

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 7,388,962 B2  
APPLICATION NO. : 10/826527  
DATED : June 17, 2008  
INVENTOR(S) : Cheung et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

**In the Claims**

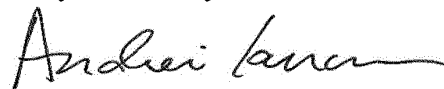
Column 15, Line 50 (Claim 22, Line 2): "amplification is frequency dependent" should read --portion having higher power is selected based on frequency--

Column 15, Line 51 (Claim 22, Line 3): "amplification" should read --power increase--

Column 16, Lines 4-5 (Claim 22, Lines 8-9): "amplification" should read --power of the output audio signals--

Column 16, Line 13 (Claim 23, Line 2): "speaker," should read --speaker;--

Signed and Sealed this  
Twenty-ninth Day of December, 2020



Andrei Iancu  
*Director of the United States 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  
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| APPLICATION NO.                                                            | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/826,527                                                                 | 04/15/2004  | Kwok Wai Cheung      | IPVBP002            | 2158             |
| 34071                                                                      | 7590        | 12/03/2020           | EXAMINER            |                  |
| IPVENTURE, INC.<br>4010 Moorpark Avenue<br>Suite 211<br>San Jose, CA 95117 |             |                      | PENDLETON, DIONNE   |                  |
|                                                                            |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                            |             |                      | 2627                |                  |
|                                                                            |             |                      | MAIL DATE           | DELIVERY MODE    |
|                                                                            |             |                      | 12/03/2020          | 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.



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
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Patent No.: 7388962  
Issue Date: 06/17/2008  
Appl. No.: 10/826,527  
Filed: 04/15/2004

**PART (A) RESPONSE FOR CERTIFICATES OF CORRECTION**

This is a decision on the Certificate of Correction request filed 09 November 2020.

The request for issuance of Certificate of Correction for the above-identified correction(s) under the provisions of 37 CFR 1.322 and/or 1.323 is hereby:

(Check one)

☒ Approved ☐ Approved in Part ☐ Denied

Comments: \_\_\_\_\_

**PART (B) PETITION UNDER 37 CFR 1.324 OR 37 CFR 1.48**

☐ This is a decision on the petition filed \_\_\_\_\_ to correct inventorship under 37 CFR 1.324.

☐ This is a decision on the request under 37 CFR 1.48, petition filed \_\_\_\_\_. In view of the fact that the patent has already issued, the request under 37 CFR 1.48 has been treated as a petition to correct inventorship under 37 CFR 1.324.

The petition is hereby: ☐ Granted ☐ Dismissed

Comment: \_\_\_\_\_

The patented filed is being forwarded to Certificate of Corrections Branch for issuance of a certificate naming only the actual inventor or inventors.

/JOSEPH H FEILD/  
Supervisory Patent Examiner, Art Unit 2689  
Technology Center 2600  
Phone: (571)272-4090

Certificates of Correction Branch email: CustomerServiceCoC@uspto.gov CoC Central Phone Number: (703) 756-1814

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Patent: 7,388,962

Issued: June 17, 2008

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

---

**REQUEST FOR CERTIFICATE OF CORRECTION  
OF OFFICE MISTAKE  
(35 U.S.C. §254, 37 CFR §1.322)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450  
Attn: Certificate of Correction

Dear Sir:

Attached is Form PTO-1050 (Certificate of Correction) at least one copy of which is suitable for printing.

The error(s) together with the exact page and line number where the error(s) appear in the application file are as follows:

**CLAIMS:**

1. In line 2 of claim 22 (column 15, line 50) change "amplification is frequency dependent" to --portion having higher power is selected based on frequency--. This appears correctly in line 2 of claim 28 on page 8 of Amendment A filed on September 7, 2007. After Allowance, claims were renumbered with claim 28 becoming claim 22. [PTO Error]
2. In line 3 of claim 22 (column 15, line 51) change "amplification" to --power increase--. This appears correctly in line 3 of claim 28 on page 8 of Amendment A filed on September 7, 2007. After Allowance, claims were renumbered with claim 28 becoming claim 22. [PTO Error]

3. In lines 8-9 of claim 22 (column 16, lines 4-5) change "amplification" to --power of the output audio signals--. This appears correctly in line 7 of claim 28 on page 9 of Amendment A filed on September 7, 2007. After Allowance, claims were renumbered with claim 28 becoming claim 22. [PTO Error]

4. In line 2 of claim 23 (column 16, line 13) change "speaker," to --speaker;--. This appears correctly in line 2 of claim 22 on page 7 of Amendment A filed on September 7, 2007. After Allowance, claims were renumbered with claim 22 becoming claim 23. [PTO Error]

Patentee hereby requests expedited issuance of the Certificate of Correction because the error lies with the Office and because the error is clearly disclosed in the records of the Office.

It is noted that the above-identified errors were printing errors that apparently occurred during the printing process. Accordingly, it is believed that no fees are due in connection with the filing of this Request for Certificate of Correction. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-3874 (Order No. IPVBP002).

Respectfully submitted,

/Peter P. Tong/

Peter P. Tong  
Registration No. 35,757

IpVenture, Inc.  
4010 Moorpark Avenue  
Suite 211  
San Jose, CA 95117

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 7,388,962  
APPLICATION NO.: 10/826,527  
ISSUE DATE : June 17, 2008  
INVENTOR(S) : CHEUNG et al.

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Column 15, Line 51 (Claim 22, Line 3): "amplification" should be --power increase--

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Column 16, Line 13 (Claim 23, Line 2): "speaker," should be --speaker;--

**MAILING ADDRESS OF SENDER (Please do not use customer number below):**

IpVenture, Inc.  
4010 Moorpark Avenue  
Suite 211

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, 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 Acknowledgement Receipt   |                                         |
|--------------------------------------|-----------------------------------------|
| EFS ID:                              | 41046662                                |
| Application Number:                  | 10826527                                |
| International Application Number:    |                                         |
| Confirmation Number:                 | 2158                                    |
| Title of Invention:                  | DIRECTIONAL HEARING ENHANCEMENT SYSTEMS |
| First Named Inventor/Applicant Name: | Kwok Wai Cheung                         |
| Customer Number:                     | 34071                                   |
| Filer:                               | Peter P. Tong/Angela Nijim              |
| Filer Authorized By:                 | Peter P. Tong                           |
| Attorney Docket Number:              | IPVBP002                                |
| Receipt Date:                        | 09-NOV-2020                             |
| Filing Date:                         | 15-APR-2004                             |
| Time Stamp:                          | 10:15:49                                |
| 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)/<br>Message Digest       | Multi Part /.zip | Pages (if appl.) |
|-----------------|---------------------------------------|------------------------------------------|-------------------------------------------|------------------|------------------|
| 1               | Request for Certificate of Correction | IPVBP002_Request_and_Cert_Corr_11-20.pdf | 168088                                    | no               | 3                |
|                 |                                       |                                          | 450f056fec2df8a166984624ba681300ef68357b9 |                  |                  |

### Warnings:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 168088 |
| <p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> <b>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.</b></p> |        |

UNITED STATES PATENT AND TRADEMARK OFFICE  
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PATENT NO. : 7,388,962 B2  
APPLICATION NO. : 10/826527  
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INVENTOR(S) : Cheung et al.

Page 1 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

Column 14, line 33 (claim 1, line 9) "output audio signals is amplified more" should be  
--output audio signals is configured to have higher power--

Column 14, line 65 (claim 2, line 2) "wherein the amplification is frequency dependent"  
should be  
--wherein the portion having higher power is selected based on frequency--

Column 14, line 46 (claim 3, line 2) "wherein certain frequencies of the input audio signals  
are not amplified" should be  
--wherein the interface unit is configured not to increase the power of certain  
frequencies of the output audio signals--

Column 14, line 49 (claim 4, line 2) "wherein the amplification depends on" should be  
--wherein the power increase depends on--

Column 14, line 55 (claim 5, line 5) "allow the amplification to be changed" should be  
--allow the power of the output audio signals to be changed--

Column 14, line 57 (claim 5, line 7) "can change the amplification in view" should be  
--can change the power in view--

Column 14, line 61 (claim 6, line 3) "higher in frequency than another" should be  
--higher in frequency is selected over another--

Column 14, line 62 (claim 6, line 4) "frequencies receives greater amplification" should be  
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Column 15, line 16 (claim 12, line 4) "wherein the amplification is reduced" should be  
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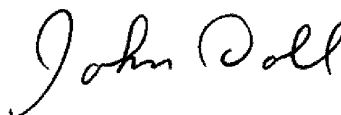
Page 2 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 16, line 27 (claim 23, line 15) "unit is configured to modify the output audio signals at least by modifying certain frequencies differently" should be  
--unit is configured so that at least certain frequencies of the output audio signals are being modified differently--

Signed and Sealed this

Seventh Day of July, 2009



JOHN DOLL  
*Acting Director of the United States Patent and Trademark Office*



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No. 10/826,527

Issued: June 17, 2008

Patent: 7,388,962 B2

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first-class mail on May 13, 2009 in an envelope addressed to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450.

Signed: Pat Tate

Pat Tate

REQUEST FOR CERTIFICATE OF CORRECTION  
OF OFFICE MISTAKE  
(35 U.S.C. §254, 37 CFR §1.322)

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450  
Attn: Certificate of Correction

**Certificate**  
MAY 21 2009  
**of Correction**

Dear Sir:

Attached is Form PTO-1050 (Certificate of Correction) at least one copy of which is suitable for printing. The errors together with the exact page and line number where the errors are shown correctly in the application file are as follows:

**IN THE CLAIMS:**

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Patent No. 7,388,962

1

Atty. Docket No. IPVBP002

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should be

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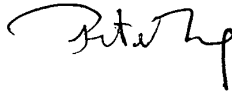
Column 16, line 27 (claim 23, line 15) "unit is configured to modify the output audio signals at least by modifying certain frequencies differently" should be

--unit is configured so that at least certain frequencies of the output audio signals are being modified differently--

These appear correctly in the Amendment A filed September 7, 2007.

It is noted that the above-identified errors were printing errors that apparently occurred during the printing process. Accordingly, it is believed that no fees are due in connection with the filing of this Request for Certificate of Correction. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-3874 (Order No. IPVBP002).

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Peter P. Tong".

Peter P. Tong  
Registration No. 35,757

UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION

Page 1 of 2

PATENT NO. : 7,388,962  
APPLICATION NO.: 10/826,527  
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MAILING ADDRESS OF SENDER (Please do not use customer number below):

IpVenture, Inc.  
5150 El Camino Real, Bldg. A, Suite 22  
Los Altos, CA 94022

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Attention Certificate of Corrections Branch, 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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Column 14, line 65 (claim 2, line 2) "wherein the amplification is frequency dependent" should be  
--wherein the portion having higher power is selected based on frequency--

Column 14, line 46 (claim 3, line 2) "wherein certain frequencies of the input audio signals are not amplified" should be  
--wherein the interface unit is configured not to increase the power of certain frequencies of the output audio signals--

Column 14, line 49 (claim 4, line 2) "wherein the amplification depends on" should be  
--wherein the power increase depends on--

Column 14, line 55 (claim 5, line 5) "allow the amplification to be changed" should be  
--allow the power of the output audio signals to be changed--

Column 14, line 57 (claim 5, line 7) "can change the amplification in view" should be  
--can change the power in view--

**MAILING ADDRESS OF SENDER (Please do not use customer number below):**

IpVenture, Inc.  
5150 El Camino Real, Bldg. A, Suite 22  
Los Altos, CA 94022

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Attention Certificate of Corrections Branch, 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.*

**UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION**

Page 2 of 2

PATENT NO. : 7,388,962

APPLICATION NO.: 10/826,527

ISSUE DATE : June 17, 2008

INVENTOR(S) : CHEUNG et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 14, line 61 (claim 6, line 3) "higher in frequency than another" should be  
--higher in frequency is selected over another--

Column 14, line 62 (claim 6, line 4) "frequencies receives greater amplification" should be  
--frequencies to have higher power--

Column 15, line 16 (claim 12, line 4) "wherein the amplification is reduced" should be  
--wherein the power of the portion is reduced--

Column 16, line 27 (claim 23, line 15) "unit is configured to modify the output audio signals at least by modifying certain frequencies differently" should be  
--unit is configured so that at least certain frequencies of the output audio signals are being modified differently--

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Los Altos, CA 94022

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, 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.*



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

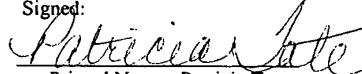
Group: 2615

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

CERTIFICATE OF FACSIMILE

I hereby certify that this correspondence is being  
transmitted via facsimile to: Commissioner for  
Patents, Alexandria, VA 22313-1450 on September 7, 2007.

Signed:

  
Printed Name: Patricia Tate

**AMENDMENT A**

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

Dear Sir:

In response to the Office Action dated June 15, 2007, please amend the above-identified patent application as follows:

**Amendments to the Specification** are reflected on page 2 of this paper.

**Amendments to the Drawings** are reflected on page 3 of this paper.

**Amendments to the Claims** are reflected in the listing of claims which being on page 3 of this paper.

**Remarks/Arguments** begin on page 9 of this paper.

**Amendments to the Specification:**

**In the Specification**

On page 9, after paragraph 41 of the specification, please ADD paragraph 41.1 as follows:

[0041.1] FIG. 11 shows a hearing enhancement system having a computing unit according to one embodiment of the invention.

On page 9, please AMEND paragraph 42 of the specification as follows:

[0042] Same numerals in ~~Figures 1-10~~ Figures 1-11 are assigned to similar elements in all the figures. Embodiments of the invention are discussed below with reference to ~~Figures 1-10~~ Figures 1-11. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

**Amendments to the Drawings:**

**In the Drawings:**

Please ADD new sheet illustrating Fig. 11 to the application.

**Amendments to the Claims:**

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

**Listing of Claims**

1. (Currently amended) A hearing enhancement system for a user, comprising:
  - an interface unit that has a directional speaker and a microphone;
  - wherein
    - the microphone receives input audio signals, which are transformed into ultrasonic signals;
    - the speaker transmits the ultrasonic signals;
    - at least a portion of the ultrasonic signals is transformed into output audio signals in air; ~~and~~
    - a portion of the ~~input~~ output audio signals is configured to have higher power ~~is amplified more~~ than another portion to enhance the hearing of the user, and
    - wherein the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user.
2. (Currently amended) A hearing enhancement system as recited in claim 1 wherein ~~the amplification is~~ the portion having higher power is selected based on frequency dependent.
3. (Currently amended) A hearing enhancement system as recited in claim 2 wherein at least a portion of the audio frequencies that is higher in frequency is selected over ~~than~~ another portion of the audio frequencies to have higher power ~~receives greater amplification.~~

4. (Currently amended) A hearing enhancement system as recited in claim 2 wherein the interface unit is configured not to increase the power of certain frequencies of the input output audio signals are not amplified.

5. (Currently amended) A hearing enhancement system as recited in claim 2 wherein the amplification power increase depends on at least one characteristic of the hearing of the user.

6. (Currently Amended) A hearing enhancement system as recited in claim 5,  
wherein the at least one characteristic of the hearing of the user is determined through calibrating the hearing of the user,  
wherein the system is configured to allow the power of the output audio signals to be changed as a function of frequency, and  
wherein the user can change the power in view of the calibration results.

7. (Original) A hearing enhancement system as recited in claim 1 wherein the system can be de-activated by the user.

8. (Previously presented) A hearing enhancement system as recited in claim 1 wherein when the system is not activated, the system can be activated depending on at least one word spoken by the user.

9. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have a power level, and  
wherein depending on the power level of the input audio signals, the system can be in a standby mode.

10. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have an average power level, and  
wherein depending on the average power level of the input audio signals, the system can be in a standby mode.

11. (Original) A hearing enhancement system as recited in claim 1 wherein the microphone is a directional microphone.
12. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have an average power level, and  
wherein the ~~amplification~~ power of the portion is reduced or limited if the average power level of the input audio signals is higher than a preset threshold.
13. (Original) A hearing enhancement system as recited in claim 1 wherein the system further includes a rechargeable battery.
14. (Original) A hearing enhancement system as recited in claim 1 wherein the system also can function as a phone.
15. (Currently Amended) A hearing enhancement system as recited in claim 1,  
wherein the system includes more than one directional speaker, ~~and~~  
wherein the phases of the ultrasonic signals driving at least two of the speakers differ by a preset value, and  
wherein the direction of the output audio signals can be changed by changing the preset value.
16. (Previously presented) A hearing enhancement system as recited in claim 1 wherein the system can also access audio signals from another instrument through a wire or a wireless connection.
17. (Original) A hearing enhancement system as recited in claim 16 wherein the another instrument is a portable instrument.
18. (Previously presented) A hearing enhancement system as recited in claim 16 wherein the another instrument is an entertainment unit.

19. (Previously presented) A hearing enhancement system as recited in claim 16 wherein the another instrument is a phone.

20. (Currently Amended) A hearing enhancement system as recited in claim 16,  
wherein the another instrument is ~~related to~~ a microphone at an event, and  
wherein audio signals are accessed from another instrument through a wireless  
connection.

21. (Currently Amended) A hearing enhancement system as recited in claim 16,  
wherein the another instrument is ~~related to~~ a speaker at an event, and  
wherein audio signals are accessed from another instrument through a wireless  
connection.

22. (Currently Amended) A hearing enhancement system for a user, comprising:  
a directional speaker;  
a microphone; and  
a computing unit operatively coupled to the directional speaker and the  
microphone,  
wherein the microphone receives input audio signals, ~~and the computing unit~~  
~~modifies the input audio signals at least by modifying certain frequencies differently than~~  
~~other frequencies to enhance the ability of the user to hear the input audio signals, and~~  
~~provides the modified signals to the directional speaker,~~  
wherein the directional speaker outputs ultrasonic waves based on the ~~modified~~  
input audio signals,  
wherein the directional speaker is configured to be spaced apart from at least one  
of the ears of the user so that at least a portion of the ultrasonic signals is transformed into  
output audio signals outside the at least one of the ears of the user, to be received by the  
at least one of the ears of the user, and

wherein the computing unit is configured so that at least certain frequencies of the output audio signals are being modified differently than other frequencies to enhance the hearing of the user.

23. (Cancelled)

24. (Previously presented) A hearing enhancement system as recited in claim 22,  
wherein the speaker is attachable to the clothing worn by the user, and  
wherein the directional speaker can direct the ultrasonic waves towards at least one ear of the user from the worn position of the directional speaker.

25. (Original) A hearing enhancement system as recited in claim 22, wherein the computing unit is integral with the directional speaker.

26. (Original) A hearing enhancement system as recited in claim 22, wherein the computing unit is separate from the directional speaker but operatively couples with the directional speaker over a wireless link.

27. (Previously presented) A hearing enhancement system as recited in claim 22,  
wherein the computing unit has a reduced power mode and a normal power mode, and  
wherein the computing unit can be automatically switched between the power modes based on at least one characteristic of the input audio signals, thereby reducing power consumption by the computing unit.

28. (New) A hearing enhancement system as recited in claim 1,  
wherein the portion having higher power is selected based on frequency,  
wherein the power increase depends on at least one characteristic of the hearing of the user,  
wherein the at least one characteristic of the hearing of the user is determined through calibrating the hearing of the user,

wherein the system is configured to allow the power of the output audio signals to be changed as a function of frequency,

wherein the system can be in a standby mode to reduce power consumption by the system,

wherein the system further includes a rechargeable battery, and

wherein the system also can function as a phone.

## REMARKS

Applicants previously presented claims 1 through 27 for examination. In the above-identified Office Action, the Examiner has withdrawn a prior election/restriction requirement, which Applicants acknowledge with gratitude; objected to the drawings; objected to the specification; and rejected all the claims.

Applicants appreciate the Examiner's detailed comments in her Office Action to the above-identified application. For the reasons to be stated below, however, Applicants respectfully traverse the rejections.

By this amendment, Applicants have cancelled claim 23; have amended claims 1-6, 9, 10, 12, 15 and 20-22 to further clarify the subject matter regarded as the invention; have added claim 28; and have submitted a proposed new drawing with corresponding changes in the specification. Accordingly, claims 1-22 and 24-28 remain pending. Applicants respectfully request that the Examiner reconsider the application in light of the amendments and the remarks expressed herein.

### Drawing Objections

The Office Action objected to the drawings because the "computing unit" as recited in claims 22 and 25-27 allegedly was not shown. To expedite the prosecution, Applicants have added Figure 11 as support for the "computing unit". The support for Figure 11 can be found, for example, in claims 22 and 25-27. In view of the submission, Applicants respectfully request withdrawal of the objection.

### Antecedent Basis Objections

Claims 9, 10 and 12 were objected to because of allegedly improper antecedent basis for the term "power level" and "average power level." To expedite the prosecution, Applicants have amended claims 9, 10 and 12 accordingly. In view of the amendment, Applicants respectfully request withdrawal of the objection.

### 112 Rejections

Claims 20 and 21 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action stated that the recitation “at an event” was not clear. Applicants respectfully disagree.

In a general sense, claim 20 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a microphone at an event. Claim 21 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a speaker at an event. The event can be, for example, a concert, a play or a presentation.

For example, paragraphs 88- 91 in the specification, partially reproduced below with emphasis added, can help explain the phrase “at an event”:

In private, such as at home, hearing impaired people sometimes might have a tendency to increase the sound level of audio or video instruments a bit too high. On the other hand, in public, hearing impaired people sometimes might have difficulty hearing. In one embodiment, the system is further designed to pick up, capture or access audio signals from portable or non-portable instruments, with the interface unit serving as a personalized listening unit.

...

FIG. 10 shows examples of such other portable or non-portable instruments. The instruments can be used in a private environment, such as at home, or attached to the user. This can include entertainment units, such as televisions, stereo systems, CD players, or radios....

Regarding public use, the user can be at a conference or a theater. The system can be coupled to the conference microphone or the theater speaker wirelessly, and thus be capable of capturing and enhancing the audio signals therefrom.

As stated above, the user goes to an event, such as going to a conference or to a theater. A hearing enhancement system according to an embodiment of the present invention can help the user hear at the event. The system can access audio signals from an instrument, which can be a microphone at the event. Alternatively, the system can access audio

signals from an instrument, which can be a speaker at the event. At least based on the above explanation, Applicants do not understand why the phrase “at an event” is unclear. Hence Applicants respectfully request withdrawal of the 112 rejection.

103 Rejections regarding claims 1-6, 11 and 13-26

Claims 1-6, 11 and 13-26 under 35 USC 103(a) as being unpatentable over Taenzer et al. (US 6,631,196, hereinafter referred to as “Taenzer”) in view of Fretz (US 6,275,596). Applicants respectfully disagree.

Instead of audio signals, Taenzer delivers inaudible ultrasonic signals to a user’s ear

Taenzer teaches a communication system that relies on transporting inaudible ultrasonic carrier directly into the ear canal of a user. Then the non-linearity within the ear itself demodulates the ultrasonic carrier, without producing audible sounds at the input to the user’s ear.<sup>1</sup> In Taenzer, the “ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ....”<sup>2</sup> Since “audio acoustic energy is not produced in the air, audio acoustic sound is not radiated from the user’s ear. As such, others in the vicinity of the user will hear no sound from the earpiece, thereby providing secure secret communication.”<sup>3</sup>

The Office Action alleged that in Taenzer, “at least a portion of the ultrasonic signals is transformed into output audio signals in air,” and cited col. 7, lines 24-28 as support. Applicants again respectfully disagree. That section of Taenzer is reproduced as follows, with emphasis added:

In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.

In the above section, Taenzer has not taught or suggested ultrasonic signals being transformed into output audio signals in air. That section seems to teach just the

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<sup>1</sup> See Taenzer’s Abstract.

<sup>2</sup> Col. 5, lines 1-3 in Taenzer.

<sup>3</sup> Col. 5, lines 29-31 in Taenzer.

opposite—the human ear receives the audio signal as inaudible airborne ultrasonic energy.

Taenzer intends not to create any audio sound outside the user's ear. Taenzer has re-emphasized this objective at numerous places of its patent. For example,

- Exemplary embodiments rely on the airborne transport of an inaudible ultrasonic carrier directly into the hearing mechanism of a user ....<sup>4</sup>
- The ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ....<sup>5</sup>
- [A]udio acoustic energy is not produced in the air ....<sup>6</sup>
- In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.<sup>7</sup>
- The transducers 506 and 510, along with any other desired components, can be mounted in a mounting means, such as an earpiece, such that outputs from the transducers are in proximity to a human ear at a location where the hearing mechanism of the human ear receives the signal as inaudible airborne ultrasonic acoustic energy.<sup>8</sup>
- Because the communication device outputs inaudible pressure waves, there is no or very little audio frequency vibration of the tympanic membrane.... As such, there is no radiation of audible sound pressure waves from the ear, even when the device is used in an open canal or partially open canal configuration.<sup>9</sup>
- Use of this invention for providing the “sound” delivery portion of the system solves the feedback problem with no drawbacks, because the microphone is only sensitive to audio frequency sonic signals, while the inventive sound delivery system only delivers inaudible ultrasonic signals to the ear.<sup>10</sup>

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<sup>4</sup> Col. 4, lines 59-61 in Taenzer.

<sup>5</sup> Col. 5, lines 1-3 in Taenzer.

<sup>6</sup> Col. 5, lines 29-30 in Taenzer, with emphasis added.

<sup>7</sup> Col. 7, lines 24-28 in Taenzer, with emphasis added.

<sup>8</sup> Col. 12, lines 8-13 in Taenzer, with emphasis added.

<sup>9</sup> Col. 12, lines 41-48 in Taenzer, with emphasis added.

<sup>10</sup> Col. 13, lines 2-7 in Taenzer, with emphasis added.

This is in distinct contrast to Applicants' claimed invention. For example, Applicants' independent claims 1 and 22 include the following limitations:

the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user

Thus, not only has Taenzer not taught or suggested Applicants' claimed invention, Taenzer teaches away from Applicants' claimed invention.

Combining Taenzer and Fretz would destroy the intended function of Taenzer

Taenzer does not teach that a portion of the output audio signals is configured to have higher power than another portion to enhance the hearing of the user. To try to remedy the deficiencies, the Office Action introduced Fretz.

Fretz pertains to an open ear canal hearing aid system so that the ear canal is at least partially open for directly receiving ambient sounds.<sup>11</sup> Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".<sup>12</sup> In other words, audible sounds are delivered to the ear of the user. This is distinctly different and again teaches away from Taenzer, which only delivers inaudible sound to the ear.

References cannot be combined if their intended function is destroyed. To combine Fretz with Taenzer would destroy the intended function of Taenzer. Thus it is inappropriate to combine Fretz with Taenzer.

In addition, Fretz also cannot overcome the deficiencies Applicants noted above regarding Taenzer.

Based on the foregoing, it is submitted that claims 1 and 22 are patentably distinct from Taenzer and Fretz, singly or in combination. In addition, it is submitted that dependent claims 2-6, 11, 13-21, and 23-26 are also patentably distinct for at least the same reasons. Additional reasons regarding a number of dependent claims being patentable over Taenzer and Fretz are discussed below.

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<sup>11</sup> See Fretz's Abstract.

<sup>12</sup> Col. 6, lines 39-41 of Fretz.

Claim 6: Power can be changed as a function of frequency

The Office Action rejected claim 6 arguing that the identification of frequencies to be amplified for a specific wearer is inherently determined through calibration.

Applicants respectfully disagree.

To further clarify the limitations, Applicants have amended claim 6 to include the limitations of the hearing enhancement system being configured to allow the power of the output audio signals to be changed as a function of frequency, such that the user of the system can change the power in view of the calibration results. Fretz does not teach or suggest hearing calibration, let alone allowing the power to be changed as a function of frequency. Thus, it is submitted again that claim 6 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 15: Direction of the output audio signals can be changed

The Office Action rejected claim 15 arguing that Taenzer teaches “more than one directional speaker” in its Figure 5. Applicants respectfully disagree. The two speakers in Taenzer’s Figure 5 generate two ultrasonic frequencies. The difference between the two frequencies becomes the audio signal.

There is no teaching or suggestion in Taenzer where the phases of the ultrasonic signals driving at least two directional speakers differ by a preset value, and the direction of the output audio signals can be changed by changing the preset value. Thus, it is submitted again that claim 15 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claims 20 and 21: The another instrument is related to a microphone or a speaker at an event.

The Office Action just asserted conclusively, with no support, that Taenzer appears to teach that its system can access audio signals from another instrument, and the another instrument is related to a microphone or a speaker at an event. Applicants respectfully disagree. There is no such teaching or suggestion in Taenzer. Rejections on obviousness grounds cannot be sustained by mere conclusory statements. Instead there must be some articulated reasoning with some rational underpinning to support the legal

conclusion of obviousness. Applicants again respectfully request withdrawing the 103 rejections on claims 20 and 21.

Claim 24: the speaker is attachable to the clothing worn by the user

The Office Action rejected claim 24, relying on col. 7, lines 13-18, and inappropriately arguing that Taenzer's speaker can be in any other convenient location near a user's ear. Applicants respectfully disagree.

In col. 7, lines 13-18, Taenzer explained that its earpiece 112 can be "in any other convenient location near or in a user's ear." However, that section of Taenzer specifically defines its earpiece 112 by stating that "A means for mounting the transducer or transducers is represented as an earpiece 112..." In other words, the earpiece 112 in Taenzer is its means for mounting Taenzer's transducer. The earpiece 112 is not Taenzer's speaker.

As explained above, Taenzer's speaker delivers inaudible ultrasonic signals to the ear, with no audio acoustic energy produced in air. Thus, it is not clear how Taenzer's speaker can be attached to the clothing worn by the user. Thus, it is submitted again that claim 24 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 26: Computing unit separate from directional speaker

The Office Action rejected claim 26, alleging that Taenzer in its column 8, lines 43-48, reads on the limitation of Applicants' computing unit that is separate from the directional speaker but operatively coupling with the speaker over a wireless link. Applicants respectfully disagree.

In the section cited by the Office Action, Taenzer teaches a communication device 100 including a microphone 116 to pick up the user's voice, for transmission to a remote location via a wired link or a wireless link (connected to a sound processing unit). Though not clear what Taenzer's sound processing unit does, Applicants submit that the sound processing unit is different from Applicants' claimed computing unit.

Applicants in claim 26 states that the computing unit is configured so that at least certain frequencies of the output audio signals are being modified differently than other

frequencies to enhance the hearing of the user. Note that at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation.

In Taenzer, though it is not clear what its sound processing unit does, the sound processing unit is not configured so that at least certain frequencies of the output audio signals are being modified differently than other frequencies to enhance the hearing of the user, particularly when at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation. Thus, it is submitted again that claim 26 is patentably distinct from Taenzer and Fretz, singly or in combination.

