited via EFS-Web with the United States Patent and Trademark Office on December 21, 2011.
Signed: K Cleland
Kate M. Cleland

AMENDMENT G

Dear Sir or Madam:

Please find enclosed a complete, updated claim listing and remarks in response to the Office Action mailed June 23, 2011.

REMARKS

Claims 1, 5, 6 and 41 have been amended to clarify the subject matter regarded as the invention. Claims 2-3, 7-8, 18-40 and 42-43 have been canceled. Claims 1, 4-6, 9-17, 41 and 44-55 remain pending.

The Examiner has rejected claims 1, 4, 6, 7 and 9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,473,702 to Yoshida et al. (hereinafter "Yoshida") in view of U.S. Patent No. 6,963,649 to Vaudrey et al. (hereinafter "Vaudrey"). Claims 49-55 were rejected under 35 U.S.C. §103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent Publication No. 2003/0044025 to Ouyang et al. (hereinafter "Ouyang"). Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 5,590,241 to Park et al. (hereinafter "Park"). Claims 10-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 6,795,713 to Housni (hereinafter "Housni"). Claim 41 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 6,980,092 to Turnbull et al. (hereinafter "Turnbull"). Claims 44-48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 5,353,376 to Oh et al. (hereinafter "Oh").

The rejections are respectfully traversed. As amended, claim 1 recites "… wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array." Neither Yoshida, Vaudrey,

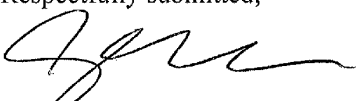
Ouyang, Park, Housni, Turnbull nor Oh describe, disclose, teach, suggest, or motivate "... wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array." Thus, Applicants submit that claim 1 is allowable for the reasons stated above.

Claims 4-6 and 9-17 depend from claim 1 and are believed to be allowable for the same reasons described above.

Claim 41 has been amended similarly and is believed to be allowable for the same reasons as described above. Claims 44-55 depend from claim 1 and also are believed to be allowable for the same reasons described above.

Reconsideration of the application and allowance of all claims are respectfully requested based on the preceding remarks. If at any time the Examiner believes that an interview would be helpful, please contact the undersigned.

Respectfully submitted,



Chien-Ju Alice Chuang
Reg. No. 65,914

KOKKA & BACKUS, PC
703 High Street
Palo Alto, CA 94301-2447
Tel: (650) 585-2359
Fax: (650) 566-9922

Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Chien-Ju Alice Chuang/Kate Cleland
Attorney Docket Number:	ALI-049

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 3 months with $0 paid	1253	1	1270	1270

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**1270**

Electronic Acknowledgement Receipt	
EFS ID:	11684016
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	15516
Filer:	Chien-Ju Alice Chuang
Filer Authorized By:	
Attorney Docket Number:	ALI-049
Receipt Date:	21-DEC-2011
Filing Date:	27-MAR-2003
Time Stamp:	21:51:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1270
RAM confirmation Number	9715
Deposit Account	
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Amendment/Req. Reconsideration-After Non-Final Reject	ALI-049_Amendment_G_asfiled.pdf	1858324 b2929dc9e248928a19c1295309c10796291ac729	no	10
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30320 137d6eb601d49e85fe3a10c1c2309e4edd167f74	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1888644		

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

In re the Application of: Burnett et al. Application Serial No.: 10/400,282 Filing Date: March 27, 2003 For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	Confirmation No.: 1397 Examiner: FAULK, Devona E. Group Art Unit: 2614 Date: December 21, 2011 Atty. Docket No.: ALI-049

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being deposited via EFS-Web with the United States Patent and Trademark Office on December 21, 2011.
Signed: K Cleland
Kate M. Cleland

AMENDMENT G

Dear Sir or Madam:

Please find enclosed a complete, updated claim listing and remarks in response to the Office Action mailed June 23, 2011.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/400,282	03/27/2003	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☒ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	0		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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	0		TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 12/21/2011

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 11	Minus	** 40	= 0	X $30 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 1	Minus	***7	= 0	X $125 =	0	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	0	OR	TOTAL ADD'L FEE	

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/GLORIA TRAMMELL/

This collection of information is required by 37 CFR 1.16. 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 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.

CLAIM LISTING

Please cancel claim 7, and amend claims 1, 5, 6 and 41, as indicated below.

1. (Currently amended) A communications system, comprising:

a voice detection subsystem ~~receiving~~configured to receive voice activity signals that includes information [[of]]associated with human voicing activity, the voice detection subsystem configured to ~~and~~ automatically ~~generating~~generate control signals using ~~information of~~ the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth ~~of a user~~, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise,

wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals

generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array.

2. – 3. (Canceled)

4. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Currently amended) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin ~~of a user~~ for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Currently amended) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin ~~of a user~~ for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. – 8. (Canceled)

9. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Previously presented) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Previously presented) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Previously presented) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Previously presented) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Previously presented) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Previously presented) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Previously presented) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Previously presented) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

18. – 40. (Canceled)

41. (Currently amended) A communications system, comprising:

a voice detection subsystem ~~receiving~~configured to receive voice activity signals that include information [[of]]associated with human voicing activity, the voice detection subsystem configured to ~~and~~ automatically ~~generating~~generate control signals using ~~information of~~ the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth ~~of a user~~, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise,

wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array; and

a portable headset comprising the plurality of microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

42. – 43. (Canceled)

44. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (Previously presented) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and less than 180 degrees.

47. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and less than 135 degrees.

48. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and greater than 90 degrees.

49. (Previously presented) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (Previously presented) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (Previously presented) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES 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.
10/400,282	03/27/2003	Gregory C. Burnett	ALI-049	1397

15516 7590 03/20/2012

Kokka & Backus, PC
703 Hight Street
Palo Alto, CA 94301

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2614	
MAIL DATE	DELIVERY MODE
03/20/2012	PAPER

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 Non-Compliant Amendment (37 CFR 1.121)	Application No. 10/400,282	Applicant(s) BURNETT ET AL.
	Examiner DEVONA FAULK	Art Unit 2614

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

The amendment document filed on *12/21/11* is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121 or 1.4. In order for the amendment document to be compliant, correction of the following item(s) is required.