103 Rejections regarding claims 7-10, 12 and 27

The Office Action has also rejected claim 8 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Slavin (US 4,622,440); claims 7, 9, 10 and 27 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Marx (US 4,955,729); and claim 12 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Charpentier (US 5,321,758). Applicants respectfully disagree.

Initially, Applicants disagree with the reasons to combine Slavin, Marx and Charpentier with Taenzer and Fretz in the manner that the Office Action proposes. Furthermore, Slavin, Marx and Charpentier do not overcome the deficiencies of Taenzer and Fretz noted above; with Taenzer and Fretz, singly or in combination, not teaching or suggesting any of the independent claims, bringing in Slavin, Marx and Charpentier for additional features in dependent claims would not remedy the deficiencies in Taenzer and Fretz regarding the independent claims. Based on the foregoing, it is submitted that claims 7-10, 12 and 27 are patentably distinct from Taenzer, Fretz, Slavin, Marx and/or Charpentier, singly or in any combination.

The independent or the dependent claims recite additional elements which when taken in the context of the claimed invention further patentably distinguish the art of record. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from Taenzer, Fretz, Slavin, Marx and/or

Charpentier. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1-22 and 24-27 under 35 USC §103(a).

Regarding the remaining references cited by the Examiner, since they have not been applied against any of the claims and do not appear properly applicable thereto, no further mention thereof will be made.

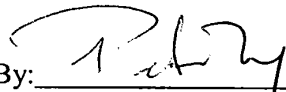
In the event that the Examiner, upon reconsideration, determines that an action other than an allowance is appropriate, the Examiner is requested and authorized to telephone Applicants' representative below prior to taking such action, if the Examiner feels that such a telephone call will advance the prosecution of the present application.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Any required fee in connection with the filing of this response is to be charged to Deposit Account No. 50-0388.

Respectfully submitted,

5150 El Camino Real  
Building A, Suite 22  
Los Altos, CA 94022  
(650) 903-9200 ext 102

By:   
Peter P. Tong  
Registration No.: 35,757

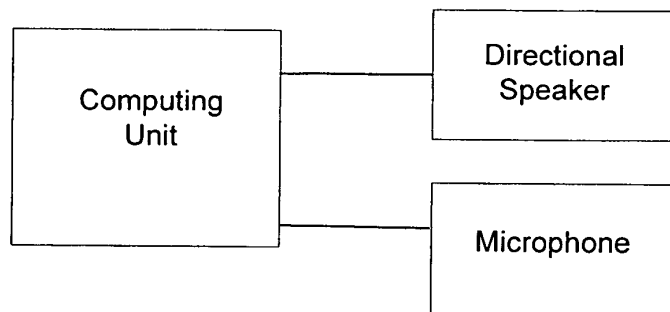


**Fig. 11**



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| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 10/826,527      | 06/17/2008 | 7388962    | IPVBP002            | 2158             |

34071 7590 05/28/2008  
IPVENTURE, INC.  
5150 EL CAMINO REAL  
SUITE A-22  
LOS ALTOS, CA 94022

## 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 722 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 Customer Service Center of the Office of Patent Publication at (571)-272-4200.

**APPLICANT(s)** (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Kwok Wai Cheung, Hong Kong, CHINA;  
Peter P. Tong, Mountain View, CA;  
C. Douglass Thomas, Campbell, CA;

2008 4:44PM HP LASERJET 3200 IP VENTU 650 903 9201

p.2

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE  
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Alexandria, Virginia 22313-1450  
or **EX** (571)-273-2885

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of 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.

34071 7590 03/24/2008

IPVENTURE, INC.  
5150 EL CAMINO REAL  
SUITE A-22  
LOS ALTOS, CA 94022

**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.

PATRICIA TATE (Depositor's name)  
Patricia Tate (Signature)  
May 8, 2008 (Date)

05/09/2008 RNEBRAH1 00000003 10826527

01 FC:2501 720.00 OF  
02 FC:1504 300.00 OF

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/826,527      | 04/15/2004  | Kwok Wai Cheung      | IPVBP002            | 2158             |

FILE OF INVENTION: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS

| APPLN. TYPE       | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|-------------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional    | YES          | \$720         | \$300               | \$0                  | \$1020           | 06/24/2008 |
| EXAMINER          |              | ART UNIT      | CLASS-SUBCLASS      |                      |                  |            |
| PENDLETON, DIONNE |              | 2627          | 381-381000          |                      |                  |            |

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.

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 in 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)

IPVENTURE, INC.

LOS ALTOS, CA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

The following fee(s) are submitted:

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☐ 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 50-3874 (enclose an extra copy of this form)

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 created as shown by the records of the United States Patent and Trademark Office.

Authorized Signature Peter P. Tong

Date May 8, 2008

Typed or printed name PETER P. TONG

Registration No. 35,757

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.

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OL-85 (Rev. 08/07) Approved for use through 08/31/2010.

OMB 0651-0033

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PAGE 2/3 \* RCVD AT 5/8/2008 8:42:43 PM [Eastern Daylight Time] \* SVR:USPTO-EFXRF-5/29 \* DNIS:2732885 \* CSID:650 903 9201 \* DURATION (mm:ss):01:58



# FAX

|                                                                 |                                                                              |
|-----------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>TO:</b><br>Commissioner for Patents,<br>Mail Stop: Issue Fee | <b>FROM:</b><br>C. Douglass Thomas<br>Ph: 650-903-9200,<br>Fax: 650-903-9201 |
| <b>COMPANY:</b><br>United States Patent Office                  | <b>DATE:</b><br>5/8/2008                                                     |
| <b>FAX NUMBER:</b><br>571-273-2885                              | <b>NO. OF PAGES (INCLUDING COVER):</b><br>3                                  |
| <b>PHONE NUMBER:</b>                                            | <b>SENDER'S REFERENCE NUMBER:</b><br>IPVBP002                                |
| <b>RE:</b>                                                      | <b>RECIPIENT'S REFERENCE NUMBER:</b><br>10/826,527                           |

**NOTES/COMMENTS:**

Transmitted herewith are the following documents for entry into the above-noted file:

Issue Fee Transmittal 1 page

Credit Card Payment Form 1 page

Thank you.

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS PRIVILEGED AND CONFIDENTIAL AND IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL NAMED ABOVE AND OTHERS WHO HAVE BEEN SPECIFICALLY AUTHORIZED TO RECEIVE SUCH. IF THE RECIPIENT IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, OR IF ANY PROBLEMS OCCUR WITH TRANSMISSION, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE AT (650)903-9200. THANK YOU.

|                                                                                                                                      |                  |                    |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002           |
|                                                                                                                                      | Application No.: | 10/826,527         |
|                                                                                                                                      | Applicant        | C. Douglass Thomas |
|                                                                                                                                      | Filing Date      | April 15, 2004     |
|                                                                                                                                      | Group            | 2644               |
|                                                                                                                                      |                  | Page 1             |

## U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date      | Patentee | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|-----------|----------|-------|-----------|-------------|
| /DP/             | 1.  | 2003/0182104 A1 | Sept-07/3 | Muesch   |       |           |             |
|                  | 2.  |                 |           |          |       |           |             |
|                  | 3.  |                 |           |          |       |           |             |
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7/31/08

## Foreign Documents

|       |  |              |      |         |       |          | Translation |    |
|-------|--|--------------|------|---------|-------|----------|-------------|----|
| Init. |  | Document No. | Date | Country | Class | Subclass | Yes         | No |
|       |  |              |      |         |       |          |             |    |
|       |  |              |      |         |       |          |             |    |

## Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

|  |   |  |
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|  | A |  |
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|  | O |  |
|  | P |  |

Examiner /Dionne Pendleton/

Date Considered 03/08/2007

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



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## NOTICE OF ALLOWANCE AND FEE(S) DUE

34071 7590 03/24/2008

IPVENTURE, INC.  
5150 EL CAMINO REAL  
SUITE A-22  
LOS ALTOS, CA 94022

EXAMINER

PENDLETON, DIONNE

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 03/24/2008

| APPLICATION NO.                                             | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/826,527                                                  | 04/15/2004  | Kwok Wai Cheung      | IPVBP002            | 2158             |
| TITLE OF INVENTION: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS |             |                      |                     |                  |

| APPLN. TYPE    | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | YES          | \$720         | \$300               | \$0                  | \$1020           | 06/24/2008 |

**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.**

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If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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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.

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34071 7590 03/24/2008

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|                    |
|--------------------|
| (Depositor's name) |
| (Signature)        |
| (Date)             |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/826,527 04/15/2004 Kwok Wai Cheung IPVP002 2158

TITLE OF INVENTION: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS

| APPLN. TYPE    | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | YES          | \$720         | \$300               | \$0                  | \$1020           | 06/24/2008 |

| EXAMINER          | ART UNIT | CLASS-SUBCLASS |
|-------------------|----------|----------------|
| PENDLETON, DIONNE | 2627     | 381-381000     |

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.**

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(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. 2 \_\_\_\_\_  
3 \_\_\_\_\_

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(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  
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☐ 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 \_\_\_\_\_

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| APPLICATION NO.                                                             | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/826,527                                                                  | 04/15/2004  | Kwok Wai Cheung      | IPVBP002            | 2158             |
| 34071                                                                       | 7590        | 03/24/2008           | EXAMINER            |                  |
| IPVENTURE, INC.<br>5150 EL CAMINO REAL<br>SUITE A-22<br>LOS ALTOS, CA 94022 |             |                      | PENDLETON, DIONNE   |                  |
|                                                                             |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                             |             |                      | 2627                |                  |
| DATE MAILED: 03/24/2008                                                     |             |                      |                     |                  |

**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 722 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 722 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>).

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|                               |                        |                     |  |
|-------------------------------|------------------------|---------------------|--|
| <b>Notice of Allowability</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                               | 10/826,527             | CHEUNG ET AL.       |  |
|                               | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                               | Dionne H. Pendleton    | 2627                |  |

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to AMENDMENT FILED 9/7/2007.
2. ☒ The allowed claim(s) is/are 1-22 and 24-28.
3. ☐ 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.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ 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)**

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)</li> <li>3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application</li> <li>6. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____</li> <li>7. <input type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____</li> </ol> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

WAYNE YOUNG  
 SUPERVISORY PATENT EXAMINER

## **DETAILED ACTION**

### ***Allowable Subject Matter***

1. Claims 1-22 and 24-28 are allowed.

### ***Reasons for allowance***

2. The following is an examiner's statement of reasons for allowance:

Regarding independent claims 1 and 22, the prior art of record fails to teach or to fairly suggest the claimed invention as is set forth and connected with the other elements of the invention recited in claims 2-21 and 24-28, for the reasons set forth in the applicant's response filed on 9/7/2007 and the attorney initiated interview of 9/7/2007.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**Norris (US 5,313,663)** teaches an ear mounted receiver.

**Norris (US 6,151,398)** teaches an ultrasonic emitter.

**Warren (US 7,013,009)** teaches a device for wireless sound transmission.

Application/Control Number:  
10/826,527  
Art Unit: 2627

Page 3

**Norris (US 2001/0055397)** teaches a virtual speaker system utilizing ultrasonic sound.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dionne H. Pendleton whose telephone number is 571-272-7497. The examiner can normally be reached on 10:30-7:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. 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.

  
D. Pendleton

  
WAYNE YOUNG  
SUPERVISORY PATENT EXAMINER

|                                   |                                       |                                                             |             |
|-----------------------------------|---------------------------------------|-------------------------------------------------------------|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>10/826,527 | Applicant(s)/Patent Under<br>Reexamination<br>CHEUNG ET AL. |             |
|                                   | Examiner<br>Dionne H. Pendleton       | Art Unit<br>2627                                            | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name              | Classification |
|---|---|--------------------------------------------------|-----------------|-------------------|----------------|
| * | A | US-2001/0055397                                  | 12-2001         | Norris et al.     | 381/79         |
| * | B | US-5,313,663                                     | 05-1994         | Norris, Elwood G. | 455/351        |
| * | C | US-6,151,398                                     | 11-2000         | Norris, Elwood G. | 381/77         |
| * | D | US-7,013,009                                     | 03-2006         | Warren, Peter     | 379/420.01     |
|   | E | US-                                              |                 |                   |                |
|   | F | US-                                              |                 |                   |                |
|   | G | US-                                              |                 |                   |                |
|   | H | US-                                              |                 |                   |                |
|   | I | US-                                              |                 |                   |                |
|   | J | US-                                              |                 |                   |                |
|   | K | US-                                              |                 |                   |                |
|   | L | US-                                              |                 |                   |                |
|   | M | US-                                              |                 |                   |                |

**FOREIGN PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>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.

|                                                                                                                                      |                  |                |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | Cheung et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
|                                                                                                                                      |                  | Page 4 of 4    |

|      |    |                                                                                                                                                  |
|------|----|--------------------------------------------------------------------------------------------------------------------------------------------------|
| /DP/ | AS | W.F. Druyvesteyn et al., "Personal Sound," J. Audio Eng. Soc., Vol. 45, No. 9, September 1997, pp. 685-701.                                      |
| /DP/ | AT | Y.W. Kim et al., "Novel Preprocessing Technique to Improve Harmonic Distortion in Airborne Parametric Array," ICSP '02 Proceedings, pp.1815-1818 |
| /DP/ | AU | Z.A. Gol'dberg, "Certain Second-Order Quantities in Acoustics," SOV PHYS ACOUST, Vol. 3, 1957, pp. 157-162.                                      |

*- context copy*

|                             |                            |
|-----------------------------|----------------------------|
| Examiner /Dionne Pendleton/ | Date Considered 03/08/2007 |
|-----------------------------|----------------------------|

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

OK TO ENTER: /DP/

RECEIVED *PATENT*  
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JAN 17 2008

**Amendments to the Specification:**

On page 1, paragraph [0002] please amend as follows:

OK TO ENTER: /DP/

[0002] This application is also related to: (i) U.S. Patent Application No.       , 10/826,529 (now U.S. Patent 7,269,452), filed concurrently, and entitled, "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference; (ii) U.S. Patent Application No.       , 10/826,531, filed concurrently, and entitled, "DIRECTIONAL SPEAKER FOR PORTABLE ELECTRONIC DEVICE," which is hereby incorporated herein by reference; (iii) U.S. Patent Application No.       , 10/826,537, filed concurrently, and entitled, "METHOD AND APPARATUS FOR LOCALIZED DELIVERY OF AUDIO SOUND FOR ENHANCED PRIVACY," which is hereby incorporated herein by reference; and (iv) U.S. Patent Application No.       , 10/826,528, filed concurrently, and entitled, "METHOD AND APPARATUS FOR WIRELESS AUDIO DELIVERY," which is hereby incorporated herein by reference.

--

On Page 10, please amend Paragraph [0046] as follows:

--

[0046] Consider the scenario where a friend is speaking to the user. In one approach, the microphone 106 picks up the friend's speech, namely, her audio signals. A hearing enhancement system according to the invention can then use the audio signals to modulate ultrasound signals. Then, the directional speaker 104 transmits the modulated ultrasonic signals in air towards the ear of the user. The transmitted signals are demodulated in air to create the output audio signals. Based on ultrasound transmission, the speaker 104 generates directional audio signals and sends them as a cone (virtual cone) 108 to the user's ear. In another approach, the directional speaker 104 includes a physical cone or a horn that directly transmits directional audio signals. In yet another

Appln. No. 10/826,527

2

Docket No. IPVBP002

**PATENT**

approach, the audio signals from the speaker can be steered to the ear or the ear canal, whose location can be identified through mechanisms, such as pattern recognition. Different embodiments of the directional speakers have been described in U.S. Patent Application No. \_\_\_\_\_, 10/826,529, filed concurrently, and entitled "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference.

--

Appln. No. 10/826,527

3

Docket No. IPVBP002





## 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. 2158

|                                                                                                                                                                                                                                                     |                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                 |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>SERIAL NUMBER</b><br>10/826,527                                                                                                                                                                                                                  | <b>FILING OR 371(c) DATE</b><br>04/15/2004<br><b>RULE</b>                                                         | <b>CLASS</b><br>381              | <b>GROUP ART UNIT</b><br>2615                                                                                                                                                                                                                                                   | <b>ATTORNEY DOCKET NO.</b><br>IPVBP002 |
| <b>APPLICANTS</b><br>Kwok Wai Cheung, Hong Kong, CHINA;<br>Peter P. Tong, Mountain View, CA;<br>C. Douglass Thomas, Campbell, CA;                                                                                                                   |                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                 |                                        |
| <b>** CONTINUING DATA *****</b><br>This appln claims benefit of 60/462,570 04/15/2003 and claims benefit of 60/469,221 05/12/2003 and claims benefit of 60/493,441 08/08/2003                                                                       |                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                 |                                        |
| <b>** FOREIGN APPLICATIONS *****</b>                                                                                                                                                                                                                |                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                 |                                        |
| <b>IF REQUIRED, FOREIGN FILING LICENSE GRANTED.. SMALL ENTITY **</b><br>** 06/25/2004                                                                                                                                                               |                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                 |                                        |
| Foreign Priority claimed <input type="checkbox"/> yes <input checked="" type="checkbox"/> no<br>35 USC 119 (a-d) conditions <input type="checkbox"/> yes <input checked="" type="checkbox"/> no <input type="checkbox"/> Met after<br>met Allowance |                                                                                                                   | <b>STATE OR COUNTRY</b><br>CHINA | <b>SHEETS DRAWING</b><br>11                                                                                                                                                                                                                                                     | <b>TOTAL CLAIMS</b><br>27              |
| Verified and Acknowledged<br>Examiner's Signature Initials                                                                                                                                                                                          |                                                                                                                   | <b>INDEPENDENT CLAIMS</b><br>2   |                                                                                                                                                                                                                                                                                 |                                        |
| <b>ADDRESS</b><br>34071                                                                                                                                                                                                                             |                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                 |                                        |
| <b>TITLE</b><br>Directional hearing enhancement systems                                                                                                                                                                                             |                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                 |                                        |
| <b>FILING FEE RECEIVED</b><br>448                                                                                                                                                                                                                   | FEES: Authority has been given in Paper<br>No. _____ to charge/credit DEPOSIT ACCOUNT<br>No. _____ for following: |                                  | <input type="checkbox"/> All Fees<br><input type="checkbox"/> 1.16 Fees ( Filing )<br><input type="checkbox"/> 1.17 Fees ( Processing Ext. of time )<br><input type="checkbox"/> 1.18 Fees ( Issue )<br><input type="checkbox"/> Other _____<br><input type="checkbox"/> Credit |                                        |

<http://neo:8000/PrexServlet/PrexAction?serviceName=BibDataSheet&Action=display&brow...> 5/31/07

|                                                                                                             |                                            |                                                                 |
|-------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------|
| <b>Index of Claims</b><br> | <b>Application/Control No.</b><br>10826527 | <b>Applicant(s)/Patent Under Reexamination</b><br>CHEUNG ET AL. |
|                                                                                                             | <b>Examiner</b><br>Pendleton, Dionne H     | <b>Art Unit</b><br>2615                                         |

|   |                 |   |                   |   |                     |   |                 |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | <b>Rejected</b> | - | <b>Cancelled</b>  | N | <b>Non-Elected</b>  | A | <b>Appeal</b>   |
| = | <b>Allowed</b>  | ÷ | <b>Restricted</b> | I | <b>Interference</b> | O | <b>Objected</b> |

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

| CLAIM |          | DATE       |            |            |  |  |  |  |  |
|-------|----------|------------|------------|------------|--|--|--|--|--|
| Final | Original | 03/08/2007 | 05/31/2007 | 11/25/2007 |  |  |  |  |  |
| 1     | 1        | +          | ✓          | ✓          |  |  |  |  |  |
| 2     | 2        | +          | ✓          | ✓          |  |  |  |  |  |
| 6     | 3        | +          | ✓          | ✓          |  |  |  |  |  |
| 3     | 4        | +          | ✓          | ✓          |  |  |  |  |  |
| 4     | 5        | +          | ✓          | ✓          |  |  |  |  |  |
| 5     | 6        | +          | ✓          | ✓          |  |  |  |  |  |
| 7     | 7        | +          | ✓          | ✓          |  |  |  |  |  |
| 8     | 8        | +          | ✓          | ✓          |  |  |  |  |  |
| 9     | 9        | +          | ✓          | ✓          |  |  |  |  |  |
| 10    | 10       | +          | ✓          | ✓          |  |  |  |  |  |
| 11    | 11       | +          | ✓          | ✓          |  |  |  |  |  |
| 12    | 12       | +          | ✓          | ✓          |  |  |  |  |  |
| 13    | 13       | +          | ✓          | ✓          |  |  |  |  |  |
| 14    | 14       | +          | ✓          | ✓          |  |  |  |  |  |
| 15    | 15       | +          | ✓          | ✓          |  |  |  |  |  |
| 16    | 16       | +          | ✓          | ✓          |  |  |  |  |  |
| 17    | 17       | +          | ✓          | ✓          |  |  |  |  |  |
| 18    | 18       | +          | ✓          | ✓          |  |  |  |  |  |
| 19    | 19       | +          | ✓          | ✓          |  |  |  |  |  |
| 20    | 20       | +          | ✓          | ✓          |  |  |  |  |  |
| 21    | 21       | +          | ✓          | ✓          |  |  |  |  |  |
| 23    | 22       | +          | ✓          | ✓          |  |  |  |  |  |
|       | 23       | +          | ✓          | -          |  |  |  |  |  |
| 24    | 24       | +          | ✓          | ✓          |  |  |  |  |  |
| 25    | 25       | +          | ✓          | ✓          |  |  |  |  |  |
| 26    | 26       | +          | ✓          | ✓          |  |  |  |  |  |
| 27    | 27       | +          | ✓          | ✓          |  |  |  |  |  |
| 22    | 28       |            |            | ✓          |  |  |  |  |  |

|                                                                                                              |                                                |                                                                     |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------|
| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br><br>10826527 | <b>Applicant(s)/Patent Under Reexamination</b><br><br>CHEUNG ET AL. |
|                                                                                                              | <b>Examiner</b><br><br>Pendleton, Dionne H     | <b>Art Unit</b><br><br>2615                                         |

| SEARCHED       |                     |                                       |          |
|----------------|---------------------|---------------------------------------|----------|
| Class          | Subclass            | Date                                  | Examiner |
| 381            | 312-316,320-322,329 | 5/16/07; 5/18/07;<br>5/30/07; 5/31/07 | DP       |
| updated search | -                   | 11/2007                               | DP       |

| SEARCH NOTES        |         |          |
|---------------------|---------|----------|
| Search Notes        | Date    | Examiner |
| East search         | "       | "        |
| Inventor name sarch | "       | "        |
| updated search      | 11/2007 | DP       |

| INTERFERENCE SEARCH |                                                                            |         |          |
|---------------------|----------------------------------------------------------------------------|---------|----------|
| Class               | Subclass                                                                   | Date    | Examiner |
| all applicable      | East <microphone and ultrasonic and (directional near5 speaker) and power> | 11/2007 | DP       |

6

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

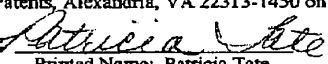
Group: 2627

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted via facsimile to:  
Commissioner for Patents, Alexandria, VA 22313-1450 on January 17, 2008.

Signed:

  
Printed Name: Patricia Tate

**AMENDMENT B**

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

Dear Sir:

Further to the Amendment filed September 7, 2007, please further amend  
the above-identified patent application as follows:

**Amendments to the Specification** begin on page 2 of this paper.

**Remarks/Arguments** begin on page 4 of this paper.

Appln. No. 10/826,527

1

Docket No. IPVBP002

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**Amendments to the Specification:**

On page 1, paragraph [0002] please amend as follows:

--

[0002] This application is also related to: (i) U.S. Patent Application No. \_\_\_\_\_, 10/826,529 (now U.S. Patent 7,269,452), filed concurrently, and entitled, "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference; (ii) U.S. Patent Application No. \_\_\_\_\_, 10/826,531, filed concurrently, and entitled, "DIRECTIONAL SPEAKER FOR PORTABLE ELECTRONIC DEVICE," which is hereby incorporated herein by reference; (iii) U.S. Patent Application No. \_\_\_\_\_, 10/826,537, filed concurrently, and entitled, "METHOD AND APPARATUS FOR LOCALIZED DELIVERY OF AUDIO SOUND FOR ENHANCED PRIVACY," which is hereby incorporated herein by reference; and (iv) U.S. Patent Application No. \_\_\_\_\_, 10/826,528, filed concurrently, and entitled, "METHOD AND APPARATUS FOR WIRELESS AUDIO DELIVERY," which is hereby incorporated herein by reference.

--

On Page 10, please amend Paragraph [0046] as follows:

--

[0046] Consider the scenario where a friend is speaking to the user. In one approach, the microphone 106 picks up the friend's speech, namely, her audio signals. A hearing enhancement system according to the invention can then use the audio signals to modulate ultrasound signals. Then, the directional speaker 104 transmits the modulated ultrasonic signals in air towards the ear of the user. The transmitted signals are demodulated in air to create the output audio signals. Based on ultrasound transmission, the speaker 104 generates directional audio signals and sends them as a cone (virtual cone) 108 to the user's ear. In another approach, the directional speaker 104 includes a physical cone or a horn that directly transmits directional audio signals. In yet another

**PATENT**

approach, the audio signals from the speaker can be steered to the ear or the ear canal, whose location can be identified through mechanisms, such as pattern recognition. Different embodiments of the directional speakers have been described in U.S. Patent Application No. \_\_\_\_\_, 10/826,529, filed concurrently, and entitled "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference.

--

**PATENT**

**REMARKS**

The specification has been amended to update certain application numbers.

Respectfully submitted,



C. Douglass Thomas  
Reg. No. 32,947

(650) 903-9200

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JAN 17 2008 PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 14, 2004

Group: 2627

Title: DIRECTIONAL HEARING ENHANCEMENT  
SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted via facsimile to:  
Commissioner for Patents, Alexandria, VA 22313-1450 on January 17, 2008.

Signed:

*Patricia Tate*  
Printed Name: Patricia Tate

**INFORMATION DISCLOSURE STATEMENT  
37 CFR §§1.56 AND 1.97(b)**

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

Dear Sir:

The references listed in the attached PTO Form 1449, a copy of which is attached, may be material to examination of the above-identified patent application. Applicants submit these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these citations of official record in this application.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that this reference indeed constitutes prior art.

This Information Disclosure Statement is being filed after the mailing date of the first Office Action on the merits, or after three months of the filing date of this application, whichever event occurred last, but it is believed before the mailing date of either: (i) a final action under §1.113 or (ii) a notice of allowance under §1.311, whichever occurs first.

Appln. No. 10/826,527

-1-

Atty. Docket No. IPVBP002

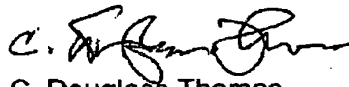
Accompanying this Information Disclosure Statement is

- ☒ a statement as specified in 37 CFR 1.97(e); or  
☐ the fee set forth in 37 CFR 1.17(p).

**37 CFR §1.97(e) Statement**

The undersigned hereby states: that no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the Information Disclosure Statement. Note, however, that item (A) of the attached PTO Form 1449 represents an archived version of item (E), page 2 on the PTO Form 1449 previously submitted and received by the USPTO on January 21, 2005.

Respectfully submitted,



C. Douglass Thomas  
Reg. No. 32, 947

5051 El Camino Real  
Building A, Suite 22  
Los Altos, CA 94022

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JAN 17 2008

|                                                                                                                                      |                  |                |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | CHEUNG et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2627           |
|                                                                                                                                      |                  | Page 1 of 1    |

## U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date    | Patentee         | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|---------|------------------|-------|-----------|-------------|
|                  | 1.  | 3,942,139       | Mar.-76 | Cooper et al     |       |           |             |
|                  | 2.  | 5,495,534       | Feb.-96 | Inanaga et al.   |       |           |             |
|                  | 3.  | 5,588,041       | Dec.-96 | Meyer et al.     |       |           |             |
|                  | 4.  | 5,764,595       | Jun.-98 | Power            |       |           |             |
|                  | 5.  | 5,764,782       | Jun.-98 | Hayes            |       |           |             |
|                  | 6.  | 5,777,665 A     | Jul.-98 | McNelley et al.  |       |           |             |
|                  | 7.  | 6,279,946 B1    | Aug.-01 | Johnson et al.   |       |           |             |
|                  | 8.  | 6,556,687 B1    | Apr.-03 | Manabe           |       |           |             |
|                  | 9.  | 6,594,367 B1    | Jul.-03 | Marash et al.    |       |           |             |
|                  | 10. | 2001/0038698 A1 | Nov.-01 | Breed et al.     |       |           |             |
|                  | 11. | 2002/0005777 A1 | Jan.-02 | Rodewald et al.  |       |           |             |
|                  | 12. | 2002/0008718 A1 | Jan.-02 | Obradovich       |       |           |             |
|                  | 13. | 2002/0141599 A1 | Oct.-02 | Trajkovic et al. |       |           |             |
|                  | 14. | 2002/0149705 A1 | Oct.-02 | Allen et al.     |       |           |             |

## Foreign Documents

| Init. | Document No. | Date | Country | Class | Subclass | Translation |    |
|-------|--------------|------|---------|-------|----------|-------------|----|
|       |              |      |         |       |          | Yes         | No |
|       |              |      |         |       |          |             |    |
|       |              |      |         |       |          |             |    |

## Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

|   |                                                                                                                                   |
|---|-----------------------------------------------------------------------------------------------------------------------------------|
| A | American Technology Corporation, HyperSonic Sound, January 22, 2002, <a href="http://www.atacsd.com">www.atacsd.com</a>           |
| B | Brain, Marshall, How USB Ports Work, October 11, 2002, <a href="http://www.howstuffworks.com/usb">www.howstuffworks.com/usb</a> . |
| C |                                                                                                                                   |
| D |                                                                                                                                   |
| E |                                                                                                                                   |

|          |                 |
|----------|-----------------|
| Examiner | Date Considered |
|----------|-----------------|

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered.  
Include copy of this form with next communication to applicant.

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JAN 17 2008

# FAX

**TO:**  
Commissioner for Patents,  
Mail Stop:

**FROM:**  
C. Douglass Thomas  
Ph: 650-903-9200,  
Fax: 650-903-9800

**COMPANY:**  
United States Patent Office

**DATE:**  
1/17/2008

**FAX NUMBER:**  
571-273-8300

**NO. OF PAGES (INCLUDING COVER):**  
21

**PHONE NUMBER:**

**SENDER'S REFERENCE NUMBER:**  
IPVBP002

**RE:**

**RECIPIENT'S REFERENCE NUMBER:**  
10/826,527

*Resending*

**NOTES/COMMENTS:**

Transmitted herewith are the following documents for entry into the above-noted file:

|                                  |          |
|----------------------------------|----------|
| Amendment B                      | 4 pages  |
| Information Disclosure Statement | 2 pages  |
| Form 1449                        | 1 page   |
| 2 Cited References               | 13 pages |
| Thank you.                       |          |

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS PRIVILEGED AND CONFIDENTIAL AND IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL NAMED ABOVE AND OTHERS WHO HAVE BEEN SPECIFICALLY AUTHORIZED TO RECEIVE SUCH. IF THE RECIPIENT IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, OR IF ANY PROBLEMS OCCUR WITH TRANSMISSION, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE AT (650)903-9200. THANK YOU.