THE FOLLOWING MARKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- ☐ 1. Amendments to the specification:
  - ☐ A. Amended paragraph(s) do not include markings.
  - ☐ B. New paragraph(s) should not be underlined.
  - ☐ C. Other _____.
- ☐ 2. Abstract:
  - ☐ A. Not presented on a separate sheet. 37 CFR 1.72.
  - ☐ B. Other _____.
- ☐ 3. Amendments to the drawings:
  - ☐ A. The drawings are not properly identified in the top margin as "Replacement Sheet," "New Sheet," or "Annotated Sheet" as required by 37 CFR 1.121(d).
  - ☐ B. The practice of submitting proposed drawing correction has been eliminated. Replacement drawings showing amended figures, without markings, in compliance with 37 CFR 1.84 are required.
  - ☐ C. Other _____.
- ☒ 4. Amendments to the claims:
  - ☒ A. A complete listing of all of the claims is not present.
  - ☒ B. The listing of claims does not include the text of all pending claims (including withdrawn claims)
  - ☒ C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified. Note: the status of every claim must be indicated after its claim number by using one of the following status identifiers: (Original), (Currently amended), (Canceled), (Previously presented), (New), (Not entered), (Withdrawn) and (Withdrawn-currently amended).
  - ☐ D. The claims of this amendment paper have not been presented in ascending numerical order.
  - ☒ E. Other: *Claims 41-55 are not presented. The examiner is not clear as to the status of those claims*.
- ☐ 5. Other (e.g., the amendment is unsigned or not signed in accordance with 37 CFR 1.4):

  _____

For further explanation of the amendment format required by 37 CFR 1.121, see MPEP § 714.

TIME PERIODS FOR FILING A REPLY TO THIS NOTICE:

1. Applicant is given **no new time period** if the non-compliant amendment is an after-final amendment or an amendment filed after allowance. If applicant wishes to resubmit the non-compliant after-final amendment with corrections, the **entire corrected amendment** must be resubmitted.

2. Applicant is given **one month**, or thirty (30) days, whichever is longer, from the mail date of this notice to supply the correction, if the non-compliant amendment is one of the following: a preliminary amendment, a non-final amendment (including a submission for a request for continued examination (RCE) under 37 CFR 1.114), a supplemental amendment filed within a suspension period under 37 CFR 1.103(a) or (c), and an amendment filed in response to a *Quayle* action. If any of above boxes 1. to 4. are checked, the correction required is only the **corrected section** of the non-compliant amendment in compliance with 37 CFR 1.121.

   Extensions of time are available under 37 CFR 1.136(a) only if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action.

   Failure to timely respond to this notice will result in:
   Abandonment of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action; or
   Non-entry of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

/Devona E. Faulk/ Primary Examiner, Art Unit 2614	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application for:	Confirmation No.: 1397
Burnett et al.	Examiner: FAULK, Devona E.
Serial No.: 10/400,282	Group Art Unit: 2614
Filing Date: March 27, 2003	Transmission Date: April 20, 2012
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	

Certificate of Transmission
I hereby certify that this correspondence is being transmitted via the U.S. Patent and Trademark electronic filing system (EFS-Web) to the USPTO on **April 20, 2012**.

Signed: K. Cleland
Kate M. Cleland

RESPONSE TO NOTICE OF NON-COMPLIANT AMENDMENT

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

Dear Sir or Madam:

In Response to the *Notice of Non-Compliant Amendment*, mailed March 20, 2012, Applicant respectfully submits that the *Notice of Non-Compliant Amendment* was erroneously issued because a complete *Amendment G* was filed on December 21, 2011 ("*Amendment G*") via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) with EFS-ID 11684016, including a complete listing of claims, the text of all pending claims, and the proper status identifier for each claim, in compliance with 37 CFR § 1.121. More specifically, claims 41-55 were presented on pages 6 to 8 of *Amendment G*. A complete copy of *Amendment G* is available on the USPTO Patent Application Information Retrieval (PAIR) system online, with a posted "Mail Room Date" of December 21, 2011. A copy of *Amendment G* also is re-submitted herewith. A copy of the *Notice* is also submitted herewith.

Please contact the undersigned representative below if you have any further questions or require any additional information.

Respectfully submitted,



Chien-Ju Alice Chuang
Reg. No. 65,914

KOKKA & BACKUS, PC
703 High Street
Palo Alto, CA 94301
Telephone: (650) 585-2359
Facsimile: (650) 566-9922

Electronic Acknowledgement Receipt	
EFS ID:	11684016
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	15516
Filer:	Chien-Ju Alice Chuang
Filer Authorized By:	
Attorney Docket Number:	ALI-049
Receipt Date:	21-DEC-2011
Filing Date:	27-MAR-2003
Time Stamp:	21:51:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1270
RAM confirmation Number	9715
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Amendment/Req. Reconsideration-After Non-Final Reject	ALI-049_Amendment_G_asfiled.pdf	1858324 b2929dc9e248928a19c1295309c10796291ac729	no	10
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30320 137d6eb601d49e85fe3a10c1c2309e4edd167f74	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1888644		

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

In re the Application of: Burnett et al.	Confirmation No.: 1397
Application Serial No.: 10/400,282	Examiner: FAULK, Devona E.
Filing Date: March 27, 2003	Group Art Unit: 2614
For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	Date: December 21, 2011 Atty. Docket No.: ALI-049

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being deposited via EFS-Web with the United States Patent and Trademark Office on December 21, 2011.
Signed: _____
Kate M. Cleland

AMENDMENT G

Dear Sir or Madam:

Please find enclosed a complete, updated claim listing and remarks in response to the Office Action mailed June 23, 2011.

CLAIM LISTING

Please cancel claim 7, and amend claims 1, 5, 6 and 41, as indicated below.

1. (Currently amended) A communications system, comprising:

a voice detection subsystem ~~receiving~~configured to receive voice activity signals that includes information [[of]]associated with human voicing activity, the voice detection subsystem configured to ~~and~~ automatically ~~generating~~generate control signals using ~~information of~~ the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth ~~of a user~~, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise,

wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals

generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array.

2. – 3. (Canceled)

4. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Currently amended) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin ~~of a user~~ for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Currently amended) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin ~~of a user~~ for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. – 8. (Canceled)

9. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Previously presented) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Previously presented) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Previously presented) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Previously presented) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Previously presented) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Previously presented) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Previously presented) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Previously presented) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

18. – 40. (Canceled)

41. (Currently amended) A communications system, comprising:

a voice detection subsystem ~~receiving~~configured to receive voice activity signals that include information [[of]]associated with human voicing activity, the voice detection subsystem configured to ~~and~~ automatically ~~generating~~generate control signals using ~~information of~~ the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth ~~of a user~~, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise,

wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array; and

a portable headset comprising the plurality of microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

42. – 43. (Canceled)

44. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (Previously presented) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and less than 180 degrees.

47. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and less than 135 degrees.

48. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and greater than 90 degrees.

49. (Previously presented) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (Previously presented) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (Previously presented) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

REMARKS

Claims 1, 5, 6 and 41 have been amended to clarify the subject matter regarded as the invention. Claims 2-3, 7-8, 18-40 and 42-43 have been canceled. Claims 1, 4-6, 9-17, 41 and 44-55 remain pending.

The Examiner has rejected claims 1, 4, 6, 7 and 9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,473,702 to Yoshida et al. (hereinafter "Yoshida") in view of U.S. Patent No. 6,963,649 to Vaudrey et al. (hereinafter "Vaudrey"). Claims 49-55 were rejected under 35 U.S.C. §103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent Publication No. 2003/0044025 to Ouyang et al. (hereinafter "Ouyang"). Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 5,590,241 to Park et al. (hereinafter "Park"). Claims 10-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 6,795,713 to Housni (hereinafter "Housni"). Claim 41 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 6,980,092 to Turnbull et al. (hereinafter "Turnbull"). Claims 44-48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida in view of Vaudrey in further view of U.S. Patent No. 5,353,376 to Oh et al. (hereinafter "Oh").

The rejections are respectfully traversed. As amended, claim 1 recites "... wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array." Neither Yoshida, Vaudrey,

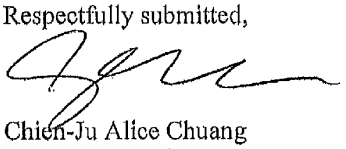
Ouyang, Park, Housni, Turnbull nor Oh describe, disclose, teach, suggest, or motivate "... wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array." Thus, Applicants submit that claim 1 is allowable for the reasons stated above.

Claims 4-6 and 9-17 depend from claim 1 and are believed to be allowable for the same reasons described above.

Claim 41 has been amended similarly and is believed to be allowable for the same reasons as described above. Claims 44-55 depend from claim 1 and also are believed to be allowable for the same reasons described above.

Reconsideration of the application and allowance of all claims are respectfully requested based on the preceding remarks. If at any time the Examiner believes that an interview would be helpful, please contact the undersigned.

Respectfully submitted,



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALI-049	1397

15516 7590 03/20/2012

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Palo Alto, CA 94301

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2614	
MAIL DATE	DELIVERY MODE
03/20/2012	PAPER

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 Non-Compliant Amendment (37 CFR 1.121)	Application No. 10/400,282	Applicant(s) BURNETT ET AL.
	Examiner DEVONA FAULK	Art Unit 2614

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

The amendment document filed on *12/21/11* is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121 or 1.4. In order for the amendment document to be compliant, correction of the following item(s) is required.

THE FOLLOWING MARKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- ☐ 1. Amendments to the specification:
  - ☐ A. Amended paragraph(s) do not include markings.
  - ☐ B. New paragraph(s) should not be underlined.
  - ☐ C. Other _____.
- ☐ 2. Abstract:
  - ☐ A. Not presented on a separate sheet. 37 CFR 1.72.
  - ☐ B. Other _____.
- ☐ 3. Amendments to the drawings:
  - ☐ A. The drawings are not properly identified in the top margin as "Replacement Sheet," "New Sheet," or "Annotated Sheet" as required by 37 CFR 1.121(d).
  - ☐ B. The practice of submitting proposed drawing correction has been eliminated. Replacement drawings showing amended figures, without markings, in compliance with 37 CFR 1.84 are required.
  - ☐ C. Other _____.
- ☒ 4. Amendments to the claims:
  - ☒ A. A complete listing of all of the claims is not present.
  - ☒ B. The listing of claims does not include the text of all pending claims (including withdrawn claims)
  - ☒ C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified. Note: the status of every claim must be indicated after its claim number by using one of the following status identifiers: (Original), (Currently amended), (Canceled), (Previously presented), (New), (Not entered), (Withdrawn) and (Withdrawn-currently amended).
  - ☐ D. The claims of this amendment paper have not been presented in ascending numerical order.
  - ☒ E. Other: *Claims 41-55 are not presented. The examiner is not clear as to the status of those claims*.
- ☐ 5. Other (e.g., the amendment is unsigned or not signed in accordance with 37 CFR 1.4):

For further explanation of the amendment format required by 37 CFR 1.121, see MPEP § 714.

TIME PERIODS FOR FILING A REPLY TO THIS NOTICE:

1. Applicant is given **no new time period** if the non-compliant amendment is an after-final amendment or an amendment filed after allowance. If applicant wishes to resubmit the non-compliant after-final amendment with corrections, the **entire corrected amendment** must be resubmitted.

2. Applicant is given **one month**, or thirty (30) days, whichever is longer, from the mail date of this notice to supply the correction, if the non-compliant amendment is one of the following: a preliminary amendment, a non-final amendment (including a submission for a request for continued examination (RCE) under 37 CFR 1.114), a supplemental amendment filed within a suspension period under 37 CFR 1.103(a) or (c), and an amendment filed in response to a *Quayle* action. If any of above boxes 1. to 4. are checked, the correction required is only the **corrected section** of the non-compliant amendment in compliance with 37 CFR 1.121.

   Extensions of time are available under 37 CFR 1.136(a) only if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action.

   Failure to timely respond to this notice will result in:
   Abandonment of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action; or
   Non-entry of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

/Devona E. Faulk/ Primary Examiner, Art Unit 2614	

Electronic Acknowledgement Receipt

EFS ID:	12593656
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	15516
Filer:	Chien-Ju Alice Chuang
Filer Authorized By:	
Attorney Docket Number:	ALI-049
Receipt Date:	20-APR-2012
Filing Date:	27-MAR-2003
Time Stamp:	19:03:26
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	Transmittal Letter	ALI-049_Response_to_Notice_asfiled.pdf	1962791 c3f25484c995769c60aa213ba9d277069f1b93d9	no	16

Warnings:	
Information:	

Total Files Size (in bytes):	1962791

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.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 10/400,282	Filing Date 03/27/2003	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	**04/20/2012**	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 13	Minus	** 40	= 0	X $30 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 1	Minus	***7	= 0	X $125 =	0	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	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CHERYL CLARK/

This collection of information is required by 37 CFR 1.16. 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 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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALI-049	1397

15516 7590 08/14/2012

Kokka & Backus, PC
703 High Street
Palo Alto, CA 94301

EXAMINER	
FAULK, DEVONA E	
ART UNIT	PAPER NUMBER
2614	
MAIL DATE	DELIVERY MODE
08/14/2012	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	DEVONA FAULK	2614	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *21 December 2011*.