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|                                                                                                                                      |                  |                |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | CHEUNG et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2627           |
|                                                                                                                                      |                  | Page 1 of 1    |

## U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date    | Patentee         | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|---------|------------------|-------|-----------|-------------|
|                  | 1.  | 3,942,139       | Mar.-76 | Cooper et al     |       |           |             |
|                  | 2.  | 5,495,534       | Feb.-96 | Inanaga et al.   |       |           |             |
|                  | 3.  | 5,588,041       | Dec.-96 | Meyer et al.     |       |           |             |
|                  | 4.  | 5,764,595       | Jun.-98 | Power            |       |           |             |
|                  | 5.  | 5,764,782       | Jun.-98 | Hayes            |       |           |             |
|                  | 6.  | 5,777,665 A     | Jul.-98 | McNelley et al.  |       |           |             |
|                  | 7.  | 6,279,946 B1    | Aug.-01 | Johnson et al.   |       |           |             |
|                  | 8.  | 6,556,687 B1    | Apr.-03 | Manabe           |       |           |             |
|                  | 9.  | 6,594,367 B1    | Jul.-03 | Marash et al.    |       |           |             |
|                  | 10. | 2001/0038698 A1 | Nov.-01 | Breed et al.     |       |           |             |
|                  | 11. | 2002/0005777 A1 | Jan.-02 | Rodewald et al.  |       |           |             |
|                  | 12. | 2002/0008718 A1 | Jan.-02 | Obradovich       |       |           |             |
|                  | 13. | 2002/0141599 A1 | Oct.-02 | Trajkovic et al. |       |           |             |
|                  | 14. | 2002/0149705 A1 | Oct.-02 | Allen et al.     |       |           |             |

## Foreign Documents

| Init. | Document No. | Date | Country | Class | Subclass | Translation |    |
|-------|--------------|------|---------|-------|----------|-------------|----|
|       |              |      |         |       |          | Yes         | No |
|       |              |      |         |       |          |             |    |
|       |              |      |         |       |          |             |    |

## Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

|   |                                                                                                                                   |
|---|-----------------------------------------------------------------------------------------------------------------------------------|
| A | American Technology Corporation, HyperSonic Sound, January 22, 2002, <a href="http://www.atacsd.com">www.atacsd.com</a>           |
| B | Brain, Marshall, How USB Ports Work, October 11, 2002, <a href="http://www.howstuffworks.com/usb">www.howstuffworks.com/usb</a> . |
| C |                                                                                                                                   |
| D |                                                                                                                                   |
| E |                                                                                                                                   |

|          |                 |
|----------|-----------------|
| Examiner | Date Considered |
|----------|-----------------|

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered.  
Include copy of this form with next communication to applicant.

**FAX****RECEIVED**  
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**JAN 17 2008****TO:**  
Commissioner for Patents,  
Mail Stop:**FROM:**  
C. Douglass Thomas  
Ph: 650-903-9200,  
Fax: 650-903-9800**COMPANY:**  
United States Patent Office**DATE:**  
1/17/2008**FAX NUMBER:**  
571-273-8300**NO. OF PAGES (INCLUDING COVER):**  
21**PHONE NUMBER:****SENDER'S REFERENCE NUMBER:**  
IPVBP002**RE:****RECIPIENT'S REFERENCE NUMBER:**  
10/826,527**NOTES/COMMENTS:**

Transmitted herewith are the following documents for entry into the above-noted file:

|                                  |          |
|----------------------------------|----------|
| Amendment B                      | 4 pages  |
| Information Disclosure Statement | 2 pages  |
| Form 1449                        | 1 page   |
| 2 Cited References               | 13 pages |

Thank you.

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS PRIVILEGED AND CONFIDENTIAL AND IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL NAMED ABOVE AND OTHERS WHO HAVE BEEN SPECIFICALLY AUTHORIZED TO RECEIVE SUCH. IF THE RECIPIENT IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, OR IF ANY PROBLEMS OCCUR WITH TRANSMISSION, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE AT (650)903-9200. THANK YOU.

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JAN 17 2008

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

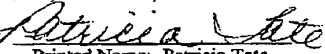
Group: 2627

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted via facsimile to:  
Commissioner for Patents, Alexandria, VA 22313-1450 on January 17, 2008.

Signed:

  
Printed Name: Patricia Tate

**AMENDMENT B**

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

Dear Sir:

Further to the Amendment filed September 7, 2007, please further amend  
the above-identified patent application as follows:

**Amendments to the Specification** begin on page 2 of this paper.

**Remarks/Arguments** begin on page 4 of this paper.

Appln. No. 10/826,527

1

Docket No. IPVBP002

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PATENT

JAN 17 2008

**Amendments to the Specification:**

On page 1, paragraph [0002] please amend as follows:

--

[0002] This application is also related to: (i) U.S. Patent Application No.           , 10/826,529 (now U.S. Patent 7,269,452), filed concurrently, and entitled, "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference; (ii) U.S. Patent Application No.           , 10/826,531, filed concurrently, and entitled, "DIRECTIONAL SPEAKER FOR PORTABLE ELECTRONIC DEVICE," which is hereby incorporated herein by reference; (iii) U.S. Patent Application No.           , 10/826,537, filed concurrently, and entitled, "METHOD AND APPARATUS FOR LOCALIZED DELIVERY OF AUDIO SOUND FOR ENHANCED PRIVACY," which is hereby incorporated herein by reference; and (iv) U.S. Patent Application No.           , 10/826,528, filed concurrently, and entitled, "METHOD AND APPARATUS FOR WIRELESS AUDIO DELIVERY," which is hereby incorporated herein by reference.

--

On Page 10, please amend Paragraph [0046] as follows:

--

[0046] Consider the scenario where a friend is speaking to the user. In one approach, the microphone 106 picks up the friend's speech, namely, her audio signals. A hearing enhancement system according to the invention can then use the audio signals to modulate ultrasound signals. Then, the directional speaker 104 transmits the modulated ultrasonic signals in air towards the ear of the user. The transmitted signals are demodulated in air to create the output audio signals. Based on ultrasound transmission, the speaker 104 generates directional audio signals and sends them as a cone (virtual cone) 108 to the user's ear. In another approach, the directional speaker 104 includes a physical cone or a horn that directly transmits directional audio signals. In yet another

**PATENT**

approach, the audio signals from the speaker can be steered to the ear or the ear canal, whose location can be identified through mechanisms, such as pattern recognition. Different embodiments of the directional speakers have been described in U.S. Patent Application No. \_\_\_\_\_, 10/826,529, filed concurrently, and entitled "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference.

--

**PATENT**

**REMARKS**

The specification has been amended to update certain application numbers.

Respectfully submitted,



C. Douglass Thomas  
Reg. No. 32,947

(650) 903-9200

Appln. No. 10/826,527

4

Docket No. IPVBP002

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JAN 17 2008 PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 14, 2004

Group: 2627

Title: DIRECTIONAL HEARING ENHANCEMENT  
SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted via facsimile to:  
Commissioner for Patents, Alexandria, VA 22313-1450 on January 17, 2008.

Signed:

*Patricia Tate*  
Printed Name: Patricia Tate

**INFORMATION DISCLOSURE STATEMENT  
37 CFR §§1.56 AND 1.97(b)**

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

Dear Sir:

The references listed in the attached PTO Form 1449, a copy of which is attached, may be material to examination of the above-identified patent application. Applicants submit these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these citations of official record in this application.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that this reference indeed constitutes prior art.

This Information Disclosure Statement is being filed after the mailing date of the first Office Action on the merits, or after three months of the filing date of this application, whichever event occurred last, but it is believed before the mailing date of either: (i) a final action under §1.113 or (ii) a notice of allowance under §1.311, whichever occurs first.

Appln. No. 10/826,527

-1-

Atty. Docket No. IPVBP002

Accompanying this Information Disclosure Statement is

☒ a statement as specified in 37 CFR 1.97(e); or

☐ the fee set forth in 37 CFR 1.17(p).

**37 CFR §1.97(e) Statement**

The undersigned hereby states: that no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the Information Disclosure Statement. Note, however, that item (A) of the attached PTO Form 1449 represents an archived version of item (E), page 2 on the PTO Form 1449 previously submitted and received by the USPTO on January 21, 2005.

Respectfully submitted,



C. Douglass Thomas  
Reg. No. 32, 947

5051 El Camino Real  
Building A, Suite 22  
Los Altos, CA 94022

## EAST Search History

| Ref # | Hits | Search Query                                                        | DBs                                                                        | Default Operator | Plurals | Time Stamp       |
|-------|------|---------------------------------------------------------------------|----------------------------------------------------------------------------|------------------|---------|------------------|
| L1    | 40   | MICROPHONE and ultrasonic and (directional near5 speaker) and power | US-PGPUB;<br>USPAT;<br>USOCR;<br>FPRS;<br>EPO; JPO;<br>DERWENT;<br>IBM_TDB | OR               | OFF     | 2007/11/26 09:02 |

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OCT 10 2007

# FAX

|                                                       |                                                                        |
|-------------------------------------------------------|------------------------------------------------------------------------|
| <b>TO:</b><br>Commissioner for Patents,<br>Mail Stop: | <b>FROM:</b><br>Peter P. Tong<br>Ph: 650-903-9200<br>Fax: 650-903-9800 |
| <b>COMPANY:</b><br>United States Patent Office        | <b>DATE:</b><br>10/10/2007                                             |
| <b>FAX NUMBER:</b><br>571-273-8300                    | <b>NO. OF PAGES (INCLUDING COVER):</b><br>3                            |
| <b>PHONE NUMBER:</b>                                  | <b>SENDER'S REFERENCE NUMBER:</b><br>IPVBP002                          |
| <b>RE:</b><br>Substance of the Interview              | <b>RECIPIENT'S REFERENCE NUMBER:</b><br>10/826,527                     |

**NOTES/COMMENTS:**

Transmitted herewith is the following document for entry into the above-noted file:

Statement of the Substance of the Interview

2 pages

Thank you.

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OCT 10 2007

***IN THE UNITED STATES PATENT AND TRADEMARK OFFICE***

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

Group: 2615

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being  
transmitted via facsimile to: Commissioner for  
Patents, Alexandria, VA 22313-1450 on October 10, 2007.

Signed:

  
Printed Name: Patricia Tate

**Statement of the Substance of the Interview**

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

Dear Sir:

On September 7, 2007, the Examiner of the above-identified application kindly granted Applicants' representative an interview.

During the interview, a number of issues were discussed, including (a) amending claims to recite transforming ultrasonic signals into audio signals outside the ear of the user; (b) claim 26, as originally presented, failed to be met by the limitations of the prior art of record; (c) claim 6, as originally presented, failed to be met by the limitations of the prior art of record, though claim 6 has been amended; and (d) claims 15, 20 and 21 no longer being anticipated.

Appln. No. 10/826,527

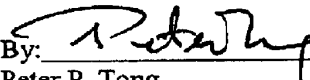
1

Docket No. IPVBP002

In the interview, the Examiner also agreed to contact Applicants' representative if claims found to be anticipated when examining the amendment Applicants submitted on that same day.

Respectfully submitted,

5150 El Camino Real  
Building A, Suite 22  
Los Altos, CA 94022  
(650) 903-9200 ext 102

By:   
Peter P. Tong  
Registration No.: 35,757



# 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. |           |               |                   |       |          |              |      |  |
|--------------------------------------------------------------------------------------|--------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------|---------------|-------------------|-------|----------|--------------|------|--|
| 10/826,527                                                                           | 04/15/2004         | Kwok Wai Cheung      | IPVBP002                                                                                                                                                                                      | 2158             |           |               |                   |       |          |              |      |  |
| 34071<br>IPVENTURE, INC.<br>5150 EL CAMINO REAL<br>SUITE A-22<br>LOS ALTOS, CA 94022 | 7590<br>09/14/2007 |                      | <table border="1"><tr><td colspan="2">EXAMINER</td></tr><tr><td colspan="2">PENDLETON, DIONNE</td></tr><tr><td>ART UNIT</td><td>PAPER NUMBER</td></tr><tr><td>2627</td><td></td></tr></table> |                  | EXAMINER  |               | PENDLETON, DIONNE |       | ART UNIT | PAPER NUMBER | 2627 |  |
| EXAMINER                                                                             |                    |                      |                                                                                                                                                                                               |                  |           |               |                   |       |          |              |      |  |
| PENDLETON, DIONNE                                                                    |                    |                      |                                                                                                                                                                                               |                  |           |               |                   |       |          |              |      |  |
| ART UNIT                                                                             | PAPER NUMBER       |                      |                                                                                                                                                                                               |                  |           |               |                   |       |          |              |      |  |
| 2627                                                                                 |                    |                      |                                                                                                                                                                                               |                  |           |               |                   |       |          |              |      |  |
|                                                                                      |                    |                      | <table border="1"><tr><td>MAIL DATE</td><td>DELIVERY MODE</td></tr><tr><td>09/14/2007</td><td>PAPER</td></tr></table>                                                                         |                  | MAIL DATE | DELIVERY MODE | 09/14/2007        | PAPER |          |              |      |  |
| MAIL DATE                                                                            | DELIVERY MODE      |                      |                                                                                                                                                                                               |                  |           |               |                   |       |          |              |      |  |
| 09/14/2007                                                                           | 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.

|                          |                                        |                                      |  |
|--------------------------|----------------------------------------|--------------------------------------|--|
| <b>Interview Summary</b> | <b>Application No.</b><br>10/826,527   | <b>Applicant(s)</b><br>CHEUNG ET AL. |  |
|                          | <b>Examiner</b><br>Dionne H. Pendleton | <b>Art Unit</b><br>2627              |  |

All participants (applicant, applicant's representative, PTO personnel):

(1) Dionne H. Pendleton. (3) \_\_\_\_\_

(2) Peter Tong. (4) \_\_\_\_\_

Date of Interview: 07 September 2007.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.  
If Yes, brief description: \_\_\_\_\_

Claim(s) discussed: all.

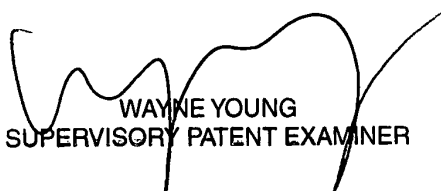
Identification of prior art discussed: Taenzer (US 6,631,196) and Fretz (US 6,275,596).

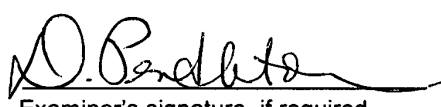
Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Claims now amended to clearly recite that sound is transformed into audio signal OUTSIDE the ear of the user; additionally, claim 26, as originally presented, fails to be met by the limitations of the prior art of record. The same applies for claim 6, which is now amended. Claims 15, 20 and 21 also briefly discusses and no longer anticipated. Examiner agrees to contact Mr. Tong, if claims found to be anticipated when examining the amendment.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

  
**WAYNE YOUNG**  
**SUPERVISORY PATENT EXAMINER**

  
Examiner's signature, if required

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

#### Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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**SEP 07 2007**

# FAX

|                                                       |                                                                      |
|-------------------------------------------------------|----------------------------------------------------------------------|
| <b>TO:</b><br>Commissioner for Patents,<br>Mail Stop: | <b>FROM:</b><br>Peter P. Tong<br>Ph: 650-903-9200, Fax: 650-903-9800 |
| <b>COMPANY:</b><br>United States Patent Office        | <b>DATE:</b><br>9/7/2007                                             |
| <b>FAX NUMBER:</b><br>571-273-8300                    | <b>NO. OF PAGES (INCLUDING COVER):</b><br>21                         |
| <b>PHONE NUMBER:</b>                                  | <b>SENDER'S REFERENCE NUMBER:</b><br>IPVBP002                        |
| <b>RE:</b>                                            | <b>RECIPIENT'S REFERENCE NUMBER:</b><br>10/826,527                   |

## NOTES/COMMENTS:

Transmitted herewith are the following documents for entry into the above-noted file:

|                       |          |
|-----------------------|----------|
| Amendment Transmittal | 1 page   |
| Amendment A           | 18 pages |
| New Sheet Figure 11   | 1 page   |

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS PRIVILEGED AND CONFIDENTIAL AND IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL NAMED ABOVE AND OTHERS WHO HAVE BEEN SPECIFICALLY AUTHORIZED TO RECEIVE SUCH. IF THE RECIPIENT IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, OR IF ANY PROBLEMS OCCUR WITH TRANSMISSION, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE AT (650)903-9200. THANK YOU.

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**SEP 07 2007**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

Group: 2615

Title: DIRECTIONAL HEARING  
 ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted by facsimile to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 7, 2007.

Signed: Patricia Tate Printed Name: Patricia Tate.

**AMENDMENT A TRANSMITTAL**

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

Sir:

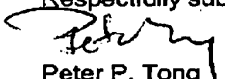
Transmitted herewith is an Amendment in the above-identified application.

The fee has been calculated as shown below.

|                                                              | Claims<br>After<br>Amendment |       | Highest<br>Previously<br>Paid For | Present<br>Extra | Small Entity<br>Rate Fee | Large Entity<br>Rate Fee |
|--------------------------------------------------------------|------------------------------|-------|-----------------------------------|------------------|--------------------------|--------------------------|
| Total Claims                                                 | 27                           | MINUS | 27                                | 00               | x 25 =                   | x 50 =                   |
| Independent<br>Claims                                        | 2                            | MINUS | 2                                 | 00               | x 100 =                  | x 200 =                  |
| Multiple Dependent Claim Present and Fee Not Previously Paid |                              |       |                                   |                  | \$                       | \$                       |
| Total                                                        |                              |       |                                   |                  | \$00.00                  | \$00.00                  |

- ☐ Applicant(s) hereby petition for a \_\_\_\_\_ - month extension(s) of time to respond to the aforementioned Office Action.
- ☒ Applicant(s) believe that no (additional) Extension of Time is required; however, if it is determined that such an extension is required, Applicant(s) hereby petition that such an extension be granted and authorize the Commissioner to charge the required fees for an Extension of Time under 37 CFR 1.136 to Deposit Account No. 50-3874 (Order No. IPVBP002).
- ☐ Enclosed is a Credit Card Payment Form for the amount of \$\_\_\_\_\_ to cover the additional claim fee and/or extension of time fees.
- ☐ Please charge any additional fees required to facilitate filing the enclosed response, to Deposit Account No. 50-3874 (Order No. \_\_\_\_\_).

Respectfully submitted,

  
 Peter P. Tong  
 Reg. No. 35,757

Appln. No. 10/826,527

Atty. Docket No. IPVBP002

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

Group: 2615

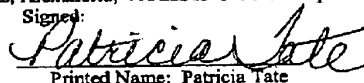
Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

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**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being  
transmitted via facsimile to: Commissioner for  
Patents, Alexandria, VA 22313-1450 on September 7, 2007.

Signed:



Printed Name: Patricia Tate

**AMENDMENT A**

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

Dear Sir:

In response to the Office Action dated June 15, 2007, please amend the above-identified patent application as follows:

**Amendments to the Specification** are reflected on page 2 of this paper.

**Amendments to the Drawings** are reflected on page 3 of this paper.

**Amendments to the Claims** are reflected in the listing of claims which being on page 3 of this paper.

**Remarks/Arguments** begin on page 9 of this paper.

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Docket No. IPVBP002

**Amendments to the Specification:**

**In the Specification**

On page 9, after paragraph 41 of the specification, please ADD paragraph 41.1 as follows:

[0041.1] FIG. 11 shows a hearing enhancement system having a computing unit according to one embodiment of the invention.

On page 9, please AMEND paragraph 42 of the specification as follows:

[0042] Same numerals in ~~Figures 1-10~~ Figures 1-11 are assigned to similar elements in all the figures. Embodiments of the invention are discussed below with reference to ~~Figures 1-10~~ Figures 1-11. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

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**Amendments to the Claims:**

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

**Listing of Claims**

1. (Currently amended) A hearing enhancement system for a user, comprising:  
an interface unit that has a directional speaker and a microphone;  
wherein  
the microphone receives input audio signals, which are transformed into ultrasonic signals;  
the speaker transmits the ultrasonic signals;  
at least a portion of the ultrasonic signals is transformed into output audio signals in air;~~and~~  
a portion of the ~~input~~ output audio signals is configured to have higher power ~~is amplified more~~ than another portion to enhance the hearing of the user,  
and  
wherein the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user.
2. (Currently amended) A hearing enhancement system as recited in claim 1 wherein the ~~amplification is~~ the portion having higher power is selected based on frequency dependent.
3. (Currently amended) A hearing enhancement system as recited in claim 2 wherein at least a portion of the audio frequencies that is higher in frequency is selected over ~~than~~ another portion of the audio frequencies to have higher power receives greater amplification.

4. (Currently amended) A hearing enhancement system as recited in claim 2 wherein the interface unit is configured not to increase the power of certain frequencies of the input output audio signals are not amplified.

5. (Currently amended) A hearing enhancement system as recited in claim 2 wherein the amplification power increase depends on at least one characteristic of the hearing of the user.

6. (Currently Amended) A hearing enhancement system as recited in claim 5,  
 wherein the at least one characteristic of the hearing of the user is determined through calibrating the hearing of the user,  
wherein the system is configured to allow the power of the output audio signals to be changed as a function of frequency, and  
wherein the user can change the power in view of the calibration results.

7. (Original) A hearing enhancement system as recited in claim 1 wherein the system can be de-activated by the user.

8. (Previously presented) A hearing enhancement system as recited in claim 1 wherein when the system is not activated, the system can be activated depending on at least one word spoken by the user.

9. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have a power level, and  
 wherein depending on the power level of the input audio signals, the system can be in a standby mode.

10. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have an average power level, and  
 wherein depending on the average power level of the input audio signals, the system can be in a standby mode.

11. (Original) A hearing enhancement system as recited in claim 1 wherein the microphone is a directional microphone.

12. (Currently Amended) A hearing enhancement system as recited in claim 1 wherein the input audio signals have an average power level, and wherein the ~~amplification~~ power of the portion is reduced or limited if the average power level of the input audio signals is higher than a preset threshold.

13. (Original) A hearing enhancement system as recited in claim 1 wherein the system further includes a rechargeable battery.

14. (Original) A hearing enhancement system as recited in claim 1 wherein the system also can function as a phone.

15. (Currently Amended) A hearing enhancement system as recited in claim 1, wherein the system includes more than one directional speaker, and wherein the phases of the ultrasonic signals driving at least two of the speakers differ by a preset value, and wherein the direction of the output audio signals can be changed by changing the preset value.

16. (Previously presented) A hearing enhancement system as recited in claim 1 wherein the system can also access audio signals from another instrument through a wire or a wireless connection.

17. (Original) A hearing enhancement system as recited in claim 16 wherein the another instrument is a portable instrument.

18. (Previously presented) A hearing enhancement system as recited in claim 16 wherein the another instrument is an entertainment unit.

19. (Previously presented) A hearing enhancement system as recited in claim 16 wherein the another instrument is a phone.

20. (Currently Amended) A hearing enhancement system as recited in claim 16, wherein the another instrument is ~~related to~~ a microphone at an event, and wherein audio signals are accessed from another instrument through a wireless connection.

21. (Currently Amended) A hearing enhancement system as recited in claim 16, wherein the another instrument is ~~related to~~ a speaker at an event, and wherein audio signals are accessed from another instrument through a wireless connection.

22. (Currently Amended) A hearing enhancement system for a user, comprising:  
a directional speaker;  
a microphone; and  
a computing unit operatively coupled to the directional speaker and the microphone,

wherein the microphone receives input audio signals, ~~and the computing unit modifies the input audio signals at least by modifying certain frequencies differently than other frequencies to enhance the ability of the user to hear the input audio signals, and provides the modified signals to the directional speaker,~~

wherein the directional speaker outputs ultrasonic waves based on the ~~modified~~ input audio signals,

wherein the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user, and

wherein the computing unit is configured so that at least certain frequencies of the output audio signals are being modified differently than other frequencies to enhance the hearing of the user.

23. (Cancelled)

24. (Previously presented) A hearing enhancement system as recited in claim 22,  
 wherein the speaker is attachable to the clothing worn by the user, and  
 wherein the directional speaker can direct the ultrasonic waves towards at least  
 one ear of the user from the worn position of the directional speaker.

25. (Original) A hearing enhancement system as recited in claim 22, wherein the  
 computing unit is integral with the directional speaker.

26. (Original) A hearing enhancement system as recited in claim 22, wherein the  
 computing unit is separate from the directional speaker but operatively couples with the  
 directional speaker over a wireless link.

27. (Previously presented) A hearing enhancement system as recited in claim 22,  
 wherein the computing unit has a reduced power mode and a normal power mode, and  
 wherein the computing unit can be automatically switched between the power modes  
 based on at least one characteristic of the input audio signals, thereby reducing power  
 consumption by the computing unit.

28. (New) A hearing enhancement system as recited in claim 1,  
 wherein the portion having higher power is selected based on frequency,  
 wherein the power increase depends on at least one characteristic of the hearing of  
 the user,  
 wherein the at least one characteristic of the hearing of the user is determined  
 through calibrating the hearing of the user,

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wherein the system is configured to allow the power of the output audio signals to be changed as a function of frequency,

wherein the system can be in a standby mode to reduce power consumption by the system,

wherein the system further includes a rechargeable battery, and

wherein the system also can function as a phone.

**Amendments to the Drawings:**

**In the Drawings:**

Please ADD new sheet illustrating Fig. 11 to the application.

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### REMARKS

Applicants previously presented claims 1 through 27 for examination. In the above-identified Office Action, the Examiner has withdrawn a prior election/restriction requirement, which Applicants acknowledge with gratitude; objected to the drawings; objected to the specification; and rejected all the claims.

Applicants appreciate the Examiner's detailed comments in her Office Action to the above-identified application. For the reasons to be stated below, however, Applicants respectfully traverse the rejections.

By this amendment, Applicants have cancelled claim 23; have amended claims 1-6, 9, 10, 12, 15 and 20-22 to further clarify the subject matter regarded as the invention; have added claim 28; and have submitted a proposed new drawing with corresponding changes in the specification. Accordingly, claims 1-22 and 24-28 remain pending. Applicants respectfully request that the Examiner reconsider the application in light of the amendments and the remarks expressed herein.

#### Drawing Objections

The Office Action objected to the drawings because the "computing unit" as recited in claims 22 and 25-27 allegedly was not shown. To expedite the prosecution, Applicants have added Figure 11 as support for the "computing unit". The support for Figure 11 can be found, for example, in claims 22 and 25-27. In view of the submission, Applicants respectfully request withdrawal of the objection.

#### Antecedent Basis Objections

Claims 9, 10 and 12 were objected to because of allegedly improper antecedent basis for the term "power level" and "average power level." To expedite the prosecution, Applicants have amended claims 9, 10 and 12 accordingly. In view of the amendment, Applicants respectfully request withdrawal of the objection.

### 112 Rejections

Claims 20 and 21 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action stated that the recitation "at an event" was not clear. Applicants respectfully disagree.

In a general sense, claim 20 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a microphone at an event. Claim 21 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a speaker at an event. The event can be, for example, a concert, a play or a presentation.

For example, paragraphs 88- 91 in the specification, partially reproduced below with emphasis added, can help explain the phrase "at an event":

In private, such as at home, hearing impaired people sometimes might have a tendency to increase the sound level of audio or video instruments a bit too high. On the other hand, in public, hearing impaired people sometimes might have difficulty hearing. In one embodiment, the system is further designed to pick up, capture or access audio signals from portable or non-portable instruments, with the interface unit serving as a personalized listening unit.

FIG. 10 shows examples of such other portable or non-portable instruments. The instruments can be used in a private environment, such as at home, or attached to the user. This can include entertainment units, such as televisions, stereo systems, CD players, or radios....

Regarding public use, the user can be at a conference or a theater. The system can be coupled to the conference microphone or the theater speaker wirelessly, and thus be capable of capturing and enhancing the audio signals therefrom.

As stated above, the user goes to an event, such as going to a conference or to a theater. A hearing enhancement system according to an embodiment of the present invention can help the user hear at the event. The system can access audio signals from an instrument, which can be a microphone at the event. Alternatively, the system can access audio

signals from an instrument, which can be a speaker at the event. At least based on the above explanation, Applicants do not understand why the phrase "at an event" is unclear. Hence Applicants respectfully request withdrawal of the 112 rejection.

103 Rejections regarding claims 1-6, 11 and 13-26

Claims 1-6, 11 and 13-26 under 35 USC 103(a) as being unpatentable over Taenzer et al. (US 6,631,196, hereinafter referred to as "Taenzer") in view of Fretz (US 6,275,596). Applicants respectfully disagree.

Instead of audio signals, Taenzer delivers inaudible ultrasonic signals to a user's ear

Taenzer teaches a communication system that relies on transporting inaudible ultrasonic carrier directly into the ear canal of a user. Then the non-linearity within the ear itself demodulates the ultrasonic carrier, without producing audible sounds at the input to the user's ear.<sup>1</sup> In Taenzer, the "ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ...."<sup>2</sup> Since "audio acoustic energy is not produced in the air, audio acoustic sound is not radiated from the user's ear. As such, others in the vicinity of the user will hear no sound from the earpiece, thereby providing secure secret communication."<sup>3</sup>

The Office Action alleged that in Taenzer, "at least a portion of the ultrasonic signals is transformed into output audio signals in air," and cited col. 7, lines 24-28 as support. Applicants again respectfully disagree. That section of Taenzer is reproduced as follows, with emphasis added:

In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.

In the above section, Taenzer has not taught or suggested ultrasonic signals being transformed into output audio signals in air. That section seems to teach just the

<sup>1</sup> See Taenzer's Abstract.

<sup>2</sup> Col. 5, lines 1-3 in Taenzer.

<sup>3</sup> Col. 5, lines 29-31 in Taenzer.

opposite—the human ear receives the audio signal as inaudible airborne ultrasonic energy.