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) *1,4-7,9-17,41 and 44-55* 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) *1,4-7,9-17,41 and 44-55* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

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

Application Papers

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

11)☒ The drawing(s) filed on *7/25/07* 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).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

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

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, regarding the newly recite claim language, filed 12/21/11, with respect to the rejection(s) of claim(s) , 1,4-7,9-17,41 and 44-55 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

2. The examiner has determined that a double patent rejection is warranted. Claims 2,3,8,18-40,42-43 are cancelled.

3. The applicant's representative is welcome to contact the examiner to see if prosecution can be expedited.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/301237. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are similar in scope. .

6. Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1,22-24 of copending Application No. 12/163647. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are similar in scope.

7. Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1,12,28 and 34 of copending Application No. 12/123364. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are similar in scope.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

10/400282	10/301237	12/163647	121/123364
!. (Currently amended) A communications system, comprising: a voice detection subsystem configured to receive voice activity signals that includes information associated with human voicing activity, the voice detection subsystem configured to automatically generate control signals using ~~information~~ of the voice activity signals; and a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is :fixed at a first position relative	1. A method for removing noise from electronic signals, comprising: receiving a plurality of acoustic signals in a first receiving device; receiving a plurality of acoustic signals in a second receiving device, wherein the plurality of acoustic signals include at least one noise signal generated by at least one noise source and at least one voice signal generated by at least one signal source, wherein the at least one signal source comprises a human speaker, and wherein relative locations of the signal source, the first receiving device, and the second receiving device are fixed and known; receiving physiological information associated with human voicing activity of the	1. A device comprising: a headset including a housing; a loudspeaker connected to the housing; a first **microphone** connected to a first side of the housing; a second **microphone** connected to a second side of the housing; and a vent cavity in an interior region of the housing, the vent cavity forming a common rear port of the first **microphone** and the second **microphone** and having a volume that is small relative to a wavelength of acoustic signals received by the first and second microphones. 22. The device of claim 1, comprising a processing component coupled to the first **microphone** and	1. A device comprising: a boom having two receptacles that define an axis; a first **microphone** connected to the boom, the first **microphone** having a first vector normal to a front of the first **microphone,** the first vector approximately parallel with the axis; and a second **microphone** connected to the boom and positioned a first distance from the first **microphone,** the second **microphone** having a second vector normal to a front of the second **microphone,** wherein the second vector forms an angle relative to the first vector. 12. A device comprising: a headset including at least one loudspeaker,

to a mouth, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position [brms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals	human speaker, including whether voice activity is present; generating at least one first transfer function representative of the plurality of acoustic noise signals upon determining that voicing activity is absent from the plurality of acoustic signals for at least one specified period; generating at least one second transfer function representative of the plurality of acoustic signals upon determining that voicing information is present in the plurality of acoustic signals for the at least one specified period of time; and removing noise from the plurality of acoustic signals using at least one combination of the at least one first transfer function and the at least one second transfer function to produce at least one denoised data stream.	the second **microphone**. 23. The device of claim 22, comprising a **voice activity** detector (VAD) coupled to the processing component, the VAD generating **voice activity** signals. 24. The device of claim 22, comprising an adaptive noise removal application coupled to the processing component, the adaptive noise removal application receiving signals from the first and second microphones and generating the output signals.	wherein the headset attaches to a region of a human head; and a **microphone** array connected to the headset, the **microphone** array including a first **microphone** and a second **microphone,** the first **microphone** having a first vector normal to a front of the first **microphone,** the first vector defining an axis, and the second **microphone** positioned a first distance from the first **microphone,** the second **microphone** having a second vector normal to a front of the second **microphone,** wherein the second vector forms an angle relative to the first vector. 28. A device comprising: a first **microphone** having a first vector normal to a front of the first **microphone,** the first vector approximately parallel with an axis oriented in a

using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise~ wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system~ the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array.			direction toward a mouth of a speaker, wherein the first **microphone** is positioned a first distance from the mouth; and a second **microphone** positioned a second distance from the first **microphone**, the second **microphone** having a second vector normal to a front of the second **microphone**, wherein the second vector forms an angle relative to the first vector, wherein the angle is in a range of approximately zero (0) degrees to 45 degrees. 34. A system comprising: a first **microphone** having a first vector normal to a front of the first **microphone**, the first vector approximately parallel with an axis oriented in a direction toward a mouth of a speaker, wherein the first **microphone** is positioned a first distance from the

			mouth; a second **microphone** positioned a second distance from the first **microphone**, the second **microphone** having a second vector normal to a front of the second **microphone**, wherein the second vector forms an angle relative to the first vector, wherein the angle is in a range of approximately zero (0) degrees to 45 degrees; and an adaptive noise removal application receiving acoustic signals from the first **microphone** and the second **microphone** and generating an output signal, wherein the output signal is a denoised acoustic signal

Allowable Subject Matter

8. The remaining claims would be allowable once the double patent rejection is addressed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devona E. Faulk/
Primary Examiner, Art Unit 2614

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner DEVONA FAULK	Art Unit 2614	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	B	US-6,963,649	11-2005	Vaudrey et al.	381/94.7
*	C	US-5,353,376	10-1994	Oh et al.	704/233
*	D	US-5,590,241	12-1996	Park et al.	704/227
*	E	US-6,795,713	09-2004	Housni, Jamal	455/550.1
*	F	US-6,980,092	12-2005	Turnbull et al.	340/425.5
*	G	US-2003/0044025	03-2003	Ouyang et al.	381/92
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA FAULK	2614

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010	06/06/2011	03/15/2012	
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	3	✓	✓	-	-	-	-	-	-	
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	7	✓	✓	✓	✓	✓	✓	-	-	
	8	O	-	-	-	-	-	-	-	
	9	O	✓	✓	✓	✓	✓	✓	✓	
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	13	✓	✓	✓	✓	✓	✓	✓	✓	
	14	✓	✓	✓	✓	✓	✓	✓	✓	
	15	O	✓	✓	✓	✓	✓	✓	✓	
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	33	✓	✓	-	-	-	-	-	✓	
	34	✓	✓	-	-	-	-	-	✓	
	35	✓	✓	-	-	-	-	-	✓	
	36	✓	✓	-	-	-	-	-	✓	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA FAULK	2614