Taenzer intends not to create any audio sound outside the user's ear. Taenzer has re-emphasized this objective at numerous places of its patent. For example,

- Exemplary embodiments rely on the airborne transport of an inaudible ultrasonic carrier directly into the hearing mechanism of a user ....<sup>4</sup>
- The ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ....<sup>5</sup>
- [A]udio acoustic energy is not produced in the air ....<sup>6</sup>
- In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.<sup>7</sup>
- The transducers 506 and 510, along with any other desired components, can be mounted in a mounting means, such as an earpiece, such that outputs from the transducers are in proximity to a human ear at a location where the hearing mechanism of the human ear receives the signal as inaudible airborne ultrasonic acoustic energy.<sup>8</sup>
- Because the communication device outputs inaudible pressure waves, there is no or very little audio frequency vibration of the tympanic membrane.... As such, there is no radiation of audible sound pressure waves from the ear, even when the device is used in an open canal or partially open canal configuration.<sup>9</sup>
- Use of this invention for providing the “sound” delivery portion of the system solves the feedback problem with no drawbacks, because the microphone is only sensitive to audio frequency sonic signals, while the inventive sound delivery system only delivers inaudible ultrasonic signals to the ear.<sup>10</sup>

<sup>4</sup> Col. 4, lines 59-61 in Taenzer.

<sup>5</sup> Col. 5, lines 1-3 in Taenzer.

<sup>6</sup> Col. 5, lines 29-30 in Taenzer, with emphasis added.

<sup>7</sup> Col. 7, lines 24-28 in Taenzer, with emphasis added.

<sup>8</sup> Col. 12, lines 8-13 in Taenzer, with emphasis added.

<sup>9</sup> Col. 12, lines 41-48 in Taenzer, with emphasis added.

<sup>10</sup> Col. 13, lines 2-7 in Taenzer, with emphasis added.

This is in distinct contrast to Applicants' claimed invention. For example, Applicants' independent claims 1 and 22 include the following limitations:

the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user

Thus, not only has Taenzer not taught or suggested Applicants' claimed invention, Taenzer teaches away from Applicants' claimed invention.

Combining Taenzer and Fretz would destroy the intended function of Taenzer

Taenzer does not teach that a portion of the output audio signals is configured to have higher power than another portion to enhance the hearing of the user. To try to remedy the deficiencies, the Office Action introduced Fretz.

Fretz pertains to an open ear canal hearing aid system so that the ear canal is at least partially open for directly receiving ambient sounds.<sup>11</sup> Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".<sup>12</sup> In other words, audible sounds are delivered to the ear of the user. This is distinctly different and again teaches away from Taenzer, which only delivers inaudible sound to the ear.

References cannot be combined if their intended function is destroyed. To combine Fretz with Taenzer would destroy the intended function of Taenzer. Thus it is inappropriate to combine Fretz with Taenzer.

In addition, Fretz also cannot overcome the deficiencies Applicants noted above regarding Taenzer.

Based on the foregoing, it is submitted that claims 1 and 22 are patentably distinct from Taenzer and Fretz, singly or in combination. In addition, it is submitted that dependent claims 2-6, 11, 13-21, and 23-26 are also patentably distinct for at least the same reasons. Additional reasons regarding a number of dependent claims being patentable over Taenzer and Fretz are discussed below.

<sup>11</sup> See Fretz's Abstract.

<sup>12</sup> Col. 6, lines 39-41 of Fretz.

Claim 6: Power can be changed as a function of frequency

The Office Action rejected claim 6 arguing that the identification of frequencies to be amplified for a specific wearer is inherently determined through calibration. Applicants respectfully disagree.

To further clarify the limitations, Applicants have amended claim 6 to include the limitations of the hearing enhancement system being configured to allow the power of the output audio signals to be changed as a function of frequency, such that the user of the system can change the power in view of the calibration results. Fretz does not teach or suggest hearing calibration, let alone allowing the power to be changed as a function of frequency. Thus, it is submitted again that claim 6 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 15: Direction of the output audio signals can be changed

The Office Action rejected claim 15 arguing that Taenzer teaches "more than one directional speaker" in its Figure 5. Applicants respectfully disagree. The two speakers in Taenzer's Figure 5 generate two ultrasonic frequencies. The difference between the two frequencies becomes the audio signal.

There is no teaching or suggestion in Taenzer where the phases of the ultrasonic signals driving at least two directional speakers differ by a preset value, and the direction of the output audio signals can be changed by changing the preset value. Thus, it is submitted again that claim 15 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claims 20 and 21: The another instrument is related to a microphone or a speaker at an event.

The Office Action just asserted conclusively, with no support, that Taenzer appears to teach that its system can access audio signals from another instrument, and the another instrument is related to a microphone or a speaker at an event. Applicants respectfully disagree. There is no such teaching or suggestion in Taenzer. Rejections on obviousness grounds cannot be sustained by mere conclusory statements. Instead there must be some articulated reasoning with some rational underpinning to support the legal

conclusion of obviousness. Applicants again respectfully request withdrawing the 103 rejections on claims 20 and 21.

Claim 24: the speaker is attachable to the clothing worn by the user

The Office Action rejected claim 24, relying on col. 7, lines 13-18, and inappropriately arguing that Taenzer's speaker can be in any other convenient location near a user's ear. Applicants respectfully disagree.

In col. 7, lines 13-18, Taenzer explained that its earpiece 112 can be "in any other convenient location near or in a user's ear." However, that section of Taenzer specifically defines its earpiece 112 by stating that "A means for mounting the transducer or transducers is represented as an earpiece 112...." In other words, the earpiece 112 in Taenzer is its means for mounting Taenzer's transducer. The earpiece 112 is not Taenzer's speaker.

As explained above, Taenzer's speaker delivers inaudible ultrasonic signals to the ear, with no audio acoustic energy produced in air. Thus, it is not clear how Taenzer's speaker can be attached to the clothing worn by the user. Thus, it is submitted again that claim 24 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 26: Computing unit separate from directional speaker

The Office Action rejected claim 26, alleging that Taenzer in its column 8, lines 43-48, reads on the limitation of Applicants' computing unit that is separate from the directional speaker but operatively coupling with the speaker over a wireless link. Applicants respectfully disagree.

In the section cited by the Office Action, Taenzer teaches a communication device 100 including a microphone 116 to pick up the user's voice, for transmission to a remote location via a wired link or a wireless link (connected to a sound processing unit). Though not clear what Taenzer's sound processing unit does, Applicants submit that the sound processing unit is different from Applicants' claimed computing unit.

Applicants in claim 26 states that the computing unit is configured so that at least certain frequencies of the output audio signals are being modified differently than other

frequencies to enhance the hearing of the user. Note that at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation.

In Taenzer, though it is not clear what its sound processing unit does, the sound processing unit is not configured so that at least certain frequencies of the output audio signals are being modified differently than other frequencies to enhance the hearing of the user, particularly when at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation. Thus, it is submitted again that claim 26 is patentably distinct from Taenzer and Fretz, singly or in combination.

103 Rejections regarding claims 7-10, 12 and 27

The Office Action has also rejected claim 8 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Slavin (US 4,622,440); claims 7, 9, 10 and 27 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Marx (US 4,955,729); and claim 12 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Charpentier (US 5,321,758). Applicants respectfully disagree.

Initially, Applicants disagree with the reasons to combine Slavin, Marx and Charpentier with Taenzer and Fretz in the manner that the Office Action proposes. Furthermore, Slavin, Marx and Charpentier do not overcome the deficiencies of Taenzer and Fretz noted above; with Taenzer and Fretz, singly or in combination, not teaching or suggesting any of the independent claims, bringing in Slavin, Marx and Charpentier for additional features in dependent claims would not remedy the deficiencies in Taenzer and Fretz regarding the independent claims. Based on the foregoing, it is submitted that claims 7-10, 12 and 27 are patentably distinct from Taenzer, Fretz, Slavin, Marx and/or Charpentier, singly or in any combination.

The independent or the dependent claims recite additional elements which when taken in the context of the claimed invention further patentably distinguish the art of record. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from Taenzer, Fretz, Slavin, Marx and/or

Charpentier. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1-22 and 24-27 under 35 USC §103(a).

Regarding the remaining references cited by the Examiner, since they have not been applied against any of the claims and do not appear properly applicable thereto, no further mention thereof will be made.

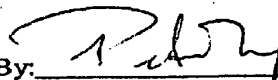
In the event that the Examiner, upon reconsideration, determines that an action other than an allowance is appropriate, the Examiner is requested and authorized to telephone Applicants' representative below prior to taking such action, if the Examiner feels that such a telephone call will advance the prosecution of the present application.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Any required fee in connection with the filing of this response is to be charged to Deposit Account No. 50-0388.

Respectfully submitted,

5150 El Camino Real  
Building A, Suite 22  
Los Altos, CA 94022  
(650) 903-9200 ext 102

By:   
Peter P. Tong  
Registration No.: 35,757

New Sheet

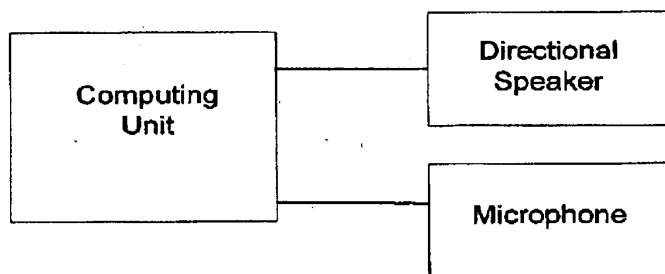


**Fig. 11**

# FAX

|                                                       |                                                                      |
|-------------------------------------------------------|----------------------------------------------------------------------|
| <b>TO:</b><br>Commissioner for Patents,<br>Mail Stop: | <b>FROM:</b><br>Peter P. Tong<br>Ph: 650-903-9200, Fax: 650-903-9800 |
| <b>COMPANY:</b><br>United States Patent Office        | <b>DATE:</b><br>9/7/2007                                             |
| <b>FAX NUMBER:</b><br>571-273-8300                    | <b>NO. OF PAGES (INCLUDING COVER):</b><br>21                         |
| <b>PHONE NUMBER:</b>                                  | <b>SENDER'S REFERENCE NUMBER:</b><br>IPVBP002                        |
| <b>RE:</b>                                            | <b>RECIPIENT'S REFERENCE NUMBER:</b><br>10/826,527                   |

## NOTES/COMMENTS:

Transmitted herewith are the following documents for entry into the above-noted file:

|                       |          |
|-----------------------|----------|
| Amendment Transmittal | 1 page   |
| Amendment A           | 18 pages |
| New Sheet Figure 11   | 1 page   |

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS PRIVILEGED AND CONFIDENTIAL AND IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL NAMED ABOVE AND OTHERS WHO HAVE BEEN SPECIFICALLY AUTHORIZED TO RECEIVE SUCH. IF THE RECIPIENT IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, OR IF ANY PROBLEMS OCCUR WITH TRANSMISSION, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE AT (650)903-9200. THANK YOU.

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

Group: 2615

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted by facsimile to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 7, 2007.

Signed: *Patricia Tate*

Printed Name: Patricia Tate

**AMENDMENT A TRANSMITTAL**

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

Sir:

Transmitted herewith is an Amendment in the above-identified application.

The fee has been calculated as shown below.

|                                                              | Claims<br>After<br>Amendment |       | Highest<br>Previously<br>Paid For | Present<br>Extra | Small Entity<br>Rate Fee | Large Entity<br>Rate Fee |
|--------------------------------------------------------------|------------------------------|-------|-----------------------------------|------------------|--------------------------|--------------------------|
| Total Claims                                                 | 27                           | MINUS | 27                                | 00               | x 25 =                   | x 50 =                   |
| Independent<br>Claims                                        | 2                            | MINUS | 2                                 | 00               | x 100 =                  | x 200 =                  |
| Multiple Dependent Claim Present and Fee Not Previously Paid |                              |       |                                   |                  | \$                       | \$                       |
| Total                                                        |                              |       |                                   |                  | \$00.00                  | \$00.00                  |

- ☐ Applicant(s) hereby petition for a \_\_\_\_\_ - month extension(s) of time to respond to the aforementioned Office Action.
- ☒ Applicant(s) believe that no (additional) Extension of Time is required; however, if it is determined that such an extension is required, Applicant(s) hereby petition that such an extension be granted and authorize the Commissioner to charge the required fees for an Extension of Time under 37 CFR 1.136 to Deposit Account No. 50-3874 (Order No. IPVBP002).
- ☐ Enclosed is a Credit Card Payment Form for the amount of \$\_\_\_\_\_ to cover the additional claim fee and/or extension of time fees.
- ☐ Please charge any additional fees required to facilitate filing the enclosed response, to Deposit Account No. 50-3874 (Order No. \_\_\_\_\_).

Respectfully submitted,

*Peter P. Tong*  
Peter P. Tong  
Reg. No. 35,757

Appln. No. 10/826,527

Atty. Docket No. IPVBP002

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

Group: 2615

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

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**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being  
transmitted via facsimile to: Commissioner for  
Patents, Alexandria, VA 22313-1450 on September 7, 2007.

Signed:

  
Printed Name: Patricia Tate

**AMENDMENT A**

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

Dear Sir:

In response to the Office Action dated June 15, 2007, please amend the above-identified patent application as follows:

**Amendments to the Specification** are reflected on page 2 of this paper.

**Amendments to the Drawings** are reflected on page 3 of this paper.

**Amendments to the Claims** are reflected in the listing of claims which being on page 3 of this paper.

**Remarks/Arguments** begin on page 9 of this paper.

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**Amendments to the Specification:**

**In the Specification**

On page 9, after paragraph 41 of the specification, please ADD paragraph 41.1 as follows:

[0041.1] FIG. 11 shows a hearing enhancement system having a computing unit according to one embodiment of the invention.

On page 9, please AMEND paragraph 42 of the specification as follows:

[0042] Same numerals in ~~Figures 1-10~~ Figures 1-11 are assigned to similar elements in all the figures. Embodiments of the invention are discussed below with reference to ~~Figures 1-10~~ Figures 1-11. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

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**Amendments to the Claims:**

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

**Listing of Claims**

1. (Currently amended) A hearing enhancement system for a user, comprising:  
an interface unit that has a directional speaker and a microphone;  
wherein  
the microphone receives input audio signals, which are transformed into ultrasonic signals;  
the speaker transmits the ultrasonic signals;  
at least a portion of the ultrasonic signals is transformed into output audio signals in air; and  
a portion of the ~~input output~~ audio signals is configured to have higher power is amplified more than another portion to enhance the hearing of the user,  
and  
wherein the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user.
2. (Currently amended) A hearing enhancement system as recited in claim 1 wherein the ~~amplification is~~ the portion having higher power is selected based on frequency dependent.
3. (Currently amended) A hearing enhancement system as recited in claim 2 wherein at least a portion of the audio frequencies that is higher in frequency is selected over than another portion of the audio frequencies to have higher power receives greater amplification.

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4. (Currently amended) A hearing enhancement system as recited in claim 2 wherein the interface unit is configured not to increase the power of certain frequencies of the input output audio signals are not amplified.

5. (Currently amended) A hearing enhancement system as recited in claim 2 wherein the amplification power increase depends on at least one characteristic of the hearing of the user.

6. (Currently Amended) A hearing enhancement system as recited in claim 5,  
 wherein the at least one characteristic of the hearing of the user is determined through calibrating the hearing of the user,  
wherein the system is configured to allow the power of the output audio signals to be changed as a function of frequency, and  
wherein the user can change the power in view of the calibration results.

7. (Original) A hearing enhancement system as recited in claim 1 wherein the system can be de-activated by the user.

8. (Previously presented) A hearing enhancement system as recited in claim 1 wherein when the system is not activated, the system can be activated depending on at least one word spoken by the user.

9. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have a power level, and  
 wherein depending on the power level of the input audio signals, the system can be in a standby mode.

10. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have an average power level, and  
 wherein depending on the average power level of the input audio signals, the system can be in a standby mode.

11. (Original) A hearing enhancement system as recited in claim 1 wherein the microphone is a directional microphone.
12. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have an average power level, and  
wherein the ~~amplification~~ power of the portion is reduced or limited if the average power level of the input audio signals is higher than a preset threshold.
13. (Original) A hearing enhancement system as recited in claim 1 wherein the system further includes a rechargeable battery.
14. (Original) A hearing enhancement system as recited in claim 1 wherein the system also can function as a phone.
15. (Currently Amended) A hearing enhancement system as recited in claim 1,  
wherein the system includes more than one directional speaker, and  
wherein the phases of the ultrasonic signals driving at least two of the speakers differ by a preset value, and  
wherein the direction of the output audio signals can be changed by changing the preset value.
16. (Previously presented) A hearing enhancement system as recited in claim 1 wherein the system can also access audio signals from another instrument through a wire or a wireless connection.
17. (Original) A hearing enhancement system as recited in claim 16 wherein the another instrument is a portable instrument.
18. (Previously presented) A hearing enhancement system as recited in claim 16 wherein the another instrument is an entertainment unit.

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19. (Previously presented) A hearing enhancement system as recited in claim 16 wherein the another instrument is a phone.

20. (Currently Amended) A hearing enhancement system as recited in claim 16,  
 wherein the another instrument is ~~related to~~ a microphone at an event, and  
wherein audio signals are accessed from another instrument through a wireless  
connection.

21. (Currently Amended) A hearing enhancement system as recited in claim 16,  
 wherein the another instrument is ~~related to~~ a speaker at an event, and  
wherein audio signals are accessed from another instrument through a wireless  
connection.

22. (Currently Amended) A hearing enhancement system for a user, comprising:

a directional speaker;

a microphone; and

a computing unit operatively coupled to the directional speaker and the  
 microphone,

wherein the microphone receives input audio signals, ~~and the computing unit~~  
~~modifies the input audio signals at least by modifying certain frequencies differently than~~  
~~other frequencies to enhance the ability of the user to hear the input audio signals, and~~  
~~provides the modified signals to the directional speaker,~~

wherein the directional speaker outputs ultrasonic waves based on the ~~modified~~  
input audio signals,

wherein the directional speaker is configured to be spaced apart from at least one  
of the ears of the user so that at least a portion of the ultrasonic signals is transformed into  
output audio signals outside the at least one of the ears of the user, to be received by the  
at least one of the ears of the user, and

wherein the computing unit is configured so that at least certain frequencies of the output audio signals are being modified differently than other frequencies to enhance the hearing of the user.

23. (Cancelled)

24. (Previously presented) A hearing enhancement system as recited in claim 22,  
 wherein the speaker is attachable to the clothing worn by the user, and  
 wherein the directional speaker can direct the ultrasonic waves towards at least one ear of the user from the worn position of the directional speaker.

25. (Original) A hearing enhancement system as recited in claim 22, wherein the computing unit is integral with the directional speaker.

26. (Original) A hearing enhancement system as recited in claim 22, wherein the computing unit is separate from the directional speaker but operatively couples with the directional speaker over a wireless link.

27. (Previously presented) A hearing enhancement system as recited in claim 22,  
 wherein the computing unit has a reduced power mode and a normal power mode, and  
 wherein the computing unit can be automatically switched between the power modes based on at least one characteristic of the input audio signals, thereby reducing power consumption by the computing unit.

28. (New) A hearing enhancement system as recited in claim 1,  
 wherein the portion having higher power is selected based on frequency,  
 wherein the power increase depends on at least one characteristic of the hearing of the user,  
 wherein the at least one characteristic of the hearing of the user is determined through calibrating the hearing of the user,

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wherein the system is configured to allow the power of the output audio signals to be changed as a function of frequency,

wherein the system can be in a standby mode to reduce power consumption by the system,

wherein the system further includes a rechargeable battery, and

wherein the system also can function as a phone.

**Amendments to the Drawings:**

**In the Drawings:**

Please ADD new sheet illustrating Fig. 11 to the application.

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### REMARKS

Applicants previously presented claims 1 through 27 for examination. In the above-identified Office Action, the Examiner has withdrawn a prior election/restriction requirement, which Applicants acknowledge with gratitude; objected to the drawings; objected to the specification; and rejected all the claims.

Applicants appreciate the Examiner's detailed comments in her Office Action to the above-identified application. For the reasons to be stated below, however, Applicants respectfully traverse the rejections.

By this amendment, Applicants have cancelled claim 23; have amended claims 1-6, 9, 10, 12, 15 and 20-22 to further clarify the subject matter regarded as the invention; have added claim 28; and have submitted a proposed new drawing with corresponding changes in the specification. Accordingly, claims 1-22 and 24-28 remain pending. Applicants respectfully request that the Examiner reconsider the application in light of the amendments and the remarks expressed herein.

#### Drawing Objections

The Office Action objected to the drawings because the "computing unit" as recited in claims 22 and 25-27 allegedly was not shown. To expedite the prosecution, Applicants have added Figure 11 as support for the "computing unit". The support for Figure 11 can be found, for example, in claims 22 and 25-27. In view of the submission, Applicants respectfully request withdrawal of the objection.

#### Antecedent Basis Objections

Claims 9, 10 and 12 were objected to because of allegedly improper antecedent basis for the term "power level" and "average power level." To expedite the prosecution, Applicants have amended claims 9, 10 and 12 accordingly. In view of the amendment, Applicants respectfully request withdrawal of the objection.

### 112 Rejections

Claims 20 and 21 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action stated that the recitation "at an event" was not clear. Applicants respectfully disagree.

In a general sense, claim 20 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a microphone at an event. Claim 21 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a speaker at an event. The event can be, for example, a concert, a play or a presentation.

For example, paragraphs 88- 91 in the specification, partially reproduced below with emphasis added, can help explain the phrase "at an event":

In private, such as at home, hearing impaired people sometimes might have a tendency to increase the sound level of audio or video instruments a bit too high. On the other hand, in public, hearing impaired people sometimes might have difficulty hearing. In one embodiment, the system is further designed to pick up, capture or access audio signals from portable or non-portable instruments, with the interface unit serving as a personalized listening unit.

...

FIG. 10 shows examples of such other portable or non-portable instruments. The instruments can be used in a private environment, such as at home, or attached to the user. This can include entertainment units, such as televisions, stereo systems, CD players, or radios....

Regarding public use, the user can be at a conference or a theater. The system can be coupled to the conference microphone or the theater speaker wirelessly, and thus be capable of capturing and enhancing the audio signals therefrom.

As stated above, the user goes to an event, such as going to a conference or to a theater. A hearing enhancement system according to an embodiment of the present invention can help the user hear at the event. The system can access audio signals from an instrument, which can be a microphone at the event. Alternatively, the system can access audio

signals from an instrument, which can be a speaker at the event. At least based on the above explanation, Applicants do not understand why the phrase "at an event" is unclear. Hence Applicants respectfully request withdrawal of the 112 rejection.

103 Rejections regarding claims 1-6, 11 and 13-26

Claims 1-6, 11 and 13-26 under 35 USC 103(a) as being unpatentable over Taenzer et al. (US 6,631,196, hereinafter referred to as "Taenzer") in view of Fretz (US 6,275,596). Applicants respectfully disagree.

Instead of audio signals, Taenzer delivers inaudible ultrasonic signals to a user's ear

Taenzer teaches a communication system that relies on transporting inaudible ultrasonic carrier directly into the ear canal of a user. Then the non-linearity within the ear itself demodulates the ultrasonic carrier, without producing audible sounds at the input to the user's ear.<sup>1</sup> In Taenzer, the "ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ...."<sup>2</sup> Since "audio acoustic energy is not produced in the air, audio acoustic sound is not radiated from the user's ear. As such, others in the vicinity of the user will hear no sound from the earpiece, thereby providing secure secret communication."<sup>3</sup>

The Office Action alleged that in Taenzer, "at least a portion of the ultrasonic signals is transformed into output audio signals in air," and cited col. 7, lines 24-28 as support. Applicants again respectfully disagree. That section of Taenzer is reproduced as follows, with emphasis added:

In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.

In the above section, Taenzer has not taught or suggested ultrasonic signals being transformed into output audio signals in air. That section seems to teach just the

<sup>1</sup> See Taenzer's Abstract.

<sup>2</sup> Col. 5, lines 1-3 in Taenzer.

<sup>3</sup> Col. 5, lines 29-31 in Taenzer.

opposite—the human ear receives the audio signal as inaudible airborne ultrasonic energy.

Taenzer intends not to create any audio sound outside the user's ear. Taenzer has re-emphasized this objective at numerous places of its patent. For example,

- Exemplary embodiments rely on the airborne transport of an inaudible ultrasonic carrier directly into the hearing mechanism of a user ....<sup>4</sup>
- The ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ....<sup>5</sup>
- [A]udio acoustic energy is not produced in the air ....<sup>6</sup>
- In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.<sup>7</sup>
- The transducers 506 and 510, along with any other desired components, can be mounted in a mounting means, such as an earpiece, such that outputs from the transducers are in proximity to a human ear at a location where the hearing mechanism of the human ear receives the signal as inaudible airborne ultrasonic acoustic energy.<sup>8</sup>
- Because the communication device outputs inaudible pressure waves, there is no or very little audio frequency vibration of the tympanic membrane.... As such, there is no radiation of audible sound pressure waves from the ear, even when the device is used in an open canal or partially open canal configuration.<sup>9</sup>
- Use of this invention for providing the “sound” delivery portion of the system solves the feedback problem with no drawbacks, because the microphone is only sensitive to audio frequency sonic signals, while the inventive sound delivery system only delivers inaudible ultrasonic signals to the ear.<sup>10</sup>

<sup>4</sup> Col. 4, lines 59-61 in Taenzer.

<sup>5</sup> Col. 5, lines 1-3 in Taenzer.

<sup>6</sup> Col. 5, lines 29-30 in Taenzer, with emphasis added.

<sup>7</sup> Col. 7, lines 24-28 in Taenzer, with emphasis added.

<sup>8</sup> Col. 12, lines 8-13 in Taenzer, with emphasis added.

<sup>9</sup> Col. 12, lines 41-48 in Taenzer, with emphasis added.

<sup>10</sup> Col. 13, lines 2-7 in Taenzer, with emphasis added.

This is in distinct contrast to Applicants' claimed invention. For example, Applicants' independent claims 1 and 22 include the following limitations:

the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user

Thus, not only has Taenzer not taught or suggested Applicants' claimed invention, Taenzer teaches away from Applicants' claimed invention.

Combining Taenzer and Fretz would destroy the intended function of Taenzer

Taenzer does not teach that a portion of the output audio signals is configured to have higher power than another portion to enhance the hearing of the user. To try to remedy the deficiencies, the Office Action introduced Fretz.

Fretz pertains to an open ear canal hearing aid system so that the ear canal is at least partially open for directly receiving ambient sounds.<sup>11</sup> Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".<sup>12</sup> In other words, audible sounds are delivered to the ear of the user. This is distinctly different and again teaches away from Taenzer, which only delivers inaudible sound to the ear.

References cannot be combined if their intended function is destroyed. To combine Fretz with Taenzer would destroy the intended function of Taenzer. Thus it is inappropriate to combine Fretz with Taenzer.

In addition, Fretz also cannot overcome the deficiencies Applicants noted above regarding Taenzer.

Based on the foregoing, it is submitted that claims 1 and 22 are patentably distinct from Taenzer and Fretz, singly or in combination. In addition, it is submitted that dependent claims 2-6, 11, 13-21, and 23-26 are also patentably distinct for at least the same reasons. Additional reasons regarding a number of dependent claims being patentable over Taenzer and Fretz are discussed below.

<sup>11</sup> See Fretz's Abstract.

<sup>12</sup> Col. 6, lines 39-41 of Fretz.

**Claim 6: Power can be changed as a function of frequency**

The Office Action rejected claim 6 arguing that the identification of frequencies to be amplified for a specific wearer is inherently determined through calibration. Applicants respectfully disagree.

To further clarify the limitations, Applicants have amended claim 6 to include the limitations of the hearing enhancement system being configured to allow the power of the output audio signals to be changed as a function of frequency, such that the user of the system can change the power in view of the calibration results. Fretz does not teach or suggest hearing calibration, let alone allowing the power to be changed as a function of frequency. Thus, it is submitted again that claim 6 is patentably distinct from Taenzer and Fretz, singly or in combination.

**Claim 15: Direction of the output audio signals can be changed**

The Office Action rejected claim 15 arguing that Taenzer teaches "more than one directional speaker" in its Figure 5. Applicants respectfully disagree. The two speakers in Taenzer's Figure 5 generate two ultrasonic frequencies. The difference between the two frequencies becomes the audio signal.

There is no teaching or suggestion in Taenzer where the phases of the ultrasonic signals driving at least two directional speakers differ by a preset value, and the direction of the output audio signals can be changed by changing the preset value. Thus, it is submitted again that claim 15 is patentably distinct from Taenzer and Fretz, singly or in combination.

**Claims 20 and 21: The another instrument is related to a microphone or a speaker at an event.**

The Office Action just asserted conclusively, with no support, that Taenzer appears to teach that its system can access audio signals from another instrument, and the another instrument is related to a microphone or a speaker at an event. Applicants respectfully disagree. There is no such teaching or suggestion in Taenzer. Rejections on obviousness grounds cannot be sustained by mere conclusory statements. Instead there must be some articulated reasoning with some rational underpinning to support the legal

conclusion of obviousness. Applicants again respectfully request withdrawing the 103 rejections on claims 20 and 21.

Claim 24: the speaker is attachable to the clothing worn by the user

The Office Action rejected claim 24, relying on col. 7, lines 13-18, and inappropriately arguing that Taenzer's speaker can be in any other convenient location near a user's ear. Applicants respectfully disagree.

In col. 7, lines 13-18, Taenzer explained that its earpiece 112 can be "in any other convenient location near or in a user's ear." However, that section of Taenzer specifically defines its earpiece 112 by stating that "A means for mounting the transducer or transducers is represented as an earpiece 112...." In other words, the earpiece 112 in Taenzer is its means for mounting Taenzer's transducer. The earpiece 112 is not Taenzer's speaker.

As explained above, Taenzer's speaker delivers inaudible ultrasonic signals to the ear, with no audio acoustic energy produced in air. Thus, it is not clear how Taenzer's speaker can be attached to the clothing worn by the user. Thus, it is submitted again that claim 24 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 26: Computing unit separate from directional speaker

The Office Action rejected claim 26, alleging that Taenzer in its column 8, lines 43-48, reads on the limitation of Applicants' computing unit that is separate from the directional speaker but operatively coupling with the speaker over a wireless link. Applicants respectfully disagree.

In the section cited by the Office Action, Taenzer teaches a communication device 100 including a microphone 116 to pick up the user's voice, for transmission to a remote location via a wired link or a wireless link (connected to a sound processing unit). Though not clear what Taenzer's sound processing unit does, Applicants submit that the sound processing unit is different from Applicants' claimed computing unit.

Applicants in claim 26 states that the computing unit is configured so that at least certain frequencies of the output audio signals are being modified differently than other

frequencies to enhance the hearing of the user. Note that at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation.