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010	06/06/2011	03/15/2012	
	37	✓	✓	-	-	-	-	-	✓	
	38	O	-	-	-	-	-	-	✓	
	39	O	✓	-	-	-	-	-	✓	
	40		✓	-	-	-	-	-	✓	
	41		✓	✓	✓	✓	✓	✓	✓	
	42		✓	-	-	-	-	-	✓	
	43		✓	-	-	-	-	-	✓	
	44			✓	✓	✓	✓	✓	✓	
	45			✓	✓	✓	✓	✓	✓	
	46			✓	✓	✓	✓	✓	✓	
	47			✓	✓	✓	✓	✓	✓	
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	49			✓	✓	✓	✓	✓	✓	
	50			✓	✓	✓	✓	✓	✓	
	51			✓	✓	✓	✓	✓	✓	
	52			✓	✓	✓	✓	✓	✓	
	53			✓	✓	✓	✓	✓	✓	
	54			✓	✓	✓	✓	✓	✓	
	55			✓	✓	✓	✓	✓	✓	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	(10/301237).APP.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/15 20:18

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	3918	(381/94.1-94.7,110,71.6,92,111,122).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2012/03/15 20:32
L4	2067	(704/226,233).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2012/03/15 20:32

3/15/2012 8:34:25 PM
C:\Users\dfaulk\Documents\EAST\Workspaces\10400282.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

SEARCHED			
Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF
381	71.6,94.1,94.7	7/29/08, 8/14/08	DEF
704	226,233	7/29/08,8/14/08	DEF
381	71.7,94.1,94.7,110,92	3/12/09	DEF
381	71.6,94.1,94.7,110,92,111	12/7/09	DEF
381	71.6,94.1,94.7,110,92,11	6/1,3,18/11	DEF
704	226,233	6/1,3,18/11	DEF
381	71.6,94.1,94.7,110,92,111	3/15/12	DEF
704	226,233	3/15/12	DEF

SEARCH NOTES		
Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF
additonal search	7/29/08, 8/14/08	DEF
additional search	3/12/09	DEF
reviewed applicant's arguments/ applied same art to claims	8/13/10	DEF
additional search	6/1,3,18/11	DEF
additional search	3/6,15/12	DEF

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

	/DEVONA E FAULK/ Primary Examiner.Art Unit 2614

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:
Burnett et al.

Application Serial No.: 10/400,282

Filing Date: March 27, 2003

For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

Examiner: FAULK, Devona E.

Group Art Unit: 2614

Confirmation No.: 1397

Date: January 14, 2013

Atty. Docket No.: ALI-049

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being transmitted via the U.S. Patent and Trademark Office electronic filing system (EFS-Web) to the USPTO on January 14, 2013.

Signed: _____
Amiee H. Shin

AMENDMENT H

Dear Sir or Madam:

Please find enclosed a complete, updated claim listing and remarks in response to the Office Action mailed August 14, 2012.

CLAIM LISTING

1. (Previously presented) A communications system, comprising:

a voice detection subsystem configured to receive voice activity signals that includes information associated with human voicing activity, the voice detection subsystem configured to automatically generate control signals using the voice activity signals; and

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise,

wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array.

2. – 3. (Canceled)

4. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one glottal electromagnetic micropower sensor (GEMS) including at least one antenna for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the GEMS voice activity signals and generating the control signals.

5. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one accelerometer sensor in contact with skin for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the accelerometer sensor voice activity signals and generating the control signals.

6. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises:

at least one skin-surface microphone sensor in contact with skin for receiving the voice activity signals; and

at least one voice activity detector (VAD) algorithm for processing the skin-surface microphone sensor voice activity signals and generating the control signals.

7. – 8. (Canceled)

9. (Previously presented) The system of claim 1, wherein the voice detection subsystem further comprises at least one manually activated voice activity detector (VAD) for generating the voice activity signals.

10. (Previously presented) The system of claim 1, further including a portable handset that includes the microphones, wherein the portable handset includes at least one of cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

11. (Previously presented) The system of claim 10, wherein the portable handset includes at least one of the voice detection subsystem and the denoising subsystem.

12. (Previously presented) The system of claim 1, further including a portable headset that includes the microphones along with at least one speaker device.

13. (Previously presented) The system of claim 12, wherein the portable headset couples to at least one communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

14. (Previously presented) The system of claim 13, wherein the portable headset couples to the communication device using at least one of wireless couplings, wired couplings, and combination wireless and wired couplings.

15. (Previously presented) The system of claim 13, wherein the communication device includes at least one of the voice detection subsystem and the denoising subsystem.

16. (Previously presented) The system of claim 12, wherein the portable headset includes at least one of the voice detection subsystem and the denoising subsystem.

17. (Previously presented) The system of claim 12, wherein the portable headset is a portable communication device selected from among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), and personal computers (PCs).

18. – 40. (Canceled)

41. (Previously presented) A communications system, comprising:

a voice detection subsystem configured to receive voice activity signals that include information associated with human voicing activity, the voice detection subsystem configured to automatically generate control signals using the voice activity signals;

a denoising subsystem coupled to the voice detection subsystem, the denoising subsystem comprising a microphone array including a plurality of microphones, wherein a first microphone of the array is fixed at a first position relative to a mouth, wherein the first position orients a front of the first microphone towards the mouth, wherein a second microphone of the array is fixed at a second position relative to the mouth, wherein the second position orients a front of the second microphone away from the mouth such that the second position forms an angle relative to the first position, wherein the angle is greater than zero degrees, the microphone array providing acoustic signals of an environment to components of the denoising subsystem, components of the denoising subsystem automatically selecting at least one denoising method appropriate to data of at least one frequency subband of the acoustic signals using the control signals and processing the acoustic signals using the selected denoising method to generate denoised acoustic signals, wherein the denoising method includes generating a noise waveform estimate associated with noise of the acoustic signals and subtracting the noise waveform estimate from the acoustic signal when the acoustic signal includes speech and noise,

wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array; and

a portable headset comprising the plurality of microphones and at least one speaker device, wherein the portable headset couples to at least one communication device selected from

among cellular telephones, satellite telephones, portable telephones, wireline telephones, Internet telephones, wireless transceivers, wireless communication radios, personal digital assistants (PDAs), personal computers (PCs), and at least one of the voice detection subsystem and the denoising subsystem.

42. – 43. (Canceled)

44. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is a unidirectional microphone.

45. (Previously presented) The system of claim 44, wherein the first microphone and the second microphone are separated by a distance in a range of approximately zero (0) centimeters to 15 centimeters.

46. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and less than 180 degrees.

47. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and less than 135 degrees.

48. (Previously presented) The system of claim 44, wherein the angle is in a range of approximately greater than zero (0) degrees and one of equal to and greater than 90 degrees.

49. (Previously presented) The system of claim 1, wherein the first microphone is an omnidirectional microphone and the second microphone is a unidirectional microphone.

50. (Previously presented) The system of claim 49, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

51. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 30 degrees to 180 degrees.

52. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 60 degrees to 180 degrees.

53. (Previously presented) The system of claim 49, wherein the angle is approximately in a range of 90 degrees to 180 degrees.

54. (Previously presented) The system of claim 1, wherein the first microphone is a unidirectional microphone and the second microphone is an omnidirectional microphone.

55. (Previously presented) The system of claim 54, wherein the first microphone and the second microphone are separated by a distance approximately in a range of zero (0) centimeters to 15 centimeters.

REMARKS

Claims 1, 4-6, 9-17, 41 and 44-55 remain pending.

Provisional Non-Statutory Double Patenting Rejection

The Examiner has provisionally rejected claim 1 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending U.S. Patent Application No. 10/301,237, claims 1 and 22-24 of copending U.S. Patent Application No. 12/163,647, and claims 1, 12, 28 and 34 of copending U.S. Patent Application No. 12/123,364. Applicant is filing concurrently herewith a terminal disclaimer, in compliance with 37 C.F.R. § 1.321(c), disclaiming the terminal part of the statutory term of any patent granted on the present application, which would extend beyond the expiration date of the full statutory term of any patent(s) granted on U.S. Patent Application No. 10/301,237, U.S. Patent Application No. 12/163,647, and U.S. Patent Application No. 12/123,364. Thus, Applicant submits that this rejection is overcome and respectfully requests that the rejection be withdrawn.

Allowable Subject Matter

The Examiner has indicated that the remaining pending claims, including claims 1, 4-6, 9-17, 41 and 44-55, are allowable once the double patenting rejection is addressed. In view of the terminal disclaimer described above, and being submitted concurrently herewith, allowance of all pending claims is respectfully requested.

///

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If at any time the Examiner believes that an interview would be helpful, please contact the undersigned.

Respectfully submitted,



Chien-Ju Alice Chuang
Reg. No. 65,914

KOKKA & BACKUS, PC
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Fax: (650) 566-9922

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Burnett et al. Application No.: 10/400,282 Filing Date: March 27, 2003 For: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS	Examiner: FAULK, Devona E. Confirmation No.: 1397 Group Art Unit: 2614 Date: January 14, 2013 Atty. Docket No.: ALI-049

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being transmitted via the U.S. Patent and Trademark Office electronic filing system (EFS-Web) to the USPTO on **January 14, 2013.**

Signed: _____
Aimee H. Shin

TERMINAL DISCLAIMER UNDER 37 C.F.R. § 1.321 TO OBVIATE A PROVISIONAL OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir or Madam:

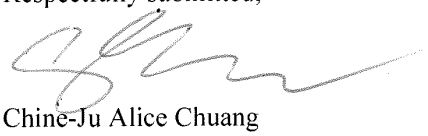
The owner, AliphCom (Assignee), of the entire interest in the above-identified application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the above-identified application (hereafter "instant application"), which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 and 173 of any patent granted on copending U.S. Patent Application No. 10/301,237 filed on November 21, 2002, U.S. Patent Application No. 12/163,647 filed on June 27, 2008, and U.S. Patent Application No. 12/123,364 filed on May 19, 2008 (collectively "reference patent applications"), as the term of any patent granted on said reference patent applications may be shortened by any terminal disclaimer filed prior to the

patent on the reference patent applications. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference patent applications are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the above-identified application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of any patent(s) granted on said reference patent applications, as the term of any patent(s) granted on said reference patent applications may be shortened by any terminal disclaimer filed prior to the grant of any patent(s) on the copending reference applications, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued or is in any matter terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

We hereby submit the amount of $80.00 to cover the statutory disclaimer fees for small entity. If any questions arise regarding this statutory disclaimer, please contact the undersigned attorney or agent of record.

Respectfully submitted,



Chine-Ju Alice Chuang
Reg. No. 65,914

Date: January 14, 2013

Kokka & Backus, PC
703 High Street
Palo Alto, CA 94301
Tel: (650) 585-2359
Fax: (650) 566-9922

Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Chien-Ju Alice Chuang/Amiee Shin
Attorney Docket Number:	ALI-049

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 2 months with $0 paid	2252	1	285	285

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Statutory or terminal disclaimer	2814	1	80	80
		Total in USD ($)		**365**

Electronic Acknowledgement Receipt

EFS ID:	14691995
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	15516
Filer:	Chien-Ju Alice Chuang
Filer Authorized By:	
Attorney Docket Number:	ALI-049
Receipt Date:	14-JAN-2013
Filing Date:	27-MAR-2003
Time Stamp:	20:10:00
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		ALI-049_Response_to_Non_Final_Office_Action_asfiled.pdf	106614 0cab00d5d3afe628c6ff26e3d9fde7c3add85ddb	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	10
	Terminal Disclaimer Filed	11	12

Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31917 d079926e666bae03df4c433729a007888bccbb63	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	138531		

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.

Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Chien-Ju Alice Chuang
Attorney Docket Number:	ALI-049

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 2 months with $0 paid	2252	1	285	285

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Statutory or terminal disclaimer	2814	1	80	80
		Total in USD ($)		**365**

Electronic Acknowledgement Receipt

EFS ID:	14697784
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	Microphone and Voice Activity Detection (VAD) configurations for use with communication systems
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	15516
Filer:	Chien-Ju Alice Chuang
Filer Authorized By:	
Attorney Docket Number:	ALI-049
Receipt Date:	14-JAN-2013
Filing Date:	27-MAR-2003
Time Stamp:	20:41:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$365
RAM confirmation Number	7541
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Fee Worksheet (SB06)	fee-info.pdf	31885 05aaf5f401af1dba2c97e25d0e3e3f5152a69541	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	31885	

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.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 10/400,282	Filing Date 03/27/2003	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	01/14/2013	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 26	Minus	** 40	= 0	X $31 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***7	= 0	X $125 =	0	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	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/KATISCHA WANZER/

This collection of information is required by 37 CFR 1.16. 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 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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/400,282	BURNETT ET AL.	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 01/14/13	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

Angie Walker

U.S. Patent and Trademark Office

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

15516 7590 02/20/2013

Kokka & Backus, PC
703 High Street
Palo Alto, CA 94301

EXAMINER
PAUL, DISLER

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 02/20/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALI-049	1397

TITLE OF INVENTION: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$885	$300	$0	$1185	05/20/2013

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 SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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 and an extra copy of the form should be submitted. 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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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)

15516 7590 02/20/2013
Kokka & Backus, PC
703 High Street
Palo Alto, CA 94301

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALI-049	1397

TITLE OF INVENTION: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$885	$300	$0	$1185	05/20/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
PAUL, DISLER	2655	381-071600

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/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form 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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information 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 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, 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.

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.
10/400,282	03/27/2003	Gregory C. Burnett	ALI-049	1397

15516 7590 02/20/2013

Kokka & Backus, PC
703 High Street
Palo Alto, CA 94301

EXAMINER	
PAUL, DISLER	
ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 02/20/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 264 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 264 day(s).

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 Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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.	Applicant(s)	
	10/400,282	BURNETT ET AL.	
	Examiner	Art Unit	
	DISLER PAUL	2655	

-- 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 *1/14/13*.

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 *1,4-6,9-17,41 and 44-55*. 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).
   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 _____.

/DISLER PAUL/
Primary Examiner, Art Unit 2655

DETAILED ACTION

Terminal Disclaimer

The terminal disclaimer filed on 1/14/13 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of full statutory term has been reviewed and is accepted. The terminal disclaimer has been recorded.

Allowable Subject Matter

Claims 1, 4-6, 9-17, 41, 44-55 are allowed.

The above claims are allowed after further search since although, the prior arts disclose of the voice detecting subsystem and denoising subsystem but, none of the prior art disclose of such specific as wherein the voice detection subsystem is configured to receive the voice activity signals using a sensor independent from the microphone array and to output the control signals generated from the voice activity signals to the denoising system, the denoising system configured to use the control signals to denoise the acoustic signals from the microphone array.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DISLER PAUL whose telephone number is (571)270-1187. The examiner can normally be reached on 10-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Goins Davetta can be reached on (571) 272-29-57. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DISLER PAUL/
Primary Examiner, Art Unit 2655

Notice of References Cited	Application/Control No. 10/400,282	Applicant(s)/Patent Under Reexamination BURNETT ET AL.	
	Examiner DISLER PAUL	Art Unit 2655	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,473,702	12-1995	Yoshida et al.	381/94.7
*	B	US-5,590,241	12-1996	Park et al.	704/227
*	C	US-5,625,684	04-1997	Matouk et al.	379/392.01
*	D	US-2003/0130839	07-2003	Beaucoup et al.	704/226
*	E	US-7,206,418	04-2007	Yang et al.	381/92
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA FAULK	2614

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010	06/06/2011	03/15/2012	02/12/2013
1	1	✓	✓	✓	✓	✓	✓	✓	✓	=
	2	✓	✓	-	-	-	-	-	-	-
	3	✓	✓	-	-	-	-	-	-	-
2	4	✓	✓	✓	✓	✓	✓	✓	✓	=
3	5	✓	✓	✓	✓	✓	✓	✓	✓	=
4	6	✓	✓	✓	✓	✓	✓	✓	✓	=
	7	✓	✓	✓	✓	✓	✓	-	-	-
	8	O	-	-	-	-	-	-	-	-
5	9	O	✓	✓	✓	✓	✓	✓	✓	=
6	10	✓	✓	✓	✓	✓	✓	✓	✓	=
7	11	✓	✓	✓	✓	✓	✓	✓	✓	=
8	12	✓	✓	✓	✓	✓	✓	✓	✓	=
9	13	✓	✓	✓	✓	✓	✓	✓	✓	=
10	14	✓	✓	✓	✓	✓	✓	✓	✓	=
11	15	O	✓	✓	✓	✓	✓	✓	✓	=
12	16	✓	✓	✓	✓	✓	✓	✓	✓	=
13	17	✓	✓	✓	✓	✓	✓	✓	✓	=
	18	✓	✓	-	-	-	-	-	✓	-
	19	✓	✓	-	-	-	-	-	✓	-
	20	✓	✓	-	-	-	-	-	✓	-
	21	✓	✓	-	-	-	-	-	✓	-
	22	✓	✓	-	-	-	-	-	✓	-
	23	✓	✓	-	-	-	-	-	✓	-
	24	O	-	-	-	-	-	-	✓	-
	25	O	✓	-	-	-	-	-	✓	-
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	34	✓	✓	-	-	-	-	-	✓	-
	35	✓	✓	-	-	-	-	-	✓	-
	36	✓	✓	-	-	-	-	-	✓	-

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	**Art Unit**
	DEVONA FAULK	2614

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

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

CLAIM		DATE								
Final	Original	01/23/2007	10/18/2007	08/14/2008	03/12/2009	12/07/2009	08/13/2010	06/06/2011	03/15/2012	02/12/2013
	37	✓	✓	-	-	-	-	-	✓	-
	38	O	-	-	-	-	-	-	✓	-
	39	O	✓	-	-	-	-	-	✓	-
	40		✓	-	-	-	-	-	✓	-
26	41		✓	✓	✓	✓	✓	✓	✓	=
	42		✓	-	-	-	-	-	✓	-
	43		✓	-	-	-	-	-	✓	-
14	44			✓	✓	✓	✓	✓	✓	=
15	45			✓	✓	✓	✓	✓	✓	=
16	46			✓	✓	✓	✓	✓	✓	=
17	47			✓	✓	✓	✓	✓	✓	=
18	48			✓	✓	✓	✓	✓	✓	=
19	49			✓	✓	✓	✓	✓	✓	=
20	50			✓	✓	✓	✓	✓	✓	=
21	51			✓	✓	✓	✓	✓	✓	=
22	52			✓	✓	✓	✓	✓	✓	=
23	53			✓	✓	✓	✓	✓	✓	=
24	54			✓	✓	✓	✓	✓	✓	=
25	55			✓	✓	✓	✓	✓	✓	=

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DISLER PAUL	2655

CPC		
Symbol	Type	Version

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION									
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED				
381	94.1	H	0	4	B	15 / 00 (2006.01.01)					
CROSS REFERENCE(S)											
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)										
381	92	94.3	94.7								
704	226	233									

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	26	
/DISLER PAUL/ Primary Examiner.Art Unit 2655	02/12/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office

Part of Paper No. 20130212

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	**Art Unit**
	DISLER PAUL	2655