In Taenzer, though it is not clear what its sound processing unit does, the sound processing unit is not configured so that at least certain frequencies of the output audio signals are being modified differently than other frequencies to enhance the hearing of the user, particularly when at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation. Thus, it is submitted again that claim 26 is patentably distinct from Taenzer and Fretz, singly or in combination.

103 Rejections regarding claims 7-10, 12 and 27

The Office Action has also rejected claim 8 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Slavin (US 4,622,440); claims 7, 9, 10 and 27 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Marx (US 4,955,729); and claim 12 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Charpentier (US 5,321,758). Applicants respectfully disagree.

Initially, Applicants disagree with the reasons to combine Slavin, Marx and Charpentier with Taenzer and Fretz in the manner that the Office Action proposes. Furthermore, Slavin, Marx and Charpentier do not overcome the deficiencies of Taenzer and Fretz noted above; with Taenzer and Fretz, singly or in combination, not teaching or suggesting any of the independent claims, bringing in Slavin, Marx and Charpentier for additional features in dependent claims would not remedy the deficiencies in Taenzer and Fretz regarding the independent claims. Based on the foregoing, it is submitted that claims 7-10, 12 and 27 are patentably distinct from Taenzer, Fretz, Slavin, Marx and/or Charpentier, singly or in any combination.

The independent or the dependent claims recite additional elements which when taken in the context of the claimed invention further patentably distinguish the art of record. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from Taenzer, Fretz, Slavin, Marx and/or

Charpentier. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1-22 and 24-27 under 35 USC §103(a).

Regarding the remaining references cited by the Examiner, since they have not been applied against any of the claims and do not appear properly applicable thereto, no further mention thereof will be made.

In the event that the Examiner, upon reconsideration, determines that an action other than an allowance is appropriate, the Examiner is requested and authorized to telephone Applicants' representative below prior to taking such action, if the Examiner feels that such a telephone call will advance the prosecution of the present application.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Any required fee in connection with the filing of this response is to be charged to Deposit Account No. 50-0388.

Respectfully submitted,

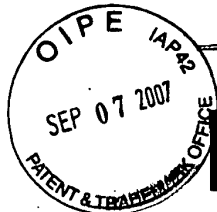
5150 El Camino Real  
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(650) 903-9200 ext 102

By:   
Peter P. Tong  
Registration No.: 35,757

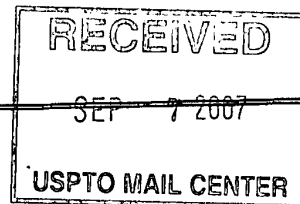
Appln. No. 10/826,527

18

Docket No. IPVBP002



**FAX**



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|                                                                        |                                                                               |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <b>TO:</b><br>Commissioner for Patents,<br>Mail Stop: Dionne Pendleton | <b>FROM:</b><br>Peter Tong<br>Ph: 650-903-9200, ext. 102<br>Fax: 650-903-9800 |
| <b>COMPANY:</b><br>United States Patent Office                         | <b>DATE:</b><br>9/5/2007                                                      |
| <b>FAX NUMBER:</b><br>571-273-7497                                     | <b>NO. OF PAGES (INCLUDING COVER):</b><br>18                                  |
| <b>PHONE NUMBER:</b>                                                   | <b>SENDER'S REFERENCE NUMBER:</b><br>IPVBP002                                 |
| <b>RE:</b><br>Draft Amendment                                          | <b>RECIPIENT'S REFERENCE NUMBER:</b><br>10/825,527                            |

**NOTES/COMMENTS:**

Transmitted herewith is the following Draft Amendment for your consideration.

Draft Amendment A 16

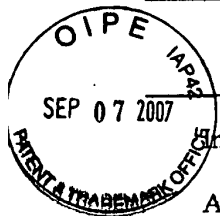
Figure 11 1

Thank you.

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571-273-7497

**DRAFT**



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

Group: 2615

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being  
transmitted via facsimile to: Commissioner for  
Patents, Alexandria, VA 22313-1450 on \_\_\_\_\_, 2007.  
Signed:

Printed Name: Patricia Tate

**AMENDMENT A**

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

Dear Sir:

In response to the Office Action dated June 15, 2007, please amend the above-identified patent application as follows:

**Amendments to the Specification** are reflected on page 2 of this paper.

**Amendments to the Claims** are reflected in the listing of claims which being on page 3 of this paper.

**Remarks/Arguments** begin on page 8 of this paper.

Appln. No. 10/826,527

1

Docket No. IPVBP002

**DRAFT****Amendments to the Specification:****In the Specification**

On page 9, after paragraph 41 of the specification, please ADD paragraph 41.1 as follows:

[0041.1] FIG. 11 shows a number of embodiments regarding a computing unit according to different embodiments of the invention.

On page 9, please AMEND paragraph 42 of the specification as follows:

[0042] Same numerals in ~~Figures 1-10~~ Figures 1-11 are assigned to similar elements in all the figures. Embodiments of the invention are discussed below with reference to ~~Figures 1-10~~ Figures 1-11. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

**DRAFT****Amendments to the Claims:**

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

**Listing of Claims**

1. (Currently amended) A hearing enhancement system for a user, comprising:  
an interface unit that has a directional speaker and a microphone;  
wherein  
the microphone receives input audio signals, which are transformed into ultrasonic signals;  
the speaker transmits the ultrasonic signals;  
at least a portion of the ultrasonic signals is transformed into output audio signals in air;  
and  
a portion of the ~~input~~ output audio signals is amplified more than another portion to enhance the hearing of the user, and  
wherein the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user.
2. (Original) A hearing enhancement system as recited in claim 1 wherein the amplification is frequency dependent.
3. (Previously presented) A hearing enhancement system as recited in claim 2 wherein at least a portion of the audio frequencies that is higher in frequency than another portion of the audio frequencies receives greater amplification.
4. (Original) A hearing enhancement system as recited in claim 2 wherein certain frequencies of the input audio signals are not amplified.

**DRAFT**

5. (Original) A hearing enhancement system as recited in claim 2 wherein the amplification depends on at least one characteristic of the hearing of the user.
6. (Currently Amended) A hearing enhancement system as recited in claim 5,  
 wherein the at least one characteristic of the hearing of the user is determined through calibrating the hearing of the user,  
wherein the system is configured to allow the amplification to be changed as a function of frequency, and  
wherein the user can change the amplification in view of the calibration results.
7. (Original) A hearing enhancement system as recited in claim 1 wherein the system can be de-activated by the user.
8. (Previously presented) A hearing enhancement system as recited in claim 1 wherein when the system is not activated, the system can be activated depending on at least one word spoken by the user.
9. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have a power level, and  
 wherein depending on the power level of the input audio signals, the system can be in a standby mode.
10. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have an average power level, and  
 wherein depending on the average power level of the input audio signals, the system can be in a standby mode.
11. (Original) A hearing enhancement system as recited in claim 1 wherein the microphone is a directional microphone.

**DRAFT**

12. (Currently Amended) A hearing enhancement system as recited in claim 1  
wherein the input audio signals have an average power level, and  
wherein the amplification is reduced or limited if the average power level of the  
input audio signals is higher than a preset threshold.
13. (Original) A hearing enhancement system as recited in claim 1 wherein the system  
further includes a rechargeable battery.
14. (Original) A hearing enhancement system as recited in claim 1 wherein the system  
also can function as a phone.
15. (Currently Amended) A hearing enhancement system as recited in claim 1,  
wherein the system includes more than one directional speaker, and  
wherein the phases of the ultrasonic signals driving at least two of the speakers  
differ by a preset value, and  
wherein the direction of the output audio signals can be changed by changing the  
preset value.
16. (Previously presented) A hearing enhancement system as recited in claim 1 wherein  
the system can also access audio signals from another instrument through a wire or a  
wireless connection.
17. (Original) A hearing enhancement system as recited in claim 16 wherein the another  
instrument is a portable instrument.
18. (Previously presented) A hearing enhancement system as recited in claim 16 wherein  
the another instrument is an entertainment unit.
19. (Previously presented) A hearing enhancement system as recited in claim 16 wherein  
the another instrument is a phone.

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20. (Currently Amended) A hearing enhancement system as recited in claim 16,  
 wherein the another instrument is ~~related to~~ a microphone at an event, and  
wherein audio signals are accessed from another instrument through a wireless  
connection.
21. (Currently Amended) A hearing enhancement system as recited in claim 16,  
 wherein the another instrument is ~~related to~~ a speaker at an event, and  
wherein audio signals are accessed from another instrument through a wireless  
connection.
22. (Previously presented) A hearing enhancement system for a user, comprising:  
 a directional speaker;  
 a microphone; and  
 a computing unit operatively coupled to the directional speaker and the  
 microphone,  
 wherein the microphone receives input audio signals, ~~and the computing unit~~  
~~modifies the input audio signals at least by modifying certain frequencies differently than~~  
~~other frequencies to enhance the ability of the user to hear the input audio signals, and~~  
~~provides the modified signals to the directional speaker,~~  
 wherein the directional speaker outputs ultrasonic waves based on the modified  
input audio signals,  
wherein the directional speaker is configured to be spaced apart from at least one  
of the ears of the user so that at least a portion of the ultrasonic signals is transformed into  
output audio signals outside the at least one of the ears of the user, to be received by the  
at least one of the ears of the user, and  
wherein the computing unit is configured to modify the output audio signals at  
least by modifying certain frequencies differently than other frequencies to enhance the  
hearing of the user.
23. (Cancelled)

**DRAFT**

24. (Previously presented) A hearing enhancement system as recited in claim 22,  
wherein the speaker is attachable to the clothing worn by the user, and  
wherein the directional speaker can direct the ultrasonic waves towards at least  
one ear of the user from the worn position of the directional speaker.
25. (Original) A hearing enhancement system as recited in claim 22, wherein the  
computing unit is integral with the directional speaker.
26. (Original) A hearing enhancement system as recited in claim 22, wherein the  
computing unit is separate from the directional speaker but operatively couples with the  
directional speaker over a wireless link.
27. (Previously presented) A hearing enhancement system as recited in claim 22,  
wherein the computing unit has a reduced power mode and a normal power mode, and  
wherein the computing unit can be automatically switched between the power modes  
based on at least one characteristic of the input audio signals, thereby reducing power  
consumption by the computing unit.
28. (New) A hearing enhancement system as recited in claim 1,  
wherein the amplification is frequency dependent,  
wherein the amplification depends on at least one characteristic of the hearing of  
the user,  
wherein the at least one characteristic of the hearing of the user is determined  
through calibrating the hearing of the user,  
wherein the system is configured to allow the amplification to be changed as a  
function of frequency,  
wherein the system can be in a standby mode to reduce power consumption by the  
system,  
wherein the system further includes a rechargeable battery, and  
wherein the system also can function as a phone.

**DRAFT****REMARKS**

Applicants previously presented claims 1 through 27 for examination. In the above-identified Office Action, the Examiner has withdrawn a prior election/restriction requirement, which Applicants acknowledge with gratitude; objected to the drawings; objected to the specification; and rejected all the claims.

Applicants appreciate the Examiner's detailed comments in her Office Action to the above-identified application. For the reasons to be stated below, however, Applicants respectfully traverse the rejections.

By this amendment, Applicants have cancelled claim 23; have amended claims 1, 6, 9, 10, 12, 15 and 20-22 to further clarify the subject matter regarded as the invention; have added claim 28; and have submitted a proposed new drawing with corresponding changes in the specification. Accordingly, claims 1-22 and 24-28 remain pending. Applicants respectfully request that the Examiner reconsider the application in light of the amendments and the remarks expressed herein.

**Drawing Objections**

The Office Action objected to the drawings because the "computing unit" as recited in claims 22 and 25-27 allegedly was not shown. To expedite the prosecution, Applicants have added Figure 11 as support for the "computing unit". The antecedent bases for Figure 11 can be found, for example, in claims 22 and 25-27. In view of the submission, Applicants respectfully request withdrawal of the objection.

**Antecedent Basis Objections**

Claims 9, 10 and 12 were objected to because of allegedly improper antecedent basis for the term "power level" and "average power level." To expedite the prosecution, Applicants have amended claims 9, 10 and 12 accordingly. In view of the amendment, Applicants respectfully request withdrawal of the objection.

**DRAFT****112 Rejections**

Claims 20 and 21 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action stated that the recitation "at an event" was not clear. Applicants respectfully disagree.

In a general sense, claim 20 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a microphone at an event. Claim 21 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a speaker at an event. The event can be, for example, a concert, a play or a presentation.

For example, paragraphs 88- 91 in the specification, partially reproduced below with emphasis added, can help explain the phrase "at an event":

In private, such as at home, hearing impaired people sometimes might have a tendency to increase the sound level of audio or video instruments a bit too high. On the other hand, in public, hearing impaired people sometimes might have difficulty hearing. In one embodiment, the system is further designed to pick up, capture or access audio signals from portable or non-portable instruments, with the interface unit serving as a personalized listening unit.

...

FIG. 10 shows examples of such other portable or non-portable instruments. The instruments can be used in a private environment, such as at home, or attached to the user. This can include entertainment units, such as televisions, stereo systems, CD players, or radios....

Regarding public use, the user can be at a conference or a theater. The system can be coupled to the conference microphone or the theater speaker wirelessly, and thus be capable of capturing and enhancing the audio signals therefrom.

As stated above, the user goes to an event, such as going to a conference or to a theater. A hearing enhancement system according to an embodiment of the present invention can help the user hear at the event. The system can access audio signals from an instrument, which can be a microphone at the event. Alternatively, the system can access audio

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signals from an instrument, which can be a speaker at the event. At least based on the above explanation, Applicants do not understand why the phrase "at an event" is unclear. Hence Applicants respectfully request withdrawal of the 112 rejection.

103 Rejections regarding claims 1-6, 11 and 13-26

Claims 1-6, 11 and 13-26 under 35 USC 103(a) as being unpatentable over Taenzer et al. (US 6,631,196, hereinafter referred to as "Taenzer") in view of Fretz (US 6,275,596). Applicants respectfully disagree.

Instead of audio signals, Taenzer delivers inaudible ultrasonic signals to a user's ear

Taenzer teaches a communication system that relies on transporting inaudible ultrasonic carrier directly into the ear canal of a user. Then the non-linearity within the ear itself demodulates the ultrasonic carrier, without producing audible sounds at the input to the user's ear.<sup>1</sup> In Taenzer, the "ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ...."<sup>2</sup> Since "audio acoustic energy is not produced in the air, audio acoustic sound is not radiated from the user's ear. As such, others in the vicinity of the user will hear no sound from the earpiece, thereby providing secure secret communication."<sup>3</sup>

The Office Action alleged that in Taenzer, "at least a portion of the ultrasonic signals is transformed into output audio signals in air," and cited col. 7, lines 24-28 as support. Applicants again respectfully disagree. That section of Taenzer is reproduced as follows, with emphasis added:

In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.

In the above section, Taenzer has not taught or suggested ultrasonic signals being transformed into output audio signals in air. That section seems to teach just the

<sup>1</sup> See Taenzer's Abstract.

<sup>2</sup> Col. 5, lines 1-3 in Taenzer.

<sup>3</sup> Col. 5, lines 29-31 in Taenzer.

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opposite—the human ear receives the audio signal as inaudible airborne ultrasonic energy.

Taenzer intends not to create any audio sound outside the user's ear. Taenzer has re-emphasized this objective at numerous places of its patent. For example,

- Exemplary embodiments rely on the airborne transport of an inaudible ultrasonic carrier directly into the hearing mechanism of a user ....<sup>4</sup>
- The ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ....<sup>5</sup>
- [A]udio acoustic energy is not produced in the air ....<sup>6</sup>
- In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.<sup>7</sup>
- The transducers 506 and 510, along with any other desired components, can be mounted in a mounting means, such as an earpiece, such that outputs from the transducers are in proximity to a human ear at a location where the hearing mechanism of the human ear receives the signal as inaudible airborne ultrasonic acoustic energy.<sup>8</sup>
- Because the communication device outputs inaudible pressure waves, there is no or very little audio frequency vibration of the tympanic membrane.... As such, there is no radiation of audible sound pressure waves from the ear, even when the device is used in an open canal or partially open canal configuration.<sup>9</sup>
- Use of this invention for providing the “sound” delivery portion of the system solves the feedback problem with no drawbacks, because the microphone is only sensitive to audio frequency sonic signals, while the inventive sound delivery system only delivers inaudible ultrasonic signals to the ear.<sup>10</sup>

<sup>4</sup> Col. 4, lines 59-61 in Taenzer.

<sup>5</sup> Col. 5, lines 1-3 in Taenzer.

<sup>6</sup> Col. 5, lines 29-30 in Taenzer, with emphasis added.

<sup>7</sup> Col. 7, lines 24-28 in Taenzer, with emphasis added.

<sup>8</sup> Col. 12, lines 8-13 in Taenzer, with emphasis added.

<sup>9</sup> Col. 12, lines 41-48 in Taenzer, with emphasis added.

<sup>10</sup> Col. 13, lines 2-7 in Taenzer, with emphasis added.

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This is in distinct contrast to Applicants' claimed invention. For example, Applicants' independent claims 1 and 22 include the following limitations:

the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user

Thus, not only has Taenzer not taught or suggested Applicants' claimed invention, Taenzer teaches away from Applicants' claimed invention.

Combining Taenzer and Fretz would destroy the intended function of Taenzer

The Office Action acknowledged that Taenzer does not teach that a portion of the input audio signals is amplified more than another portion to enhance the hearing of the user, which Applicants agree. To try to remedy the deficiencies, the Office Action introduced Fretz.

Fretz pertains to an open ear canal hearing aid system so that the ear canal is at least partially open for directly receiving ambient sounds.<sup>11</sup> Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".<sup>12</sup> In other words, audible sounds are delivered to the ear of the user. This is distinctly different and again teaches away from Taenzer, which only delivers inaudible sound to the ear.

References cannot be combined if their intended function is destroyed. To combine Fretz with Taenzer would destroy the intended function of Taenzer. Thus it is inappropriate to combine Fretz with Taenzer.

In addition, Fretz also cannot overcome the deficiencies Applicants noted above regarding Taenzer.

Based on the foregoing, it is submitted that claims 1 and 22 are patentably distinct from Taenzer and Fretz, singly or in combination. In addition, it is submitted that dependent claims 2-6, 11, 13-21, and 23-26 are also patentably distinct for at least the same reasons. Additional reasons regarding a number of dependent claims being patentable over Taenzer and Fretz are discussed below.

<sup>11</sup> See Fretz's Abstract.

<sup>12</sup> Col. 6, lines 39-41 of Fretz.

**DRAFT**Claim 6: Amplification can be changed as a function of frequency

The Office Action rejected claim 6 arguing that the identification of frequencies to be amplified for a specific wearer is inherently determined through calibration. Applicants respectfully disagree.

To further clarify the limitations, Applicants have amended claim 6 to include the limitations of the hearing enhancement system being configured to allow the amplification to be changed as a function of frequency such that the user of the system can change the amplification in view of the calibration results. Fretz does not teach or suggest hearing calibration, let alone allowing the amplification to be changed as a function of frequency. Thus, it is submitted again that claim 6 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 15: Direction of the output audio signals can be changed

The Office Action rejected claim 15 arguing that Taenzer teaches "more than one directional speaker" in its Figure 5. Applicants respectfully disagree. The two speakers in Taenzer's Figure 5 generate two ultrasonic frequencies. The difference between the two frequencies becomes the audio signal.

There is no teaching or suggestion in Taenzer where the phases of the ultrasonic signals driving at least two directional speakers differ by a preset value, and the direction of the output audio signals can be changed by changing the preset value. Thus, it is submitted again that claim 15 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claims 20 and 21: The another instrument is related to a microphone or a speaker at an event.

The Office Action just asserted conclusively, with no support, that Taenzer appears to teach that its system can access audio signals from another instrument, and the another instrument is related to a microphone or a speaker at an event. Applicants respectfully disagree. There is no such teaching or suggestion in Taenzer. Rejections on obviousness grounds cannot be sustained by mere conclusory statements. Instead there must be some articulated reasoning with some rational underpinning to support the legal

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conclusion of obviousness. Applicants again respectfully request withdrawing the 103 rejections on claims 20 and 21.

Claim 24: the speaker is attachable to the clothing worn by the user

The Office Action rejected claim 24, relying on col. 7, lines 13-18, and inappropriately arguing that Taenzer's speaker can be in any other convenient location near a user's ear. Applicants respectfully disagree.

In col. 7, lines 13-18, Taenzer explained that its earpiece 112 can be "in any other convenient location near or in a user's ear." However, that section of Taenzer specifically defines its earpiece 112 by stating that "A means for mounting the transducer or transducers is represented as an earpiece 112...." In other words, the earpiece 112 in Taenzer is its means for mounting Taenzer's transducer. The earpiece 112 is not Taenzer's speaker.

As explained above, Taenzer's speaker delivers inaudible ultrasonic signals to the ear, with no audio acoustic energy produced in air. Thus, it is not clear how Taenzer's speaker can be attached to the clothing worn by the user. Thus, it is submitted again that claim 24 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 26: Computing unit separate from directional speaker

The Office Action rejected claim 26, alleging that Taenzer in its column 8, lines 43-48, reads on the limitation of Applicants' computing unit that is separate from the directional speaker but operatively coupling with the speaker over a wireless link. Applicants respectfully disagree.

In the section cited by the Office Action, Taenger teaches a communication device 100 including a microphone 116 to pick up the user's voice, for transmission to a remote location via a wired link or a wireless link (connected to a sound processing unit). Though not clear what Taenger's sound processing unit does, Applicants submit that the sound processing unit is different from Applicants' claimed computing unit.

Applicants in claim 26 states that the computing unit is configured to modify the output audio signals at least by modifying certain frequencies differently than other

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frequencies to enhance the hearing of the user. Note that at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation.

In Taenger, though it is not clear what its sound processing unit does, the sound processing unit does not configure to modify its output audio signals at least by modifying certain frequencies differently than other frequencies, particularly when at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation. Thus, it is submitted again that claim 26 is patentably distinct from Taenzer and Fretz, singly or in combination.

**103 Rejections regarding claims 7-10, 12 and 27**

The Office Action has also rejected claim 8 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Slavin (US 4,622,440); claims 7, 9, 10 and 27 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Marx (US 4,955,729); and claim 12 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Charpentier (US 5,321,758). Applicants respectfully disagree.

Initially, Applicants disagree with the reasons to combine Slavin, Marx and Charpentier with Taenzer and Fretz in the manner that the Office Action proposes. Furthermore, Slavin, Marx and Charpentier do not overcome the deficiencies of Taenzer and Fretz noted above; with Taenzer and Fretz, singly or in combination, not teaching or suggesting any of the independent claims, bringing in Slavin, Marx and Charpentier for additional features in dependent claims would not remedy the deficiencies in Taenzer and Fretz regarding the independent claims. Based on the foregoing, it is submitted that claims 7-10, 12 and 27 are patentably distinct from Taenzer, Fretz, Slavin, Marx and/or Charpentier, singly or in any combination.

The independent or the dependent claims recite additional elements which when taken in the context of the claimed invention further patentably distinguish the art of record. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from Taenzer, Fretz, Slavin, Marx and/or

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Charpentier. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1-22 and 24-27 under 35 USC §103(a).

Regarding the remaining references cited by the Examiner, since they have not been applied against any of the claims and do not appear properly applicable thereto, no further mention thereof will be made.

In the event that the Examiner, upon reconsideration, determines that an action other than an allowance is appropriate, the Examiner is requested and authorized to telephone Applicants' representative below prior to taking such action, if the Examiner feels that such a telephone call will advance the prosecution of the present application.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Any required fee in connection with the filing of this response is to be charged to Deposit Account No. 50-0388.

Respectfully submitted,

5150 El Camino Real  
Building A, Suite 22  
Los Altos, CA 94022  
(650) 903-9200 ext 102

By: \_\_\_\_\_  
Peter P. Tong  
Registration No.: 35,757

Appln. No. 10/826,527

16

Docket No. IPVBP002



New Sheet

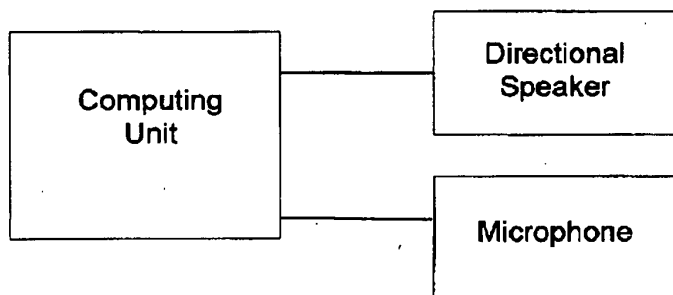


**Fig. 11**

# PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2003

Application or Docket Number

IPV3P002  
10/826527

## CLAIMS AS FILED - PART I

|                                                           | (Column 1)    | (Column 2)   |
|-----------------------------------------------------------|---------------|--------------|
| TOTAL CLAIMS                                              | 27            |              |
| FOR                                                       | NUMBER FILED  | NUMBER EXTRA |
| TOTAL CHARGEABLE CLAIMS                                   | 27 minus 20 = | 7            |
| INDEPENDENT CLAIMS                                        | 2 minus 3 =   | -            |
| MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/> |               |              |

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

## CLAIMS AS AMENDED - PART II

|                                                                         | (Column 1) | (Column 2)                       | (Column 3)                         |
|-------------------------------------------------------------------------|------------|----------------------------------|------------------------------------|
| AMENDMENT A                                                             | 9/17/07    | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR |
|                                                                         |            |                                  | PRESENT EXTRA                      |
| Total                                                                   | 27         | Minus                            | 27 =                               |
| Independent                                                             | 2          | Minus                            | 3 =                                |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |            |                                  |                                    |

|                                                                         | (Column 1) | (Column 2)                       | (Column 3)                         |
|-------------------------------------------------------------------------|------------|----------------------------------|------------------------------------|
| AMENDMENT B                                                             |            | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR |
|                                                                         |            |                                  | PRESENT EXTRA                      |
| Total                                                                   |            | Minus                            | =                                  |
| Independent                                                             |            | Minus                            | =                                  |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |            |                                  |                                    |

|                                                                         | (Column 1) | (Column 2)                       | (Column 3)                         |
|-------------------------------------------------------------------------|------------|----------------------------------|------------------------------------|
| AMENDMENT C                                                             |            | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR |
|                                                                         |            |                                  | PRESENT EXTRA                      |
| Total                                                                   |            | Minus                            | =                                  |
| Independent                                                             |            | Minus                            | =                                  |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |            |                                  |                                    |

\* 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.

SMALL ENTITY TYPE ☐

OR OTHER THAN SMALL ENTITY

| RATE      | FEE    |
|-----------|--------|
| BASIC FEE | 385.00 |
| XS 9=     | 63     |
| X43=      |        |
| +145=     |        |
| TOTAL     | 448    |

| RATE      | FEE    |
|-----------|--------|
| BASIC FEE | 770.00 |
| XS18=     |        |
| X86=      |        |
| +290=     |        |
| TOTAL     |        |

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

| RATE             | ADDITIONAL FEE |
|------------------|----------------|
| XS 9=            |                |
| X43=             |                |
| +145=            |                |
| TOTAL ADDIT. FEE |                |

| RATE             | ADDITIONAL FEE |
|------------------|----------------|
| XS18=            |                |
| X86=             |                |
| +290=            |                |
| TOTAL ADDIT. FEE |                |

| RATE             | ADDITIONAL FEE |
|------------------|----------------|
| XS 9=            |                |
| X43=             |                |
| +145=            |                |
| TOTAL ADDIT. FEE |                |

| RATE             | ADDITIONAL FEE |
|------------------|----------------|
| XS18=            |                |
| X86=             |                |
| +290=            |                |
| TOTAL ADDIT. FEE |                |

| RATE             | ADDITIONAL FEE |
|------------------|----------------|
| XS 9=            |                |
| X43=             |                |
| +145=            |                |
| TOTAL ADDIT. FEE |                |

| RATE             | ADDITIONAL FEE |
|------------------|----------------|
| XS18=            |                |
| X86=             |                |
| +290=            |                |
| TOTAL ADDIT. FEE |                |

# PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2003

Application or Docket Number

1PVB3P002  
10/826527

## CLAIMS AS FILED - PART I

|                                                           | (Column 1)    | (Column 2)   |
|-----------------------------------------------------------|---------------|--------------|
| TOTAL CLAIMS                                              | 27            |              |
| FOR                                                       | NUMBER FILED  | NUMBER EXTRA |
| TOTAL CHARGEABLE CLAIMS                                   | 27 minus 20 = | 7            |
| INDEPENDENT CLAIMS                                        | 2 minus 3 =   | -            |
| MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/> |               |              |

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

## CLAIMS AS AMENDED - PART II

|                                                                         | (Column 1) | (Column 2)                       | (Column 3)                         |
|-------------------------------------------------------------------------|------------|----------------------------------|------------------------------------|
| AMENDMENT A                                                             | 9/10/07    | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR |
| Total                                                                   | 27         | Minus                            | 27                                 |
| Independent                                                             | 2          | Minus                            | 3                                  |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |            |                                  |                                    |

|                                                                         | (Column 1) | (Column 2)                       | (Column 3)                         |
|-------------------------------------------------------------------------|------------|----------------------------------|------------------------------------|
| AMENDMENT B                                                             | 9/10/07    | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR |
| Total                                                                   | 27         | Minus                            | 27                                 |
| Independent                                                             | 2          | Minus                            | 3                                  |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |            |                                  |                                    |

|                                                                         | (Column 1) | (Column 2)                       | (Column 3)                         |
|-------------------------------------------------------------------------|------------|----------------------------------|------------------------------------|
| AMENDMENT C                                                             |            | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR |
| Total                                                                   |            | Minus                            |                                    |
| Independent                                                             |            | Minus                            |                                    |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |            |                                  |                                    |

\* 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.

SMALL ENTITY TYPE ☐

OR OTHER THAN SMALL ENTITY

| RATE      | FEE    |    | RATE      | FEE    |
|-----------|--------|----|-----------|--------|
| BASIC FEE | 385.00 | OR | BASIC FEE | 770.00 |
| XS 9=     | 63     | OR | XS18=     |        |
| X43=      |        | OR | X86=      |        |
| +145=     |        | OR | +290=     |        |
| TOTAL     | 448    | OR | TOTAL     |        |

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

| RATE             | ADDITIONAL FEE |    | RATE             | ADDITIONAL FEE |
|------------------|----------------|----|------------------|----------------|
| XS 9=            |                | OR | XS18=            |                |
| X43=             |                | OR | X86=             |                |
| +145=            |                | OR | +290=            |                |
| TOTAL ADDIT. FEE |                | OR | TOTAL ADDIT. FEE |                |

| RATE             | ADDITIONAL FEE |    | RATE             | ADDITIONAL FEE |
|------------------|----------------|----|------------------|----------------|
| XS 9=            |                | OR | XS18=            |                |
| X43=             |                | OR | X86=             |                |
| +145=            |                | OR | +290=            |                |
| TOTAL ADDIT. FEE |                | OR | TOTAL ADDIT. FEE |                |

| RATE             | ADDITIONAL FEE |    | RATE             | ADDITIONAL FEE |
|------------------|----------------|----|------------------|----------------|
| XS 9=            |                | OR | XS18=            |                |
| X43=             |                | OR | X86=             |                |
| +145=            |                | OR | +290=            |                |
| TOTAL ADDIT. FEE |                | OR | TOTAL ADDIT. FEE |                |



# 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. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/826,527      | 04/15/2004  | Kwok Wai Cheung      | IPVBP002            | 2158             |

|                     |      |            |                   |  |
|---------------------|------|------------|-------------------|--|
| 34071               | 7590 | 06/15/2007 | EXAMINER          |  |
| IPVENTURE, INC.     |      |            | PENDLETON, DIONNE |  |
| 5150 EL CAMINO REAL |      |            |                   |  |
| SUITE A-22          |      |            |                   |  |
| LOS ALTOS, CA 94022 |      |            |                   |  |

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
| 2615     |              |

|            |               |
|------------|---------------|
| MAIL DATE  | DELIVERY MODE |
| 06/15/2007 | 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.

|                              |                                                                                                         |                                      |  |
|------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/826,527                                                                    | <b>Applicant(s)</b><br>CHEUNG ET AL. |  |
|                              | <b>Examiner</b><br>Dionne H. Pendleton                                                                  | <b>Art Unit</b><br>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 07 April 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) 1-27 is/are pending in the application.

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

5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1-27 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 15 April 2004 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 See Continuation Sheet.

4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: \_\_\_\_\_.

Continuation of Attachment(s) 3. Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :1/12/07;8/11/05;2/22/05;1/21/05.

## DETAILED ACTION

### *Election/Restrictions*

Applicant's arguments with respect to the Election/Restriction have been fully considered. The Election/Restriction has been withdrawn.

### *Drawings*

1. 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 "computing unit" as recited in claims 22 and 25-27***, 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.

### ***Specification***

2. 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: In **Claims 9, 10 & 12**, In line 2, Claims 9 and 10 respectively recite “power level”. In line 2, Claim 12 recites “average power level.” There is improper antecedent basis for said recitations.

### ***Claim Rejections - 35 USC § 112***

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.

3. **Claims 20 and 21** 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 20 & 21**

Line 2 of claims 20 and 21, respectively recite “microphone at an event” and “speaker at an event”. It is not clear what the Applicant means by the recitation “*at an event*”. Clarification and/or correction is required.

***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 negated by the manner in which the invention was made.

4. **Claims 1-6,11 and 13-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Taenzer et al. (US 6,631,196)** in view of **Fretz (US 6,275,596)**.

**Regarding claim 1,**

**Figure 1** of Taenzer teaches a hearing enhancement system for a user comprising: an interface unit (100) that has a directional speaker (108) and a microphone (116) (see *column 7, lines 56-59*); wherein the microphone receives input audio signals, which are transformed into ultrasonic signals, see *column 8, lines 51-53*; the speaker transmits the ultrasonic signals, see *column 7, lines 5-6*; and at least a portion of the ultrasonic signals is transformed into output audio signals in air, see *column 7, lines 24-28*.

Taenzer does not clearly teach that a portion of the input audio signals is amplified more than another portion to enhance the hearing of the user.

In *column 4, lines 52-67, column 5, lines 2-5, lines 10-12 and lines 34-41*, Fretz teaches that a portion of the input audio signals is amplified more than another portion to enhance the hearing of the user.

It would have been obvious for one of ordinary skill in the art at the time of the invention to alter the tubing (114) of Taenzer, per the teachings of Fretz, for the

purpose of shaping the frequency response and affecting the frequency gain of the output signal.

**Regarding claim 2,**

In *column 7, lines 8-13*, Fretz teaches that amplification occurs to high frequency range signals, corresponding to “wherein the amplification is frequency dependent” recitation.

**Regarding claim 3,**

In *column 7, lines 8-13*, Fretz teaches that gain is only applied to soft sounds in the high frequency range, which corresponds to the claimed recitation, “wherein the amplification focuses on higher audio frequencies.

**Regarding claim 4,**

Fretz’s teaches in *column 7, lines 8-13*, that gain is only applied to soft sounds in the high frequency range, thereby implying that “certain frequencies of the input audio signals are not amplified”, as claimed.

**Regarding claim 5,**

Fretz’s amplification of a certain frequency range due to the user’s inability to hear sounds within said range, corresponds to the claimed recitation, “wherein the amplification depends on at least one characteristic of the hearing of the user”.

**Regarding claim 6,**

The identification of those frequencies to be amplified for a specific wearer, as taught by Fretz, is inherently determined through calibration by an audiologist, as is well understood in the art.

**Regarding claim 11,**

In *column 8, lines 39-40*, Fretz teaches a hearing enhancement system as recited in claim 1, wherein the microphone is a directional microphone.

**Regarding claim 13,**

The combined disclosures of Taenzer and Fretz fail to clearly teach a hearing enhancement system as recited in claim 1, wherein the system further includes a rechargeable battery. However, the Examiner takes *Official Notice* that providing hearing enhancement devices with rechargeable batteries is well known in the art and would have been obvious for the purpose of not inconveniencing the wearer with having to replace the battery.

**Regarding claim 14,**

In *column 8, lines 38-50*, Taenzer teaches that the hearing device may function as a two-way communicator and in connection with a cellular telephone network, which corresponds to the recitation, "wherein the system also can function as a phone", as broadly claimed.

**Regarding claim 15,**

In **Figure 5**, Taenzer teaches that the system includes more than one directional speaker (506,510), and in *column 11, lines 63- column 12, line 5*, teaches an ultrasonic transducer (506) and a second ultrasonic transducer (510) which produces an output at a frequency of the ultrasonic signal and which has been frequency offset with the audio signal via frequency offset block (504), an amplifier (512) and a filter (514), reading on “the phases of the ultrasonic signals driving at least two of the speakers differ by a preset value.”

**Regarding claim 16,**

In *column 8, lines 38-50*, Taenzer teaches that the system can also access audio signals from another instrument through a wire or wirelessly through a wireless local area network.

**Regarding claim 17,**

In *column 8, lines 38-50*, Taenzer teaches that the another instrument is a portable instrument.

**Regarding claim 18,**

In *column 6, lines 54-56*, Taenzer teaches that the another instrument is an entertainment unit, as broadly claimed.

**Regarding claim 19,**

*In column 8, lines 38-50, Taenzer teaches that the instrument is a phone.*

**Regarding claim 20,**

*As best understood with regard to the USC 112 second paragraph rejection, above, Taenzer appears to teach that the instrument is related to a microphone at an event.*

**Regarding claim 21,**

*As best understood with regard to the USC 112 second paragraph rejection, above, Taenzer appears to teach that the instrument is related to a speaker at an event.*

**Regarding claim 22,**

Taenzer teaches a hearing enhancement system for a user comprising: a directional speaker (108,506,510); a microphone (116); and a computing unit (102,106,110), as broadly claimed, operatively coupled to the directional speaker and the microphone, wherein the microphone receives input audio signals, and the computing unit transforms the input audio signals into modified audio signals (see, *column 8, lines 51-53*) and provides the modified audio signals to the directional speaker, wherein the directional speaker outputs ultrasonic signals based on the modified audio signals.

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Taenzer does not teach that the computing unit modifies certain frequencies differently than other frequencies to enhance the ability of the user to hear the input audio signals.

In *column 4, lines 52-67, column 5, lines 2-5, lines 10-12 and lines 34-41*, Fretz teaches that certain frequencies are amplified i.e., modified, more than another portion to enhance the hearing of the user.

It would have been obvious for one of ordinary skill in the art at the time of the invention to alter the tubing (114) of Taenzer, per the teachings of Fretz, for the purpose of shaping the frequency response and affecting the frequency gain of the output signal.

**Regarding claim 23,**

In *column 7, lines 24-28*, Taenzer teaches a hearing enhancement system as recited in claim 22, wherein at least a portion of the ultrasonic waves output by the directional speaker are transformed into output audio signals in air.

**Regarding claim 24,**

Taenzer does not clearly teach that the speaker is attachable to the clothing worn by the user so as to direct the ultrasonic waves towards at least one ear of the user. However, Taenzer does not restrict to any particular location for the speaker, but teaches in *column 7, lines 13-18*, that the transducer or transducers may be configured for positioning within the ear canal, behind the ear OR in any other convenient location near or in a user's ear. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to configure the speaker of Taenzer such that it is

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attachable to the clothing worn by the user such as a hat, eyeglasses or shirt, as either of these locations will be in proximity to a human ear canal such that the human ear canal will receive the audio signal as airborne ultrasonic energy.

**Regarding claim 25,**

Taenzer teaches the hearing enhancement system as recited in claim 22. Taenzer fails to clearly teach that the computing unit (102,103,106) is integral with the directional speaker. However, Taenzer does not restrict to any particular structural implementation of the computing unit (102,103,106). The Examiner takes *Official Notice* that it is well known in the art and would have been obvious to utilize a speaker unit wherein the computing unit (signal modifying electronics) are integrated within the magnetic circuit of the speaker unit.

**Regarding claim 26,**

In *column 8, lines 43-48*, Taenzer teaches that a sound processing unit, corresponding to “computing unit” of the claim, may have signals transmitted wirelessly thereto, which reads on “operatively couples with the directional speaker over a wireless link”.

5. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Taenzer et al. (US 6,631,196)** in view of **Fretz (US 6,275,596)**, as applied to claim 1, and further in view of **Slavin (US 4,622,440)**.

**Regarding claim 8,**

The combined disclosures of Taenzer and Fretz teach a hearing enhancement system as recited in claim 1. Said combined disclosure does not clearly teach that the system can be activated depending on at least one word said by the user.

In **claim 6**, Slavin teaches a hearing aid provided with a voice-operated switch for actuating the hearing aid device in response to an audio input.

It would have been obvious for one of ordinary skill in the art at the time of the invention to alter the combined teachings of Taenzer and Fretz, per the teachings of Slavin, for the purpose of facilitating easy activation of the hearing device.

6. **Claims 7, 9, 10 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Taenzer et al. (US 6,631,196)** in view of **Fretz (US 6,275,596)**, as applied to claim 1, and further in view of **Marx (US 4,955,729)**.

**Regarding claim 7;**

The combined disclosures of Taenzer and Fretz teach a hearing enhancement system as recited in claim 1. Said combined disclosure does not clearly teach that the system can be de-activated by the user.

In *column 7, lines 28-40*, Marx teaches a hearing enhancement system as recited in claim 1 wherein the system is turned off when the user places the hearing device in a stationary place, thus reading on "can be de-activated by the user."

It would have been obvious for one of ordinary skill in the art at the time of the invention to alter the combined teachings of Taenzer and Fretz, per the teachings of Marx, for the purpose of conserving the power source of the device, when not in use.

**Regarding claims 9 and 10,**

*As best understood with regard to the USC 112 second paragraph rejection, above*, the combined disclosures of Taenzer and Fretz teach a hearing enhancement system as recited in claim 1. Said combined disclosure does not clearly teach that depending on the *sound pressure level/average sound pressure level* of the input audio signals, the system can be in a standby mode.

In *column 5, lines 30-36 and lines 50-60*, Marx teaches a hearing device provided with a switch (9), which responds to the sound pressure of an incoming signal to switch the hearing device off. Since Marx doesn't explicitly disclose a user actuated "on" switch, but implies that the hearing device will continue to function whenever a particular switching characteristic is not met, said state of inactivity as caused by the

switch (9) is interpreted as corresponding to the “standby mode” as recited in the claims.

It would have been obvious for one of ordinary skill in the art at the time of the invention to alter the combined teachings of Taenzer and Fretz, per the teachings of Marx, for the purpose of limiting the wearer’s exposure to undesirable feedback signals.

**Regarding claim 27,**

Marx teaches a reduced power mode and a normal power mode, and wherein the device can be automatically switched between the power modes based on the detected sound pressure, which reads on “at least one characteristic of the input audio signals”, thereby reducing power consumption by the computing unit.

7. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Taenzer et al. (US 6,631,196)** in view of **Fretz (US 6,275,596)**, as applied to claim 1, and further in view of **Charpentier (US 5,321,758)**.

**Regarding claim 12,**

*As best understood with regard to the USC 112 second paragraph rejection, above, the combined disclosures of Taenzer and Fretz teach a hearing enhancement system as recited in claim 1. Said combined disclosure does not clearly teach that the amplification is reduced or limited if the average *sound pressure* level of the input audio signals is higher than a preset threshold.*

In *column 4, lines 19-30*, Charpentier teaches that for a given amplification profile, certain frequencies are no longer amplified when the *sound pressure* level for detected ambient sounds exceed a predetermined threshold.

It would have been obvious for one of ordinary skill in the art at the time of the invention to alter the combined teachings of Taenzer and Fretz, per the teachings of Charpentier, for the purpose of saving power and increasing speech intelligibility.

### Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**O'Brien (US 2004/0202339)** teaches a rechargeable battery in a hearing enhancement device.

**Bilan (US 6,243,472)** teaches a speaker with integrated signal modifying components.

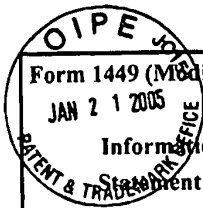
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dionne H. Pendleton whose telephone number is 571-272-7497. The examiner can normally be reached on 9-5:30 M-F.

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.

Art Unit: 2615

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.

  
Dionne Pendleton  
VIVIAN CHIN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2200



Form 1449 (Modified)

JAN 21 2005

Information Disclosure

Statement By Applicant

(Use Several Sheets if Necessary)

|                  |                |
|------------------|----------------|
| Atty. Docket No. | IPVBP002       |
| Application No.: | 10/826,527     |
| Applicant        | Cheung et al.  |
| Filing Date      | April 15, 2004 |
| Group            | 2644           |
|                  | Page 1 of 4    |

#### U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date   | Patentee          | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|--------|-------------------|-------|-----------|-------------|
| /DP/             | 1.  | 3,974,335       | Aug-76 | Blackledge        |       |           |             |
|                  | 2.  | 2002/0090103 A1 | Jul-02 | Calisto, JR.      |       |           |             |
|                  | 3.  | 6,058,315       | May-00 | Clark             |       |           |             |
|                  | 4.  | 2003/0118198 A1 | Jun-03 | Croft, III et al. |       |           |             |
|                  | 5.  | 6,535,612 B1    | Mar-03 | Croft, III et al. |       |           |             |
|                  | 6.  | 6,584,205 B1    | Jun-03 | Croft, III et al. |       |           |             |
|                  | 7.  | 5,648,824       | Jul-97 | Dunn et al.       |       |           |             |
|                  | 8.  | 5,802,190       | Sep-98 | Ferren            |       |           |             |
|                  | 9.  | 2003/0092377 A1 | May-03 | Hill              |       |           |             |
|                  | 10. | 2002/0048382 A1 | Apr-02 | Hou               |       |           |             |
|                  | 11. | 2002/0183648 A1 | Dec-02 | Hou               |       |           |             |
|                  | 12. | 6,322,521 B1    | Nov-01 | Hou               |       |           |             |
|                  | 13. | 5,835,732       | Nov-98 | Kikinis et al.    |       |           |             |
|                  | 14. | 2003/0035552 A1 | Feb-03 | Kolano et al.     |       |           |             |
|                  | 15. | 5,793,875       | Aug-98 | Lehr et al.       |       |           |             |
|                  | 16. | 5,313,663       | May-94 | Norris            |       |           |             |
|                  | 17. | 2001/0055397 A1 | Dec-01 | Norris et al.     |       |           |             |
|                  | 18. | 2003/0091200 A1 | May-03 | Pompei            |       |           |             |
|                  | 19. | 6,086,541       | Jul-00 | Rho               |       |           |             |
|                  | 20. | 2002/0048385 A1 | Apr-02 | Rosenberg         |       |           |             |
|                  | 21. | 5,943,430       | Aug-99 | Saitoh            |       |           |             |
|                  | 22. | 6,011,855       | Jan-00 | Selfridge et al.  |       |           |             |
|                  | 23. | 5,357,578       | Oct-94 | Taniishi          |       |           |             |
|                  | 24. | 6,650,755 B2    | Nov-03 | Vaudrey et al.    |       |           |             |
|                  | 25. | 6,477,258 B1    | Nov-02 | Watson et al.     |       |           |             |
|                  | 26. | 6,496,205 B1    | Dec-02 | White et al.      |       |           |             |
|                  | 27. | 5,572,575       | Nov-96 | Yamamoto et al.   |       |           |             |
|                  | 28. | 2002/0054689 A1 | May-02 | Zhang et al.      |       |           |             |
|                  | 29. | 6,453,045 B1    | Sep-02 | Zurek et al.      |       |           |             |

#### Foreign Documents

Examiner /Dionne Pendleton/ Date Considered 03/08/2007

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
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|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
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|       |  |              |      |         |       |          | Translation |    |
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| Init. |  | Document No. | Date | Country | Class | Subclass | Yes         | No |
|       |  |              |      |         |       |          |             |    |
|       |  |              |      |         |       |          |             |    |

**Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)**

|      |   |                                                                                                                                                                                                          |
|------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| /DP/ | A | "Audio Spotlight - Put sound where you want it," Holosonic Research Labs, Inc., 2002, <a href="http://www.holosonics.com/technology.html">www.holosonics.com/technology.html</a> (downloaded 1/18/2004)  |
|      | B | "Technology Introduction," American Technology Corporation, 2001, pp. 1-19.                                                                                                                              |
|      | C | "Technology Licensing - HyperSonic Sound," American Technology Corporation, 2003, pp. 1-3.                                                                                                               |
|      | D | "Theory, History, and the Advancement of Parametric Loudspeakers - A Technology Overview," White Paper, American Technology Corporation, 2002, pp. 1-27.                                                 |
|      | E | "HSS Directed Audio Sound System, Model Series: 220," Product Information, American Technology Corporation, 2003.                                                                                        |
|      | F | A. C. Baker, "Nonlinear pressure fields due to focused circular apertures," The Journal of the Acoustical Society of America, 91(2), February 1992, pp. 713-717.                                         |
|      | G | A.L. Vyas et al., "Design Considerations of Parametric Arrays," IEEE Proceedings of the 1998 International Symposium on Underwater Technology, 15-17 April 1998, pp. 98 - 102.                           |
|      | H | B. G. Lucas et al., "Field of a parametric focusing source," The Journal of the Acoustical Society of America, 73 (6), June 1983, pp. 1966-1971.                                                         |
|      | I | B.G. Lucas et al., "The field of a focusing source," The Journal of the Acoustical Society of America, 72(4), October 1982, pp. 1289-1296.                                                               |
|      | J | B.W. Lawton, "Damage to human hearing by airborne sound of a very high frequency or ultrasonic frequency," Institute of Sound and Vibration Research, Contract Research Report 343/2001, 2001, pp. 1-77. |
|      | K | C. M. Darvennes et al., "Scattering of sound by sound from two Gaussian beams," The Journal of the Acoustical Society of America, 87(5), May 1990, pp. 1955-1964.                                        |
|      | L | C.M. Darvennes et al., "Effects of absorption on the nonlinear interaction of sound beams," The Journal of the Acoustical Society of America, 89(3), March 1991, pp. 1028-1036.                          |
|      | M | D. Marculescu et al., "Ready to Ware," IEEE Spectrum, October 2003, pp. 28-32.                                                                                                                           |
|      | N | D.I. Havelock, "Directional Loudspeakers Using Sound Beams," J. Audio Eng. Soc., Vol. 48, No. 10, October 2000, pp. 908-916.                                                                             |
|      | O | E.A. Zabolotskaya et al., "Quasi-plane Waves in the Nonlinear Acoustics of Confined Beams," Soviet Physics-Acoustics, Vol. 15, No. 1, July-Sept. 1969, pp. 35-40.                                        |
|      | P | F.J. Pompei, "The Use of Airborne Ultrasonics for Generating Audible Sound Beams," J. Audio Eng. Soc., Vol. 47, No. 9, September 1999, pp. 726-731.                                                      |
|      | Q | G. Garrett et al., "Nearfield of a large acoustic transducer, Part II: Parametric radiation," The Journal of the Acoustical Society of America, 74(3), September 1983, pp. 1013-1020.                    |
|      | R | G. Garrett et al., "Nearfield of a large acoustic transducer. Part III: General results," The Journal of the Acoustical Society of America, 75(3), March 1984, pp. 769-779.                              |
|      | S | H.O. Berkay, "Possible Exploitation of Non-Linear Acoustics in Underwater Transmitting Applications," J. Sound Vib. (1965) 2(4), 435-461.                                                                |
|      | T | i60c Phone User's Guide, Nextel Communications, 2002, pp. 6, 65, 66, 135-137.                                                                                                                            |
|      | U | J. Berntsen et al., "Interaction of sound waves. Part IV: Scattering of sound by sound," The Journal of the Acoustical Society of America, 86(5), November 1989, pp. 1968-1983.                          |
|      | V | J. Berntsen et al., "Nearfield of a large acoustic transducer. Part IV: Second harmonic and sum frequency radiation," The Journal of the Acoustical Society of America, 75(5), May 1984, pp.             |

Examiner /Dionne Pendleton/

Date Considered 03/08/2007

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

|                                                                                                                                      |                  |                |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | Cheung et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
|                                                                                                                                      |                  | Page 3 of 4    |

|      |    |                                                                                                                                                                                                                                                    |
|------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |    | 1383-1391.                                                                                                                                                                                                                                         |
| /DP/ | W  | J. Meyer, "Microphone Array for Hearing Aids taking into Account the Scattering of the Head," 2001 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, 21-24 October 2001, pp. 27-30.                                       |
|      | X  | J. N. Tjotta et al., "Propagation and interaction of two collinear finite amplitude sound beams," The Journal of the Acoustical Society of America, 88(6), December 1990, pp. 2859-2870.                                                           |
|      | Y  | J. Zemanek, "Beam Behavior within the Nearfield of a Vibrating Piston," The Journal of the Acoustical Society of America, Vol. 42, No. 1 (Part 2), 1971, pp.181-191.                                                                               |
|      | Z  | K. Aoki et al., "Parametric Loudspeaker-Applied Examples," Electronics and Communications in Japan, Part 3, Vol. 77, No. 1, 1994, pp. 64-74.                                                                                                       |
|      | AA | K. Maney, "Sound technology turns the way you hear on its ear," USA Today, May 2003, pp. 1-4.                                                                                                                                                      |
|      | AB | M. Greenspan, "Piston radiator: Some extensions of the theory," The Journal of the Acoustical Society of America, 65(3), Mar. 1979, pp. 608-621.                                                                                                   |
|      | AC | M. Yoneyama et al., "The audio spotlight: An application of nonlinear interaction of sound waves to a new type of loudspeaker design," The Journal of the Acoustical Society of America, 73(5), May 1983, pp. 1532-1536.                           |
|      | AD | M.A. Averkiou et al., "Self-demodulation of amplitude- and frequency-modulated pulses in a thermoviscous fluid," The Journal of the Acoustical Society of America, 94(5), November 1993, pp. 2876-2883.                                            |
|      | AE | M.B. Bennett et al., "Parametric array in air," The Journal of the Acoustical Society of America, Vol. 57, No. 3, March 1975, pp. 562-568.                                                                                                         |
|      | AF | Nextel i60c Phone Details, <a href="http://nextelonline.nextel.com">http://nextelonline.nextel.com</a> , downloaded April 22, 2003, pp. 1-2                                                                                                        |
|      | AG | Nextel-Direct Connect, <a href="http://nextelonline.nextel.com/services/directconnect-popup.html">http://nextelonline.nextel.com/services/directconnect-popup.html</a> , downloaded April 22, 2003, p. 1.                                          |
|      | AH | P.J. Westervelt, "Parametric Acoustic Array," The Journal of the Acoustical Society of America, Vol. 35, No. 4, April 1963, pp. 535-537.                                                                                                           |
|      | AI | Palm™ m515 Handheld, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-2.                                                                                                                                                            |
|      | AJ | Palm™ PalmModem® Connectivity Kit, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-2.                                                                                                                                              |
|      | AK | Palm™ Tungsten™ C Handheld, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-3.                                                                                                                                                     |
|      | AL | Palm™ Zire™ 71 Handheld, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-3.                                                                                                                                                        |
|      | AM | T. Kamakura et al., "Suitable Modulation of the Carrier Ultrasound for a Parametric Loudspeaker," ACUSTICA, Vol. 73 (1991), pp. 215-217.                                                                                                           |
|      | AN | T. Kamakura et al., "Harmonic generation in finite amplitude sound beams from a rectangular aperture source," The Journal of the Acoustical Society of America, 91(6), June 1992, pp. 3144-3151.                                                   |
|      | AO | T. Kamakura et al., "Nonlinearly generated spectral components in the nearfield of a directive sound source," The Journal of the Acoustical Society of America, 85(6), June 1989, pp. 2331-2337.                                                   |
|      | AP | T.D. Kite et al., "Parametric Array in Air: Distortion Reduction by Preprocessing," Proceedings of the 16th International Congress on Acoustics and the 135th Meeting of the Acoustical Society of America, Seattle, WA, June 1998, pp. 1091-1092. |
|      | AQ | T.G. Muir et al., "Parametric Acoustic Transmitting Arrays," The Journal of the Acoustical Society of America, Vol. 52, No. 5, Part 2, 1972, pp.1481-1486.                                                                                         |
| ↓    | AR | V.P. Kuznetsov, "Equations of Nonlinear Acoustics," Soviet Physics-Acoustics, Vol. 16, No. 4, April-June 1971, pp. 467-470.                                                                                                                        |

|          |                    |                 |            |
|----------|--------------------|-----------------|------------|
| Examiner | /Dionne Pendleton/ | Date Considered | 03/08/2007 |
|----------|--------------------|-----------------|------------|

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|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
|                                                                                                                                      |                  | Page 4 of 4    |

|      |    |                                                                                                                                                  |
|------|----|--------------------------------------------------------------------------------------------------------------------------------------------------|
| /DP/ | AS | W.F. Druyvesteyn et al., "Personal Sound," J. Audio Eng. Soc., Vol. 45, No. 9, September 1997, pp. 685-701.                                      |
| /DP/ | AT | Y.W. Kim et al., "Novel Preprocessing Technique to Improve Harmonic Distortion in Airborne Parametric Array," ICSP '02 Proceedings, pp.1815-1818 |
| /DP/ | AU | Z.A. Gol'dberg, "Certain Second-Order Quantities in Acoustics," SOV PHYS ACOUST, Vol. 3, 1957, pp. 157-162.                                      |
|      |    |                                                                                                                                                  |

|                                |                               |
|--------------------------------|-------------------------------|
| Examiner<br>/Dionne Pendleton/ | Date Considered<br>03/08/2007 |
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|                                                                                                                                      | Applicant        | C. Douglass Thomas |
|                                                                                                                                      | Filing Date      | April 15, 2004     |
|                                                                                                                                      | Group            | 2644               |
|                                                                                                                                      |                  | Page 1             |

## U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date    | Patentee | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|---------|----------|-------|-----------|-------------|
| /DP/             | 1.  | 2003/0182104 A1 | Sept-05 | Muesch   |       |           |             |
|                  | 2.  |                 |         |          |       |           |             |
|                  | 3.  |                 |         |          |       |           |             |
|                  | 4.  |                 |         |          |       |           |             |
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## Foreign Documents

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| Init. | Document No. | Date | Country | Class | Subclass | Yes | No |
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## Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

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|                                                                                                                                      | Application No.: | 10/826,527     |                                                                    |
|                                                                                                                                      | Applicant        | CHEUNG et al.  |                                                                    |
|                                                                                                                                      | Filing Date      | April 15, 2004 |                                                                    |
|                                                                                                                                      | Group            | 2644           |                                                                    |
|                                                                                                                                      |                  | Page 1 of 1    |                                                                    |

## U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date   | Patentee         | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|--------|------------------|-------|-----------|-------------|
| /DP/             | 1.  | 4,128,738       | Dec-78 | Gallery          |       |           |             |
|                  | 2.  | 5,526,411       | Jun-98 | Krieter          |       |           |             |
|                  | 3.  | 5,819,183       | Oct-98 | Voroba et al.    |       |           |             |
|                  | 4.  | 5,828,768       | Oct-98 | Eatwell et al.   |       |           |             |
|                  | 5.  | 6,151,398       | Nov-00 | Norris           |       |           |             |
|                  | 6.  | 6,895,261 B1    | May-05 | Palamides.       |       |           |             |
|                  | 7.  | 7,013,009 B2    | Mar-06 | Warren           |       |           |             |
|                  | 8.  | 2002/0090099 A1 | Jul-02 | Hwang            |       |           |             |
|                  | 9.  | 2002/0012441    | Jan-02 | Matsunaga et al. |       |           |             |
|                  | 10. | 2002/0191807 A1 | Dec-02 | Asada et al.     |       |           |             |
|                  | 11. | 2004/0204168 A1 | Oct-04 | Laurila          |       |           |             |

## Foreign Documents

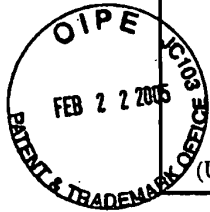
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## Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

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|                                                                                                                                  | Group            | 2644           |
|                                                                                                                                  |                  | Page 1 of 1    |

**U.S. Patent Documents**

| Examiner Initial | No. | Patent No.   | Date   | Patentee          | Class | Sub-class | Filing Date |
|------------------|-----|--------------|--------|-------------------|-------|-----------|-------------|
| /DP/             | 1.  | 6,363,139 B1 | Mar-02 | Zurek et al.      |       |           |             |
| /DP/             | 2.  | 6,169,813 B1 | Jan-01 | Richardson et al. |       |           |             |
| /DP/             | 3.  | 6,445,804 B1 | Sep-02 | Hirayanagi        |       |           |             |
| /DP/             | 4.  | 6,643,377 B1 | Nov-03 | Takahashi et al.  |       |           |             |
| /DP/             | 5.  | 4,823,908    | Apr-89 | Tanaka            |       |           |             |

**Foreign Documents**

| Init. | Document No. | Date | Country | Class | Subclass | Translation |    |
|-------|--------------|------|---------|-------|----------|-------------|----|
|       |              |      |         |       |          | Yes         | No |
|       |              |      |         |       |          |             |    |
|       |              |      |         |       |          |             |    |

**Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)**

|      |  |                                                                                                     |
|------|--|-----------------------------------------------------------------------------------------------------|
| /DP/ |  | PCT International Search Report, RE: PCT/US04/11972, January 31, 2005.                              |
|      |  | PCT Written Opinion of the International Searching Authority, RE: PCT/US04/11972, January 31, 2005. |
|      |  |                                                                                                     |
|      |  |                                                                                                     |

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|-----------------------------|----------------------------|
| Examiner /Dionne Pendleton/ | Date Considered 03/08/2007 |
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|-----------------------------------|---------------------------------------|--|-------------------------------------------------------------|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>10/826,527 |  | Applicant(s)/Patent Under<br>Reexamination<br>CHEUNG ET AL. |             |
|                                   | Examiner<br>Dionne H. Pendleton       |  | Art Unit<br>2615                                            | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name               | Classification |
|---|---|--------------------------------------------------|-----------------|--------------------|----------------|
| * | A | US-6,243,472                                     | 06-2001         | Bilan et al.       | 381/117        |
| * | B | US-2004/0202339                                  | 10-2004         | O'Brien et al.     | 381/312        |
| * | C | US-4,622,440                                     | 11-1986         | Slavin, Martin J.  | 381/313        |
| * | D | US-5,321,758                                     | 06-1994         | Charpentier et al. | 381/317        |
| * | E | US-6,631,196                                     | 10-2003         | Taenzer et al.     | 381/316        |
| * | F | US-4,955,729                                     | 09-1990         | Marx, Gunter       | 381/322        |
| * | G | US-6,275,596                                     | 08-2001         | Fretz et al.       | 381/321        |
|   | H | US-                                              |                 |                    |                |
|   | I | US-                                              |                 |                    |                |
|   | J | US-                                              |                 |                    |                |
|   | K | US-                                              |                 |                    |                |
|   | L | US-                                              |                 |                    |                |
|   | M | US-                                              |                 |                    |                |

**FOREIGN PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | Classification |
|---|---|--------------------------------------------------|-----------------|---------|------|----------------|
|   | N |                                                  |                 |         |      |                |
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**NON-PATENT DOCUMENTS**

| * |   | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|-------------------------------------------------------------------------------------------|
|   | U |                                                                                           |
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\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
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|-------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------|
| <b>Index of Claims</b><br> | <b>Application/Control No.</b><br>10826527 | <b>Applicant(s)/Patent Under Reexamination</b><br>CHEUNG ET AL. |
|                                                                                                             | <b>Examiner</b><br>Pendleton, Dionne H     | <b>Art Unit</b><br>2615                                         |

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|----------------------------------------------------------------------------------------|----------|------------|------------|------------------------------|--|-------------------------------|--|---------------------------------|--|
| CLAIM                                                                                  |          | DATE       |            |                              |  |                               |  |                                 |  |
| Final                                                                                  | Original | 03/08/2007 | 05/31/2007 |                              |  |                               |  |                                 |  |
|                                                                                        | 1        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 2        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 3        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 4        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 5        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 6        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 7        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 8        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 9        | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 10       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 11       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 12       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 13       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 14       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 15       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 16       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 17       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 18       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 19       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 20       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 21       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 22       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 23       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 24       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 25       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 26       | +          | ✓          |                              |  |                               |  |                                 |  |
|                                                                                        | 27       | +          | ✓          |                              |  |                               |  |                                 |  |

|                                                                                                              |                                                |                                                                     |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------|
| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br><br>10826527 | <b>Applicant(s)/Patent Under Reexamination</b><br><br>CHEUNG ET AL. |
|                                                                                                              | <b>Examiner</b><br><br>Pendleton, Dionne H     | <b>Art Unit</b><br><br>2615                                         |

| SEARCHED |                     |                                       |          |
|----------|---------------------|---------------------------------------|----------|
| Class    | Subclass            | Date                                  | Examiner |
| 381      | 312-316,320-322,329 | 5/16/07; 5/18/07;<br>5/30/07; 5/31/07 | DP       |

| SEARCH NOTES        |      |          |
|---------------------|------|----------|
| Search Notes        | Date | Examiner |
| East search         | "    | "        |
| Inventor name sarch | "    | "        |

| INTERFERENCE SEARCH |          |      |          |
|---------------------|----------|------|----------|
| Class               | Subclass | Date | Examiner |
|                     |          |      |          |

## EAST Search History

| Ref # | Hits | Search Query                                                                                                                                                                                                                                                              | DBs                                       | Default Operator | Plurals | Time Stamp       |
|-------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|------------------|---------|------------------|
| L3    | 474  | (381/412).CCLS.                                                                                                                                                                                                                                                           | USPAT                                     | OR               | OFF     | 2007/05/31 12:52 |
| L4    | 40   | 3 and electronics                                                                                                                                                                                                                                                         | USPAT                                     | OR               | OFF     | 2007/05/31 12:52 |
| S1    | 2250 | (381/312-316,320-322,329).CCLS.                                                                                                                                                                                                                                           | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR               | OFF     | 2007/05/16 14:38 |
| S2    | 96   | (ultrasonic and (microphone sensor)) and S1                                                                                                                                                                                                                               | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR               | ON      | 2007/05/16 14:39 |
| S3    | 79   | S2 and @ad<="20030415"                                                                                                                                                                                                                                                    | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR               | ON      | 2007/05/18 09:53 |
| S4    | 46   | demodulat\$4 near4 ultraso\$3 near8 air                                                                                                                                                                                                                                   | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR               | ON      | 2007/05/16 15:19 |
| S5    | 2    | S1 and S4                                                                                                                                                                                                                                                                 | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR               | ON      | 2007/05/16 15:19 |
| S6    | 21   | ("3068954"   "4539440"   "4539708"   "4756312"   "4800982"   "4815138"   "4982434"   "5047994"   "5285499"   "5298692"   "5313663"   "5420930"   "5636285"   "5649019"   "5761316"   "5889870"   "5987146"   "6169813"   "6173062"   "6275596").PN. OR ("6631196"). URPN. | US-PGPUB;<br>USPAT;<br>USOCR              | OR               | OFF     | 2007/05/16 16:13 |
| S7    | 4    | (voice near3 activat\$4) and S2                                                                                                                                                                                                                                           | US-PGPUB;<br>USPAT;<br>USOCR;<br>EPO; JPO | OR               | OFF     | 2007/05/30 14:09 |
| S8    | 2250 | (381/312-316,320-322,329).CCLS.                                                                                                                                                                                                                                           | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR               | OFF     | 2007/05/18 09:50 |
| S9    | 96   | (ultrasonic and (microphone sensor)) and S8                                                                                                                                                                                                                               | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR               | ON      | 2007/05/18 09:50 |
| S10   | 0    | ((voice near3 activat\$4) near3 on) and S9                                                                                                                                                                                                                                | US-PGPUB;<br>USPAT;<br>USOCR;<br>EPO; JPO | OR               | OFF     | 2007/05/18 09:51 |
| S11   | 0    | (voice near3 activat\$4 near3 on) and S9                                                                                                                                                                                                                                  | US-PGPUB;<br>USPAT;<br>USOCR;<br>EPO; JPO | OR               | OFF     | 2007/05/18 09:52 |

## EAST Search History

|     |      |                                                                                           |                                           |    |     |                  |
|-----|------|-------------------------------------------------------------------------------------------|-------------------------------------------|----|-----|------------------|
| S12 | 0    | (voice near3 activat\$4 near3 power) and S9                                               | US-PGPUB;<br>USPAT;<br>USOCR;<br>EPO; JPO | OR | OFF | 2007/05/18 09:52 |
| S13 | 1    | (voice near3 activat\$4 same power) and S9                                                | US-PGPUB;<br>USPAT;<br>USOCR;<br>EPO; JPO | OR | OFF | 2007/05/18 09:52 |
| S14 | 5    | (voice near3 activat\$4 same power) and S8                                                | US-PGPUB;<br>USPAT;<br>USOCR;<br>EPO; JPO | OR | OFF | 2007/05/18 09:52 |
| S15 | 4    | S14 and @ad<="20030415"                                                                   | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:35 |
| S16 | 2420 | (sound same pressure same (level threshold)) same (standby sleep off on activat\$3 power) | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:52 |
| S17 | 43   | S16 and S8                                                                                | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:35 |
| S18 | 32   | S17 and @ad<="20030415"                                                                   | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:52 |
| S19 | 73   | (sound same pressure same (level threshold)) same (standby sleep)                         | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:55 |
| S20 | 36   | S19 and @ad<="20030415"                                                                   | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:55 |
| S21 | 10   | (sound same pressure same (level threshold)) same (standby)                               | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:57 |
| S22 | 7    | S21 and @ad<="20030415"                                                                   | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:57 |
| S23 | 45   | (sound same pressure same standby)                                                        | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:57 |
| S24 | 0    | (S8 and S23) and @ad<="20030415"                                                          | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:58 |
| S25 | 0    | ("3851"/\$.ccls. and S23) and @ad<="20030415"                                             | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:58 |
| S26 | 2    | ("381"/\$.ccls. and S23) and @ad<="20030415"                                              | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | ON  | 2007/05/18 10:58 |

5/31/07 1:00:21 PM

C:\Documents and Settings\DHarvey1\My Documents\EAST\workspaces\10826527.wsp

Page 2

## EAST Search History

|     |      |                                                                                                                                                                                         |                                           |    |     |                  |
|-----|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----|-----|------------------|
| S27 | 9    | (US-20040202339-\$).did. or<br>(US-6631197-\$ or US-6631196-\$ or<br>US-6275596-\$ or US-4920570-\$ or<br>US-4622440-\$ or US-6041128-\$ or<br>US-5321758-\$ or US-4955729-\$).<br>did. | US-PGPUB;<br>USPAT                        | OR | OFF | 2007/05/18 11:12 |
| S28 | 3    | S27 and directional                                                                                                                                                                     | US-PGPUB;<br>USPAT;<br>FPRS;<br>EPO; JPO  | OR | OFF | 2007/05/18 11:14 |
| S29 | 7    | cheung.in. and tong.in. and<br>thomas.in.                                                                                                                                               | US-PGPUB                                  | OR | OFF | 2007/05/29 15:38 |
| S30 | 1    | "6631196".pn.                                                                                                                                                                           | USPAT                                     | OR | OFF | 2007/05/29 15:38 |
| S31 | 32   | ("6631196" "5321758" "6275596"<br>"4955729").pn"                                                                                                                                        | USPAT                                     | OR | OFF | 2007/05/30 14:10 |
| S32 | 4    | ("6631196" "5321758" "6275596"<br>"4955729").pn.                                                                                                                                        | USPAT                                     | OR | OFF | 2007/05/30 14:22 |
| S33 | 0    | S32 and recharg\$4                                                                                                                                                                      | USPAT                                     | OR | OFF | 2007/05/30 14:11 |
| S34 | 2    | S32 and battery                                                                                                                                                                         | USPAT                                     | OR | OFF | 2007/05/30 14:12 |
| S35 | 2259 | (381/312-316,320-322,329).CCLS.                                                                                                                                                         | US-PGPUB;<br>USPAT;<br>EPO; JPO           | OR | OFF | 2007/05/30 14:12 |
| S36 | 88   | S35 and (rechargeable near3<br>battery)                                                                                                                                                 | US-PGPUB;<br>USPAT;<br>USOCR;<br>EPO; JPO | OR | OFF | 2007/05/31 12:51 |

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**APR 03 2007**

# FAX

|                                                       |                                                                                 |
|-------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>TO:</b><br>Commissioner for Patents,<br>Mail Stop: | <b>FROM:</b><br>Peter P. Tong<br>Ph: 650-903-9200 Ext. 102<br>Fax: 650-903-9800 |
| <b>COMPANY:</b><br>United States Patent Office        | <b>DATE:</b><br>4/3/2007                                                        |
| <b>FAX NUMBER:</b><br>571-273-8300                    | <b>NO. OF PAGES (INCLUDING COVER):</b><br>3                                     |
| <b>PHONE NUMBER:</b>                                  | <b>SENDER'S REFERENCE NUMBER:</b><br>IPVBP002                                   |
| <b>RE:</b><br>Response                                | <b>RECIPIENT'S REFERENCE NUMBER:</b><br>10/826,527                              |

## NOTES/COMMENTS:

Transmitted herewith are the following documents for entry into the above-noted file:

Response to Restriction Requirement

2 pages

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APR 03 2007

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: PENDLETON, DIONNE

Filed: April 15, 2004

Group: 2615

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted by facsimile to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on April 3, 2007.

Signed: Patricia Tate

Printed Name: Patricia Tate

**RESPONSE TO RESTRICTION REQUIREMENT**

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

Dear Sir:

In response to the Restriction Requirement dated March 22, 2007, to expedite the prosecution of the above-identified application, Applicants hereby elect, with traverse, group II, claims 1-13 and 15-27 to prosecute in the application.

Although Applicants have accepted the restriction requirement, the restriction requirement is respectfully traversed on the basis that all claims have already received an action on the merits. As such, since an examination of the entire application has already been made, restriction should not be required even though the application might have included claims on distinct or independent inventions. Also, see M.P.E.P. §803, which states: "If the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to distinct or independent inventions." In addition, Applicants would like to acknowledge the Office Action admitting that the claim listing provided in pages 3-4 may contain inaccuracies.

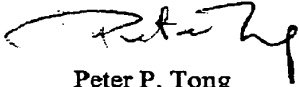
Appln. No. 10/826,527

1

Atty. Docket No. IPVBP002

If any fees are due in connection with the filing this Response to Restriction Requirement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-3874 (Order No. IPVBP002).

Respectfully submitted,



Peter P. Tong  
Registration No. 35,757

5150 El Camino Real A22  
Los Altos, CA 94022



# UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO.                                                             | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/826,527                                                                  | 04/15/2004  | Kwok Wai Cheung      | IPVBP002            | 2158             |
| 34071                                                                       | 7590        | 03/22/2007           | EXAMINER            |                  |
| IPVENTURE, INC.<br>5150 EL CAMINO REAL<br>SUITE A-22<br>LOS ALTOS, CA 94022 |             |                      | PENDLETON, DIONNE   |                  |
|                                                                             |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                             |             |                      | 2615                |                  |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE  | DELIVERY MODE |
|----------------------------------------|------------|---------------|
| 31 DAYS                                | 03/22/2007 | 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.

|                              |                        |  |                     |  |
|------------------------------|------------------------|--|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> |  | <b>Applicant(s)</b> |  |
|                              | 10/826,527             |  | CHEUNG ET AL.       |  |
|                              | <b>Examiner</b>        |  | <b>Art Unit</b>     |  |
|                              | Dionne H. 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 1 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 01 April 2004.
- 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) 1-27 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) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-27 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 \_\_\_\_\_ 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) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claim 14 (*which encompasses the limitations of claim 1*) is drawn to a telephone with hearing enhancement capabilities, classified in class 455, subclass 3.06.
  - II. Claims 1-13 and 15-27, are drawn to a hearing enhancement system, classified in class 381, subclass 81.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the hearing enhancement system may function as a stand alone device. The subcombination has separate utility such as a hearing aid.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in

Art Unit: 2615

accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

3. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

**4. In the instance that the Applicant elects the Invention of Group II:**

The Invention of Group II, identified above, contains claims directed to the following patentably distinct species:

- **Species 1**, in figure 3, is drawn a hearing device having frequency-dependent amplification means (claims 1 and 2).
- **Species 1/Sub-species A**, in figure 3, is drawn to a particular means of frequency dependent amplification in a hearing device (claim 3).
- **Species 1/Sub-species B**, in figure 3, is drawn to another particular means of frequency dependent amplification in a hearing device (claim 4).

- **Species 1/Sub-species C**, in figure 3, is drawn to yet another particular means of frequency dependent amplification in a hearing device (claim 5).
- **Species 2**, in figure 4, is drawn to a hearing device having calibration means (claim 6).
- **Species 3/Sub-species D**, in figure 5A, is drawn to a specific means of power management in a hearing device (claims 7 and 8).
- **Species 3/Sub-species E**, in figure 5A, is drawn to another specific means of power management in a hearing device (claims 9,10 and 27).
- **Species 3/Sub-species F**, in figure 5A, is drawn to yet another specific means of power management in a hearing device (claim 12).
- **Species 3/Sub-species G**, in figure 5A, is drawn to yet another specific means of power management in a hearing device (claim 13).
- **Species 4**, in figure 6A, is drawn to a hearing device having a directional particular microphone arrangement (claim 11).
- **Species 5**, in figure 6B-6C, is drawn to a hearing device having another directional particular microphone arrangement (claim 11).
- **Species 6**, no figure provided, is drawn to a hearing device having a speaker array (claim 15).
- **Species 7**, in figure 10, is drawn to a hearing device having access to audio signals from another instrument (claims 16-21).
- **Species 8**, in figures 1-2, is drawn to components for a hearing device (claims 22-26).

***Please note that the Examiner has indicated those claims believed to describe each individual species grouping. The Claim listing provided by the Examiner is not binding and may contain inaccuracies. The Examiner's claim listing has been provided as a matter of courtesy and shall not replace the claim listing which is required from the Applicant in response to this action.***

5. Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dionne H. Pendleton whose telephone number is 571-272-7497. The examiner can normally be reached on 10:00 AM-6:30 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. 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.

  
Dionne Pendleton

  
VIVIAN CHIN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600

|                                                                                                             |                                            |                                                                 |
|-------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------|
| <b>Index of Claims</b><br> | <b>Application/Control No.</b><br>10826527 | <b>Applicant(s)/Patent Under Reexamination</b><br>CHEUNG ET AL. |
|                                                                                                             | <b>Examiner</b><br>Pendleton, Dionne H     | <b>Art Unit</b><br>2615                                         |

|   |                 |   |                   |   |                     |   |                 |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | <b>Rejected</b> | - | <b>Cancelled</b>  | N | <b>Non-Elected</b>  | A | <b>Appeal</b>   |
| = | <b>Allowed</b>  | ÷ | <b>Restricted</b> | I | <b>Interference</b> | O | <b>Objected</b> |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 |          |            |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|--|--|--|--|--|--|--|--|
| CLAIM                                                                                                                                                                             |          | DATE       |  |  |  |  |  |  |  |  |
| Final                                                                                                                                                                             | Original | 03/08/2007 |  |  |  |  |  |  |  |  |
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|                                                       |                                                                           |
|-------------------------------------------------------|---------------------------------------------------------------------------|
| <b>TO:</b><br>Commissioner for Patents,<br>Mail Stop: | <b>FROM:</b><br>C. Douglass Thomas<br>Ph: 650-903-9200, Fax: 650-903-9800 |
| <b>COMPANY:</b><br>United States Patent Office        | <b>DATE:</b><br>1/12/2007                                                 |
| <b>FAX NUMBER:</b><br>571-273-8300                    | <b>NO. OF PAGES (INCLUDING COVER):</b><br>4                               |
| <b>PHONE NUMBER:</b>                                  | <b>SENDER'S REFERENCE NUMBER:</b><br>IPVBP002                             |
| <b>RE:</b>                                            | <b>RECIPIENT'S REFERENCE NUMBER:</b><br>10/826,527                        |

## NOTES/COMMENTS:

Transmitted herewith are the following documents for entry into the above-noted file:

|                                  |         |
|----------------------------------|---------|
| Information Disclosure Statement | 2 pages |
| Form 1449                        | 1 page  |

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JAN 12 2007 PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner: Unassigned

Filed: April 15, 2004

Group: 2644

Title: DIRECTIONAL HEARING ENHANCEMENT  
SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being  
transmitted via facsimile to: Commissioner for  
Patents, Alexandria, VA 22313-1450 on January 12, 2007.

Signed:



Printed Name: Patricia Tate

**INFORMATION DISCLOSURE STATEMENT**  
**37 CFR §§1.56 AND 1.97(b)**

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

Dear Sir:

The references listed in the attached PTO Form 1449, copies of which are attached, may be material to examination of the above-identified patent application. Applicants submit these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that these references indeed constitute prior art.

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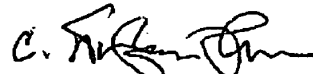
Appln. No. 10/826,527

-1-

Atty. Docket No. IPVBP002

Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-3874 (Order No. IPVBP002).

Respectfully submitted,



C. Douglass Thomas  
Registration No. 32,947

5150 El Camino Real,  
Building A, Ste. 22  
Los Altos, CA 94022

|                                                                                                                                      |                  |                |                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|--------------------------------------------------------------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       | <b>RECEIVED</b><br><b>CENTRAL FAX CENTER</b><br><b>JAN 12 2007</b> |
|                                                                                                                                      | Application No.: | 10/826,527     |                                                                    |
|                                                                                                                                      | Applicant        | CHEUNG et al.  |                                                                    |
|                                                                                                                                      | Filing Date      | April 15, 2004 |                                                                    |
|                                                                                                                                      | Group            | 2644           |                                                                    |
|                                                                                                                                      |                  | Page 1 of 1    |                                                                    |

## U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date   | Patentee         | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|--------|------------------|-------|-----------|-------------|
|                  | 1.  | 4,128,738       | Dec-78 | Gallery          |       |           |             |
|                  | 2.  | 5,526,411       | Jun-96 | Krieter          |       |           |             |
|                  | 3.  | 5,819,183       | Oct-98 | Voroba et al.    |       |           |             |
|                  | 4.  | 5,828,768       | Oct-98 | Eatwell et al.   |       |           |             |
|                  | 5.  | 6,151,398       | Nov-00 | Norris           |       |           |             |
|                  | 6.  | 6,895,261 B1    | May-05 | Palamides.       |       |           |             |
|                  | 7.  | 7,013,009 B2    | Mar-06 | Warren           |       |           |             |
|                  | 8.  | 2002/0090099 A1 | Jul-02 | Hwang            |       |           |             |
|                  | 9.  | 2002/0012441    | Jan-02 | Matsunaga et al. |       |           |             |
|                  | 10. | 2002/0191807 A1 | Dec-02 | Asada et al.     |       |           |             |
|                  | 11. | 2004/0204168 A1 | Oct-04 | Laurila          |       |           |             |

## Foreign Documents

| Init. |  | Document No. | Date | Country | Class | Subclass | Translation |    |
|-------|--|--------------|------|---------|-------|----------|-------------|----|
|       |  |              |      |         |       |          | Yes         | No |
|       |  |              |      |         |       |          |             |    |
|       |  |              |      |         |       |          |             |    |

## Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

|  |   |  |
|--|---|--|
|  | A |  |
|  | B |  |
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|  | D |  |
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|          |                 |
|----------|-----------------|
| Examiner | Date Considered |
|----------|-----------------|

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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www.uspto.gov

| APPLICATION NUMBER | PATENT NUMBER | GROUP ART UNIT | FILE WRAPPER LOCATION |
|--------------------|---------------|----------------|-----------------------|
| 10/826,527         |               | 2615           |                       |

## Correspondence Address / Fee Address Change

The following fields have been set to Customer Number 34071 on 06/16/2006

- Correspondence Address
- Maintenance Fee Address

The address of record for Customer Number 34071 is:

IPVENTURE, INC.  
5150 EL CAMINO REAL  
SUITE A-22  
LOS ALTOS,CA 94022

Aug 11 2005 16:32

IpVenture

650-903-9800

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AUG 11 2005

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Los Altos, CA 94022  
Tel: 650-903-9200  
Fax: 650-903-9800

**IpVenture, Inc.**

# Fax

|                                                                                                                                                                                                                              |                                         |                  |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------|------------------------|
| <b>To:</b>                                                                                                                                                                                                                   | United States Patent & Trademark Office | <b>From:</b>     | Patricia Tate          |
| <b>Fax:</b>                                                                                                                                                                                                                  | 571-273-8300                            | <b>Pages:</b>    | 4 (including cover)    |
| <b>Phone:</b>                                                                                                                                                                                                                |                                         | <b>Date:</b>     | 8/11/2005              |
| <b>Re:</b>                                                                                                                                                                                                                   | Application No. 10/826,527              | <b>Inventor:</b> | Kwok Wai Cheung, et al |
| <b>Filed:</b>                                                                                                                                                                                                                | April 15, 2004                          | <b>Group No.</b> | 2644                   |
| <input type="checkbox"/> <b>Urgent</b> <input type="checkbox"/> <b>For Review</b> <input type="checkbox"/> <b>Please Comment</b> <input type="checkbox"/> <b>Please Reply</b> <input type="checkbox"/> <b>Please Recycle</b> |                                         |                  |                        |

• **Comments:**

Please see attached Information Disclosure Statement. Thank you.

**AUG 11 2005**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG, et al

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner:

Filed: April 15, 2004

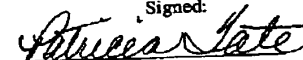
Group: 2844

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being  
transmitted via facsimile to: Commissioner for  
Patents, Alexandria, VA 22313-1450 on August 11, 2005.

Signed:

  
Printed Name: Patricia Tate

**INFORMATION DISCLOSURE STATEMENT**  
**37 CFR §§1.56 AND 1.97(b)**

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

Dear Sir:

The references listed in the attached PTO Form 1449, copies of which are attached, may be material to examination of the above-identified patent application. Applicants submit these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application.

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IPVBP002

Page 1

10/826,527

believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. RLC1G000).

Respectfully submitted,



C. Douglass Thomas  
Registration No. 32,947

5150 El Camino Real,  
Building A, Suite 22  
Los Altos, CA 94022

|                                                                                                                                      |                  |                    |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002           |
|                                                                                                                                      | Application No.: | 10/826,527         |
|                                                                                                                                      | Applicant        | C. Douglass Thomas |
|                                                                                                                                      | Filing Date      | April 15, 2004     |
|                                                                                                                                      | Group            | 2644               |
|                                                                                                                                      |                  | Page 1             |

## U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date    | Patentee | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|---------|----------|-------|-----------|-------------|
|                  | 1.  | 2003/0182104 A1 | Sept-05 | Muesch   |       |           |             |
|                  | 2.  |                 |         |          |       |           |             |
|                  | 3.  |                 |         |          |       |           |             |
|                  | 4.  |                 |         |          |       |           |             |
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## Foreign Documents

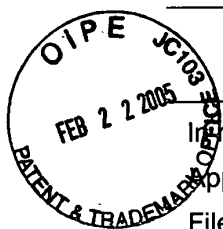
| Init. |  | Document No. | Date | Country | Class | Subclass | Translation |    |
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|       |  |              |      |         |       |          | Yes         | No |
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## Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

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| P        |                 |
| Examiner | Date Considered |

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IFW

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner:

Filed: April 15, 2004

Group: 2644

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

CERTIFICATE OF MAILING

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Signed:  Maria Shih

**INFORMATION DISCLOSURE STATEMENT**  
**37 CFR §§1.56 AND 1.97(b)**

Commissioner for Patents  
Washington, DC 20231

Dear Sir:

The references listed in the attached PTO Form 1449, copies of non-US patent publications/applications are attached, may be material to examination of the above-identified patent application. These references were cited in a corresponding PCT International Application. A copy of the PCT International Search Report, dated January 31, 2005, and a copy of the PCT Written Opinion of the International Searching Authority are also enclosed herewith. Applicants submit these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application.