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 26	
/DISLER PAUL/ Primary Examiner.Art Unit 2655 (Primary Examiner)	02/12/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No. 20130212

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	**Art Unit**
	DISLER PAUL	2655

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	16	46												
2	4	17	47												
3	5	18	48												
4	6	19	49												
5	9	20	50												
6	10	21	51												
7	11	22	52												
8	12	23	53												
9	13	24	54												
10	14	25	55												
11	15	28	55												
12	16														
13	17														
26	41														
14	44														
15	45														

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 26	
/DISLER PAUL/ Primary Examiner.Art Unit 2655 (Primary Examiner)	02/12/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No. 20130212

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10400282	BURNETT ET AL.
	Examiner	Art Unit
	DEVONA E. FAULK	2615

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
381	94.1,94.2,94.3,94.7,92	1/22/07	BTP
704	226,233	1/22/07	BTP
381	71.6,94.1,94.7,92,110	10/15/2007	DEF
704	226,233	10/18/2007	DEF
381	71.6,94.1,94.7	7/29/08, 8/14/08	DEF
704	226,233	7/29/08,8/14/08	DEF
381	71.7,94.1,94.7,110,92	3/12/09	DEF
381	71.6,94.1,94.7,110,92,111	12/7/09	DEF
381	71.6,94.1,94.7,110,92,11	6/1,3,18/11	DEF
704	226,233	6/1,3,18/11	DEF
381	71.6,94.1,94.7,110,92,111	3/15/12	DEF
704	226,233	3/15/12I ; 2/12/13	DEF/DP
381	91-92,94.1-94.3,94.7	2/12/13	DP

SEARCH NOTES		
Search Notes	Date	Examiner
East Word Search	1/22/07	
Assignee/Inventor Search	10/16/2007,10/17/2007	DEF
word search	10/16/2007,10/17/2007	DEF
additonal search	7/29/08, 8/14/08	DEF
additional search	3/12/09	DEF

	/DEVONA E FAULK/ Primary Examiner.Art Unit 2614

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
reviewed applicant's arguments/ applied same art to claims	8/13/10	DEF
additional search	6/1,3,18/11	DEF
additional search	3/6,15/12	DEF

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**
381	92, 94.1,94.3, 94.7	2/12/13	DP
704	226,233	2/12/13	DP

	/DEVONA E FAULK/ Primary Examiner.Art Unit 2614

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

BIB DATA SHEET

CONFIRMATION NO. 1397

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/400,282	03/27/2003 RULE	381	2655	ALI-049

APPLICANTS

Gregory C. Burnett, Livermore, CA;
Nicolas J. Petit, San Francisco, CA;
Alexander M. Asseily, San Francisco, CA;
Andrew E. Einaudi, San Francisco, CA;

**** CONTINUING DATA ***************************

This appln claims benefit of 60/368,209 03/27/2002

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **

05/30/2003

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/DISLER PAUL/ Examiner's Signature	☐ dp Initials	CA	29	39	3

ADDRESS

Kokka & Backus, PC
703 High Street
Palo Alto, CA 94301
UNITED STATES

TITLE

Microphone and Voice Activity Detection (VAD) configurations for use with communication systems

FILING FEE RECEIVED		
1036	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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)

33516 7590 02/20/2013

Kokka & Backus, PC
703 High Street
Palo Alto, CA 94301

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 transmitted via the U.S. Patent and Trademark Office electronic filing system (EFS-Web) to the USPTO on the date indicated below or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Amiee H. Shin	(Depositor's name)
	(Signature)
May 20, 2013	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	03/27/2003	Gregory C. Burnett	ALI-049	1397

TITLE OF INVENTION: MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$885	$300	$0	$1185	05/20/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
PAUL DISLER	2655	381-071600

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/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form 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 KOKKA & BACKUS, PC
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 has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: AliphCom

(B) RESIDENCE: (CITY and STATE OR COUNTRY): San Francisco, CA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☑ Issue Fee
- ☑ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies: _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ☐ A check is enclosed.
- ☑ Payment by credit card. via EFS-Web
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date May 20, 2013

Typed or printed name Scott S. Kokka Registration No. 51,893

This collection of information 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 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, 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.

Electronic Patent Application Fee Transmittal

Application Number:	10400282
Filing Date:	27-Mar-2003
Title of Invention:	MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS
First Named Inventor/Applicant Name:	Gregory C. Burnett
Filer:	Scott Susumu Kokka
Attorney Docket Number:	ALI-049

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Utility Appl Issue Fee	2501	1	890	890
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1190**

Electronic Acknowledgement Receipt	
EFS ID:	15825237
Application Number:	10400282
International Application Number:	
Confirmation Number:	1397
Title of Invention:	MICROPHONE AND VOICE ACTIVITY DETECTION (VAD) CONFIGURATIONS FOR USE WITH COMMUNICATION SYSTEMS
First Named Inventor/Applicant Name:	Gregory C. Burnett
Customer Number:	15516
Filer:	Scott Susumu Kokka
Filer Authorized By:	
Attorney Docket Number:	ALI-049
Receipt Date:	20-MAY-2013
Filing Date:	27-MAR-2003
Time Stamp:	22:33:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1190
RAM confirmation Number	7944
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Issue Fee Payment (PTO-85B)	ALI-049_Issue_and_Publication_Fees_asfiled.pdf	329737 dd707f53a8849cd886019ec03321b243c87e531	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32161 c56ea3977dc2bf9f6414b0cd4af322c876f84463	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	361898		

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
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complet if Kn wn	
Application Number	10/400,282
Filing Date	March 27, 2003
First Named Inventor	Gregory C. Burnett
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	ALPH.P020

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
BTP		5,212,764		Ariyoshi	05-18-1993	
		5,400,409		Linhard	03-21,1995	
		5,414,776		Sims, Jr.	05-09-1995	
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		5,835,608		Warnaka et al.	11-10-1998	
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		~~6,000,330~~		Nagata	12-28-1999	6,009,396
		6,191,724	B1	McEwan	02-20-2001	
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		~~5,400,002~~		Silverberg et al.	04-11-1995	5,406,622
BTP		5,517,435		Sugiyama	05-14-1996	

Change(s) applied to document, /D.D./ 3/30/2013

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	1/23/07

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

[1] Unique citation designation number. [2] See attached Kinds of U.S. Patent Documents. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/400,282	06/18/2013	8467543	ALI-049	1397

15516 7590 05/29/2013

Kokka & Backus, PC
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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 977 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 Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

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Nicolas J. Petit, San Francisco, CA;
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