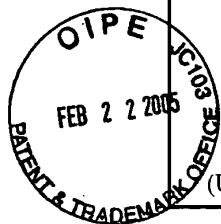
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Respectfully submitted,



C. Douglass Thomas  
Reg. No. 32, 947



|                                                                                                                                      |                  |                |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | Cheung et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
|                                                                                                                                      |                  | Page 1 of 1    |

#### U.S. Patent Documents

| Examiner Initial | No. | Patent No.   | Date   | Patentee          | Class | Sub-class | Filing Date |
|------------------|-----|--------------|--------|-------------------|-------|-----------|-------------|
|                  | 1.  | 6,363,139 B1 | Mar-02 | Zurek et al.      |       |           |             |
|                  | 2.  | 6,169,813 B1 | Jan-01 | Richardson et al. |       |           |             |
|                  | 3.  | 6,445,804 B1 | Sep-02 | Hirayanagi        |       |           |             |
|                  | 4.  | 6,643,377 B1 | Nov-03 | Takahashi et al.  |       |           |             |
|                  | 5.  | 4,823,908    | Apr-89 | Tanaka            |       |           |             |

#### Foreign Documents

| Init. |  | Document No. | Date | Country | Class | Subclass | Translation |    |
|-------|--|--------------|------|---------|-------|----------|-------------|----|
|       |  |              |      |         |       |          | Yes         | No |
|       |  |              |      |         |       |          |             |    |
|       |  |              |      |         |       |          |             |    |

#### Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

|  |  |                                                                                                     |
|--|--|-----------------------------------------------------------------------------------------------------|
|  |  | PCT International Search Report, RE: PCT/US04/11972, January 31, 2005.                              |
|  |  | PCT Written Opinion of the International Searching Authority, RE: PCT/US04/11972, January 31, 2005. |
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|  |  |                                                                                                     |

|          |                 |
|----------|-----------------|
| Examiner | Date Considered |
|----------|-----------------|

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner:

Filed: April 15, 2004

Group: 2644

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

CERTIFICATE OF MAILING

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Signed: \_\_\_\_\_

Maria Shih

**INFORMATION DISCLOSURE STATEMENT**  
**37 CFR §§1.56 AND 1.97(b)**

Commissioner for Patents  
Washington, DC 20231

Dear Sir:

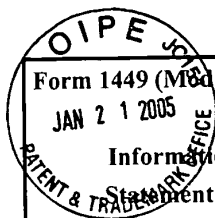
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Respectfully submitted,

C. Douglass Thomas  
Reg. No. 32, 947



|                                                                                                                                                              |                  |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
| <b>Form 1449 (Modified)</b><br><b>JAN 21 2005</b><br><b>Information Disclosure</b><br><b>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                                              | Application No.: | 10/826,527     |
|                                                                                                                                                              | Applicant        | Cheung et al.  |
|                                                                                                                                                              | Filing Date      | April 15, 2004 |
|                                                                                                                                                              | Group            | 2644           |
|                                                                                                                                                              |                  | Page 1 of 4    |

#### U.S. Patent Documents

| Examiner Initial | No. | Patent No.      | Date   | Patentee          | Class | Sub-class | Filing Date |
|------------------|-----|-----------------|--------|-------------------|-------|-----------|-------------|
|                  | 1.  | 3,974,335       | Aug-76 | Blackledge        |       |           |             |
|                  | 2.  | 2002/0090103 A1 | Jul-02 | Calisto, JR.      |       |           |             |
|                  | 3.  | 6,058,315       | May-00 | Clark             |       |           |             |
|                  | 4.  | 2003/0118198 A1 | Jun-03 | Croft, III et al. |       |           |             |
|                  | 5.  | 6,535,612 B1    | Mar-03 | Croft, III et al. |       |           |             |
|                  | 6.  | 6,584,205 B1    | Jun-03 | Croft, III et al. |       |           |             |
|                  | 7.  | 5,648,824       | Jul-97 | Dunn et al.       |       |           |             |
|                  | 8.  | 5,802,190       | Sep-98 | Ferren            |       |           |             |
|                  | 9.  | 2003/0092377 A1 | May-03 | Hill              |       |           |             |
|                  | 10. | 2002/0048382 A1 | Apr-02 | Hou               |       |           |             |
|                  | 11. | 2002/0183648 A1 | Dec-02 | Hou               |       |           |             |
|                  | 12. | 6,322,521 B1    | Nov-01 | Hou               |       |           |             |
|                  | 13. | 5,835,732       | Nov-98 | Kikinis et al.    |       |           |             |
|                  | 14. | 2003/0035552 A1 | Feb-03 | Kolano et al.     |       |           |             |
|                  | 15. | 5,793,875       | Aug-98 | Lehr et al.       |       |           |             |
|                  | 16. | 5,313,663       | May-94 | Norris            |       |           |             |
|                  | 17. | 2001/0055397 A1 | Dec-01 | Norris et al.     |       |           |             |
|                  | 18. | 2003/0091200 A1 | May-03 | Pompei            |       |           |             |
|                  | 19. | 6,086,541       | Jul-00 | Rho               |       |           |             |
|                  | 20. | 2002/0048385 A1 | Apr-02 | Rosenberg         |       |           |             |
|                  | 21. | 5,943,430       | Aug-99 | Saitoh            |       |           |             |
|                  | 22. | 6,011,855       | Jan-00 | Selfridge et al.  |       |           |             |
|                  | 23. | 5,357,578       | Oct-94 | Taniishi          |       |           |             |
|                  | 24. | 6,650,755 B2    | Nov-03 | Vaudrey et al.    |       |           |             |
|                  | 25. | 6,477,258 B1    | Nov-02 | Watson et al.     |       |           |             |
|                  | 26. | 6,496,205 B1    | Dec-02 | White et al.      |       |           |             |
|                  | 27. | 5,572,575       | Nov-96 | Yamamoto et al.   |       |           |             |
|                  | 28. | 2002/0054689 A1 | May-02 | Zhang et al.      |       |           |             |
|                  | 29. | 6,453,045 B1    | Sep-02 | Zurek et al.      |       |           |             |

#### Foreign Documents

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| Examiner | Date Considered |
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Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | Cheung et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
|                                                                                                                                      |                  | Page 2 of 4    |

|                                                                               |   |                                                                                                                                                                                                          |      |         |                 |          |     | Translation |  |
|-------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|-----------------|----------|-----|-------------|--|
| Init.                                                                         |   | Document No.                                                                                                                                                                                             | Date | Country | Class           | Subclass | Yes | No          |  |
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|                                                                               |   |                                                                                                                                                                                                          |      |         |                 |          |     |             |  |
| <b>Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)</b> |   |                                                                                                                                                                                                          |      |         |                 |          |     |             |  |
|                                                                               | A | "Audio Spotlight - Put sound where you want it," Holosonic Research Labs, Inc., 2002, <a href="http://www.holosonics.com/technology.html">www.holosonics.com/technology.html</a> (downloaded 1/18/2004)  |      |         |                 |          |     |             |  |
|                                                                               | B | "Technology Introduction," American Technology Corporation, 2001, pp.1-19.                                                                                                                               |      |         |                 |          |     |             |  |
|                                                                               | C | "Technology Licensing - HyperSonic Sound," American Technology Corporation, 2003, pp. 1-3.                                                                                                               |      |         |                 |          |     |             |  |
|                                                                               | D | "Theory, History, and the Advancement of Parametric Loudspeakers - A Technology Overview," White Paper, American Technology Corporation, 2002, pp. 1-27.                                                 |      |         |                 |          |     |             |  |
|                                                                               | E | "HSS Directed Audio Sound System, Model Series: 220," Product Information, American Technology Corporation, 2003.                                                                                        |      |         |                 |          |     |             |  |
|                                                                               | F | A. C. Baker, "Nonlinear pressure fields due to focused circular apertures," The Journal of the Acoustical Society of America, 91(2), February 1992, pp. 713-717.                                         |      |         |                 |          |     |             |  |
|                                                                               | G | A.L. Vyas et al., "Design Considerations of Parametric Arrays," IEEE Proceedings of the 1998 International Symposium on Underwater Technology, 15-17 April 1998, pp. 98 - 102.                           |      |         |                 |          |     |             |  |
|                                                                               | H | B. G. Lucas et al., "Field of a parametric focusing source," The Journal of the Acoustical Society of America, 73 (6), June 1983, pp. 1966-1971.                                                         |      |         |                 |          |     |             |  |
|                                                                               | I | B.G. Lucas et al., "The field of a focusing source," The Journal of the Acoustical Society of America, 72(4), October 1982, pp. 1289-1296.                                                               |      |         |                 |          |     |             |  |
|                                                                               | J | B.W. Lawton, "Damage to human hearing by airborne sound of a very high frequency or ultrasonic frequency," Institute of Sound and Vibration Research, Contract Research Report 343/2001, 2001, pp. 1-77. |      |         |                 |          |     |             |  |
|                                                                               | K | C. M. Darvennes et al., "Scattering of sound by sound from two Gaussian beams," The Journal of the Acoustical Society of America, 87(5), May 1990, pp. 1955-1964.                                        |      |         |                 |          |     |             |  |
|                                                                               | L | C.M. Darvennes et al., "Effects of absorption on the nonlinear interaction of sound beams," The Journal of the Acoustical Society of America, 89(3), March 1991, pp. 1028-1036.                          |      |         |                 |          |     |             |  |
|                                                                               | M | D. Marculescu et al., "Ready to Ware," IEEE Spectrum, October 2003, pp. 28-32.                                                                                                                           |      |         |                 |          |     |             |  |
|                                                                               | N | D.I. Havelock, "Directional Loudspeakers Using Sound Beams," J. Audio Eng. Soc., Vol. 48, No. 10, October 2000, pp. 908-916.                                                                             |      |         |                 |          |     |             |  |
|                                                                               | O | E.A. Zabolotskaya et al., "Quasi-plane Waves in the Nonlinear Acoustics of Confined Beams," Soviet Physics-Acoustics, Vol. 15, No. 1, July-Sept. 1969, pp. 35-40.                                        |      |         |                 |          |     |             |  |
|                                                                               | P | F.J. Pompei, "The Use of Airborne Ultrasonics for Generating Audible Sound Beams," J. Audio Eng. Soc., Vol. 47, No. 9, September 1999, pp. 726-731.                                                      |      |         |                 |          |     |             |  |
|                                                                               | Q | G. Garrett et al., "Nearfield of a large acoustic transducer, Part II: Parametric radiation," The Journal of the Acoustical Society of America, 74(3), September 1983, pp. 1013-1020.                    |      |         |                 |          |     |             |  |
|                                                                               | R | G. Garrett et al., "Nearfield of a large acoustic transducer. Part III: General results," The Journal of the Acoustical Society of America, 75(3), March 1984, pp. 769-779.                              |      |         |                 |          |     |             |  |
|                                                                               | S | H.O. Berkta, "Possible Exploitation of Non-Linear Acoustics in Underwater Transmitting Applications," J. Sound Vib. (1965) 2(4), 435-461.                                                                |      |         |                 |          |     |             |  |
|                                                                               | T | i60c Phone User's Guide, Nextel Communications, 2002, pp. 6, 65, 66, 135-137.                                                                                                                            |      |         |                 |          |     |             |  |
|                                                                               | U | J. Berntsen et al., "Interaction of sound waves. Part IV: Scattering of sound by sound," The Journal of the Acoustical Society of America, 86(5), November 1989, pp. 1968-1983.                          |      |         |                 |          |     |             |  |
|                                                                               | V | J. Berntsen et al., "Nearfield of a large acoustic transducer. Part IV: Second harmonic and sum frequency radiation," The Journal of the Acoustical Society of America, 75(5), May 1984, pp.             |      |         |                 |          |     |             |  |
| Examiner                                                                      |   |                                                                                                                                                                                                          |      |         | Date Considered |          |     |             |  |

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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| <b>Form 1449 (Modified)</b><br><br><b>Information Disclosure<br/>Statement By Applicant</b><br><br>(Use Several Sheets if Necessary) | Atty. Docket No. | IPVBP002       |
|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | Cheung et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
|                                                                                                                                      |                  | Page 3 of 4    |

|  |    |                                                                                                                                                                                                                                                    |
|--|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |    | 1383-1391.                                                                                                                                                                                                                                         |
|  | W  | J. Meyer, "Microphone Array for Hearing Aids taking into Account the Scattering of the Head," 2001 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, 21-24 October 2001, pp. 27-30.                                       |
|  | X  | J. N. Tjotta et al., "Propagation and interaction of two collinear finite amplitude sound beams," The Journal of the Acoustical Society of America, 88(6), December 1990, pp. 2859-2870.                                                           |
|  | Y  | J. Zemanek, "Beam Behavior within the Nearfield of a Vibrating Piston," The Journal of the Acoustical Society of America, Vol. 42, No. 1 (Part 2), 1971, pp.181-191.                                                                               |
|  | Z  | K. Aoki et al., "Parametric Loudspeaker-Applied Examples," Electronics and Communications in Japan, Part 3, Vol. 77, No. 1, 1994, pp. 64-74.                                                                                                       |
|  | AA | K. Maney, "Sound technology turns the way you hear on its ear," USA Today, May 2003, pp. 1-4.                                                                                                                                                      |
|  | AB | M. Greenspan, "Piston radiator: Some extensions of the theory," The Journal of the Acoustical Society of America, 65(3), Mar. 1979, pp. 608-621.                                                                                                   |
|  | AC | M. Yoneyama et al., "The audio spotlight: An application of nonlinear interaction of sound waves to a new type of loudspeaker design," The Journal of the Acoustical Society of America, 73(5), May 1983, pp. 1532-1536.                           |
|  | AD | M.A. Averkiou et al., "Self-demodulation of amplitude- and frequency-modulated pulses in a thermoviscous fluid," The Journal of the Acoustical Society of America, 94(5), November 1993, pp. 2876-2883.                                            |
|  | AE | M.B. Bennett et al., "Parametric array in air," The Journal of the Acoustical Society of America, Vol. 57, No. 3, March 1975, pp. 562-568.                                                                                                         |
|  | AF | Nextel i60c Phone Details, <a href="http://nextelonline.nextel.com">http://nextelonline.nextel.com</a> , downloaded April 22, 2003, pp. 1-2                                                                                                        |
|  | AG | Nextel-Direct Connect, <a href="http://nextelonline.nextel.com/services/directconnect-popup.html">http://nextelonline.nextel.com/services/directconnect-popup.html</a> , downloaded April 22, 2003, p. 1.                                          |
|  | AH | P.J. Westervelt, "Parametric Acoustic Array," The Journal of the Acoustical Society of America, Vol. 35, No. 4, April 1963, pp. 535-537.                                                                                                           |
|  | AI | Palm™ m515 Handheld, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-2.                                                                                                                                                            |
|  | AJ | Palm™ PalmModem® Connectivity Kit, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-2.                                                                                                                                              |
|  | AK | Palm™ Tungsten™ C Handheld, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-3.                                                                                                                                                     |
|  | AL | Palm™ Zire™ 71 Handheld, Palm Store of Yahoo! Shopping, downloaded April 23, 2003, pp. 1-3.                                                                                                                                                        |
|  | AM | T. Kamakura et al., "Suitable Modulation of the Carrier Ultrasound for a Parametric Loudspeaker," ACUSTICA, Vol. 73 (1991), pp. 215-217.                                                                                                           |
|  | AN | T. Kamakura et al., "Harmonic generation in finite amplitude sound beams from a rectangular aperture source," The Journal of the Acoustical Society of America, 91(6), June 1992, pp. 3144-3151.                                                   |
|  | AO | T. Kamakura et al., "Nonlinearly generated spectral components in the nearfield of a directive sound source," The Journal of the Acoustical Society of America, 85(6), June 1989, pp. 2331-2337.                                                   |
|  | AP | T.D. Kite et al., "Parametric Array in Air: Distortion Reduction by Preprocessing," Proceedings of the 16th International Congress on Acoustics and the 135th Meeting of the Acoustical Society of America, Seattle, WA, June 1998, pp. 1091-1092. |
|  | AQ | T.G. Muir et al., "Parametric Acoustic Transmitting Arrays," The Journal of the Acoustical Society of America, Vol. 52, No. 5, Part 2, 1972, pp.1481-1486.                                                                                         |
|  | AR | V.P. Kuznetsov, "Equations of Nonlinear Acoustics," Soviet Physics-Acoustics, Vol. 16, No. 4, April-June 1971, pp. 467-470.                                                                                                                        |

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| Examiner | Date Considered |
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Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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|                                                                                                                                      | Application No.: | 10/826,527     |
|                                                                                                                                      | Applicant        | Cheung et al.  |
|                                                                                                                                      | Filing Date      | April 15, 2004 |
|                                                                                                                                      | Group            | 2644           |
|                                                                                                                                      |                  | Page 4 of 4    |

|  |    |                                                                                                                                                  |
|--|----|--------------------------------------------------------------------------------------------------------------------------------------------------|
|  | AS | W.F. Druyvesteyn et al., "Personal Sound," J. Audio Eng. Soc., Vol. 45, No. 9, September 1997, pp. 685-701.                                      |
|  | AT | Y.W. Kim et al., "Novel Preprocessing Technique to Improve Harmonic Distortion in Airborne Parametric Array," ICSP '02 Proceedings, pp.1815-1818 |
|  | AU | Z.A. Gol'dberg, "Certain Second-Order Quantities in Acoustics," SOV PHYS ACOUST, Vol. 3, 1957, pp. 157-162.                                      |
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| Examiner | Date Considered |
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Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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| <b>To:</b> USPTO: GALI 2644                                                                                                                                                                                                             | <b>From:</b> C. Douglass Thomas, ph. 650.903.9200 |
| <b>Fax:</b> 703.872.9306                                                                                                                                                                                                                | <b>Pages:</b> 9 (including this page)             |
| <b>Phone:</b>                                                                                                                                                                                                                           | <b>Date:</b> 12/14/2004                           |
| <b>Re:</b> 10/828,527                                                                                                                                                                                                                   | <b>CC:</b>                                        |
| <input checked="" type="checkbox"/> <b>Urgent</b> <input type="checkbox"/> <b>For Review</b> <input type="checkbox"/> <b>Please Comment</b> <input type="checkbox"/> <b>Please Reply</b> <input type="checkbox"/> <b>Please Recycle</b> |                                                   |

● **Comments:**

Transmitted herewith for filing is: (1) an Amendment Transmittal (1 page); and (2) a Preliminary Amendment (pp. 1-7).

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**PATENT****IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner:

Filed: April 15, 2004

Group: 2644

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is transmitted via facsimile to: Commissioner for Patents, Alexandria, VA 22313-1450 on December 14, 2004.

Signed: C. Douglass Thomas

Printed Name: C. Douglass Thomas

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

Sir:

Transmitted herewith is an Amendment in the above-identified application.  
The fee has been calculated as shown below.

|                                                              | Claims<br>After<br>Amendment |       | Highest<br>Previously<br>Paid For | Present<br>Extra | Small Entity Rate<br>Fee | Large Entity<br>Rate Fee |
|--------------------------------------------------------------|------------------------------|-------|-----------------------------------|------------------|--------------------------|--------------------------|
| Total Claims                                                 | 27                           | MINUS | 27                                | 0                | x 25 = 0.00              | x 25 = 0.00              |
| Independent<br>Claims                                        | 2                            | MINUS | 3                                 | 0                | x 100 = 0.00             | x 200 = 0.00             |
| Multiple Dependent Claim Present and Fee Not Previously Paid |                              |       |                                   |                  | \$145.00                 | \$290.00                 |
| Total                                                        |                              |       |                                   |                  | \$ 0.00                  | \$0.00                   |

- ☐ Applicant(s) hereby petition for a \_\_\_\_ month extension(s) of time to respond to the aforementioned Office Action.
- ☒ Applicant(s) believe that no (additional) Extension of Time is required; however, if it is determined that such an extension is required, Applicant(s) hereby petition that such an extension be granted and authorize the Commissioner to charge the required fees for an Extension of Time under 37 CFR 1.136 to Deposit Account No. 500388.
- ☐ Enclosed is our Credit Card Payment Form in the amount of \$\_\_ to cover the additional claim fee and/or extension of time fees.
- ☒ Please charge the required fees, or any additional fees required to facilitate filing the enclosed response, to Deposit Account No. 500388 (Order No. RLC1G000).

Respectfully submitted,

C. Douglass ThomasC. Douglass Thomas  
Reg. No. 32,947

Ph: (650) 903-9200

DEC 14 2004

PATENT

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of: CHEUNG et al.

Attorney Docket No.: IPVBP002

Application No.: 10/826,527

Examiner:

Filed: April 15, 2004

Group: 2644

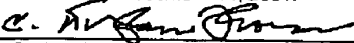
Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

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**CERTIFICATE OF FACSIMILE**

I hereby certify that this correspondence is being transmitted by facsimile to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on December 14, 2004.

Signed: \_\_\_\_\_

  
C. Douglass Thomas**PRELIMINARY AMENDMENT**

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

Dear Sir:

Prior to an Office Action on the merits, please amend the above-identified as follows:

**Amendments to the Claims** are reflected in the listing of claims which being on page 2 of this paper.

**Remarks/Arguments** begin on page 7 of this paper.

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1

IPVBP002

**PATENT****AMENDMENTS TO CLAIMS:**

[The listing of claims will replace all prior versions, and listings, of claims in the application:]

**Listing of Claims:**

1. (Currently Amended) A hearing enhancement system for a user, comprising:  
an interface unit that has a directional speaker ~~attachable to clothing worn by the user~~ and a microphone;

wherein

the microphone receives input audio signals, which are transformed into ultrasonic signals;

the speaker transmits the ultrasonic signals;

at least a portion of the ultrasonic signals is transformed into output audio signals ~~by interaction with in air~~;

~~the speaker directs the output audio signals towards at least one ear of the user from the worn position of the speaker;~~ and

a portion of the input audio signals is amplified more than another portion to enhance the hearing of the user.

2. (Original) A hearing enhancement system as recited in claim 1 wherein the amplification is frequency dependent.

3. (Currently Amended) A hearing enhancement system as recited in claim 2 wherein the amplification focuses on higher audio frequencies at least a portion of the audio frequencies that is higher in frequency than another portion of the audio frequencies receives greater amplification.

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IPVBP002

**PATENT**

4. (Original) A hearing enhancement system as recited in claim 2 wherein certain frequencies of the input audio signals are not amplified.
5. (Original) A hearing enhancement system as recited in claim 2 wherein the amplification depends on at least one characteristic of the hearing of the user.
6. (Currently Amended) A hearing enhancement system as recited in claim 5 wherein the at least one characteristic of the hearing of the user is determined through ~~calibration~~ calibrating the hearing of the user.
7. (Original) A hearing enhancement system as recited in claim 1 wherein the system can be de-activated by the user.
8. (Currently Amended) A hearing enhancement system as recited in claim 1 wherein when the system is not activated, the system can be activated depending on at least one word spoken said by the user.
9. (Original) A hearing enhancement system as recited in claim 1 wherein depending on the power level of the input audio signals, the system can be in a standby mode.
10. (Original) A hearing enhancement system as recited in claim 1 wherein depending on the average power level of the input audio signals, the system can be in a standby mode.

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**PATENT**

11. (Original) A hearing enhancement system as recited in claim 1 wherein the microphone is a directional microphone.
12. (Currently Amended) A hearing enhancement system as recited in claim 1 wherein the amplification ~~reduces~~ is reduced or limited if the average power level of the input audio signals is higher than a preset threshold.
13. (Original) A hearing enhancement system as recited in claim 1 wherein the system further includes a rechargeable battery.
14. (Original) A hearing enhancement system as recited in claim 1 wherein the system also can function as a phone.
15. (Currently Amended) A hearing enhancement system as recited in claim 1, wherein the system includes more than one directional speaker, and wherein the phases of the ultrasonic signals driving at least two of the speakers differ by a preset value. ~~the speaker is a phase array.~~
16. (Currently Amended) A hearing enhancement system as recited in claim 1 wherein the system can also access audio signals from another instrument through a wire or a wireless connection, ~~or wirelessly through a wireless local area network.~~
17. (Original) A hearing enhancement system as recited in claim 16 wherein the another instrument is a portable instrument.

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IPVBP002

**PATENT**

18. (Currently Amended) A hearing enhancement system as recited in claim 16 wherein the another instrument is an entertainment unit.

19. (Currently Amended) A hearing enhancement system as recited in claim 16 wherein the another instrument is a phone.

20. (Currently Amended) A hearing enhancement system as recited in claim 16 wherein the another instrument is related to a microphone at an event.

21. (Currently Amended) A hearing enhancement system as recited in claim 16 wherein the another instrument is related to a speaker at an event.

22. (Currently Amended) A hearing enhancement system for a user, comprising:

a directional speaker ~~attachable to clothing worn by the user,~~

a microphone; and

a computing unit operatively coupled to the directional speaker and the microphone,

wherein the microphone receives input audio signals, and the computing unit ~~transforms~~ modifies the input audio signals at least into modified audio signals by modifying certain frequencies differently than other frequencies to enhance the ability of the user to hear the input audio signals, and provides the modified ~~audio~~-signals to the directional speaker,

wherein the directional speaker outputs ultrasonic ~~signals~~ waves based on the modified ~~audio~~-signals.

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**PATENT**

23. (Currently Amended) A hearing enhancement system as recited in claim 22, wherein at least a portion of the ultrasonic signals waves output by the directional speaker are transformed into output audio signals ~~by interaction with~~ in air.
24. (Currently Amended) A hearing enhancement system as recited in claim 22, wherein the speaker is attachable to the clothing worn by the user, and wherein the directional speaker can direct ~~directs~~ the ultrasonic signals waves towards at least one ear of the user from the worn position of the directional speaker.
25. (Original) A hearing enhancement system as recited in claim 22, wherein the computing unit is integral with the directional speaker.
26. (Original) A hearing enhancement system as recited in claim 22, wherein the computing unit is separate from the directional speaker but operatively couples with the directional speaker over a wireless link.
27. (Currently Amended) A hearing enhancement system as recited in claim 22, wherein the computing unit has a reduced power mode and a normal power mode, and wherein the computing unit can be automatically switched between the power modes based on at least one characteristic ~~characteristics~~ of the input audio signals, thereby reducing power consumption by the computing unit.

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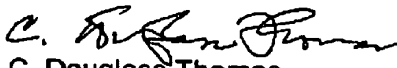
IPVBP002

*PATENT*

## **REMARKS**

Claims 1, 3, 6, 8, 12, 15, 16, 18-24 and 27 have been amended to further clarify the subject matter regarded as the invention. Claims 1-27 remain pending. Please enter this Preliminary Amendment prior to examination on the merits.

Respectfully submitted,

  
C. Douglass Thomas  
Reg. No. 32,947

10/826,527

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IPVBP002

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

PTO/SB/05 (03-01)  
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 displays a valid OMB control number.

# UTILITY PATENT APPLICATION TRANSMITTAL

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

Attorney Docket No. **IPVBP002**  
First Inventor **Cheung**  
Title **DIRECTIONAL HEARING ENHANCEMENT SYSTEMS**  
Express Mail Label No. **EV333987386US**

## APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

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

1. ☒ Fee Transmittal Form (e.g., PTO/SB/17)  
(Submit an original and a duplicate for fee processing)
2. ☒ Applicant claims small entity status.  
See 37 CFR 1.27.
3. ☒ Specification [Total Pages **28**]  
(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. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets **11**]
5. Oath or Declaration [Total Pages **2**]
  - a. ☒ 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
  - c. ☐ Statements verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

9. ☒ Assignment Papers (cover sheet & document(s))
10. ☒ 37 CFR 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☒ 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. ☐ Other: .....

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.

## 19. CORRESPONDENCE ADDRESS

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|---------|-------------------------------------|-----------|--------------|----------|--------------|
| Name    | IpVenture, Inc. Customer No.: 34071 |           |              |          |              |
| Address | 5150 El Camino Real, Suite A-22     |           |              |          |              |
| City    | Los Altos                           | State     | CA           | Zip Code | 94022        |
| Country | USA                                 | Telephone | 408-446-3333 | Fax      | 408-446-3335 |

|                   |                           |                                   |                |
|-------------------|---------------------------|-----------------------------------|----------------|
| Name (Print/Type) | C. Douglass Thomas        | Registration No. (Attorney/Agent) | 32,947         |
| Signature         | <i>C. Douglass Thomas</i> |                                   | Date 4/15/2004 |

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15992 U.S. PTO

PTO/SB/17 (10-03)  
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**FEE TRANSMITTAL  
for FY 2004**

Effective 10/01/2003. Patent fees are subject to annual revision.

☒ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$)

**Complete if Known**

|                      |                |
|----------------------|----------------|
| Application Number   | TO BE ASSIGNED |
| Filing Date          | HEREWITH       |
| First Named Inventor | CHEUNG         |
| Examiner Name        | N/A            |
| Art Unit             | N/A            |
| Attorney Docket No.  | IPVBP002       |

**METHOD OF PAYMENT (check all that apply)**

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

☐ Deposit Account:  
Deposit Account Number  
Deposit Account Name

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Credit any overpayments  
☐ Charge any additional fee(s) or any underpayment of fee(s)  
☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

**FEE CALCULATION****1. BASIC FILING FEE**

| Large Entity Fee Code (\$) | Small Entity Fee Code (\$) | Fee Description        | Fee Paid |
|----------------------------|----------------------------|------------------------|----------|
| 1001 770                   | 2001 385                   | Utility filing fee     | 385      |
| 1002 340                   | 2002 170                   | Design filing fee      |          |
| 1003 530                   | 2003 265                   | Plant filing fee       |          |
| 1004 770                   | 2004 385                   | Reissue filing fee     |          |
| 1005 160                   | 2005 80                    | Provisional filing fee |          |

SUBTOTAL (1) (\$) 385

**2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE**

Total Claims 27 -20\*\* = 7 X 9 = 63  
Independent Claims 2 -3\*\* = 0 X =  
Multiple Dependent =

| Large Entity Fee Code (\$) | Small Entity Fee Code (\$) | Fee Description                                            |
|----------------------------|----------------------------|------------------------------------------------------------|
| 1202 18                    | 2202 9                     | Claims in excess of 20                                     |
| 1201 86                    | 2201 43                    | Independent claims in excess of 3                          |
| 1203 290                   | 2203 145                   | Multiple dependent claim, if not paid                      |
| 1204 86                    | 2204 43                    | ** Reissue independent claims over original patent         |
| 1205 18                    | 2205 9                     | ** Reissue claims in excess of 20 and over original patent |

SUBTOTAL (2) (\$) 63.00

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

**FEE CALCULATION (continued)****3. ADDITIONAL FEES**

| Large Entity Fee Code (\$) | Small Entity Fee Code (\$) | 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 <i>ex parte</i> 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 420                   | 2252 210                   | Extension for reply within second month                                    |          |
| 1253 950                   | 2253 475                   | Extension for reply within third month                                     |          |
| 1254 1,480                 | 2254 740                   | Extension for reply within fourth month                                    |          |
| 1255 2,010                 | 2255 1,005                 | Extension for reply within fifth month                                     |          |
| 1401 330                   | 2401 165                   | Notice of Appeal                                                           |          |
| 1402 330                   | 2402 165                   | Filing a brief in support of an appeal                                     |          |
| 1403 290                   | 2403 145                   | 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 1,330                 | 2453 665                   | Petition to revive - unintentional                                         |          |
| 1501 1,330                 | 2501 665                   | Utility issue fee (or reissue)                                             |          |
| 1502 480                   | 2502 240                   | Design issue fee                                                           |          |
| 1503 640                   | 2503 320                   | 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 770                   | 2809 385                   | Filing a submission after final rejection (37 CFR 1.129(a))                |          |
| 1810 770                   | 2810 385                   | For each additional invention to be examined (37 CFR 1.129(b))             |          |
| 1801 770                   | 2801 385                   | 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) (\$) 40.00

**SUBMITTED BY**

|                   |                    |                                   |           |           |              |
|-------------------|--------------------|-----------------------------------|-----------|-----------|--------------|
| Name (Print/Type) | C. DOUGLASS THOMAS | Registration No. (Attorney/Agent) | 32,947    | Telephone | 408-446-3333 |
| Signature         | C. Douglass Thomas | Date                              | 4/15/2004 |           |              |

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## **DIRECTIONAL HEARING ENHANCEMENT SYSTEMS**

### **CROSS-REFERENCE TO RELATED APPLICATIONS**

**[0001]** This application claims priority of: (i) U.S. Provisional Patent Application No. 60/462,570, filed April 15, 2003, and entitled "WIRELESS COMMUNICATION SYSTEMS OR DEVICES, HEARING ENHANCEMENT SYSTEMS OR DEVICES, AND METHODS THEREFOR," which is hereby incorporated herein by reference; (ii) U.S. Provisional Patent Application No. 60/469,221, filed May 12, 2003, and entitled "WIRELESS COMMUNICATION SYSTEMS OR DEVICES, HEARING ENHANCEMENT SYSTEMS OR DEVICES, DIRECTIONAL SPEAKER FOR ELECTRONIC DEVICE, PERSONALIZED AUDIO SYSTEMS OR DEVICES, AND METHODS THEREFOR," which is hereby incorporated herein by reference; and (iii) U.S. Provisional Patent Application No. 60/493,441, filed August 8, 2003, and entitled "WIRELESS COMMUNICATION SYSTEMS OR DEVICES, HEARING ENHANCEMENT SYSTEMS OR DEVICES, DIRECTIONAL SPEAKER FOR ELECTRONIC DEVICE, AUDIO SYSTEMS OR DEVICES, WIRELESS AUDIO DELIVERY, AND METHODS THEREFOR," which is hereby incorporated herein by reference.

**[0002]** This application is also related to: (i) U.S. Patent Application No. \_\_\_\_\_, filed concurrently, and entitled, "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference; (ii) U.S. Patent Application No. \_\_\_\_\_, filed concurrently, and entitled, "DIRECTIONAL SPEAKER FOR PORTABLE ELECTRONIC DEVICE," which is hereby incorporated herein by reference; (iii) U.S. Patent Application No. \_\_\_\_\_, filed concurrently, and entitled, "METHOD AND APPARATUS FOR LOCALIZED DELIVERY OF AUDIO SOUND FOR ENHANCED PRIVACY," which is hereby incorporated herein by reference; and (iv) U.S. Patent Application No. \_\_\_\_\_, filed concurrently, and entitled, "METHOD AND APPARATUS FOR WIRELESS AUDIO DELIVERY," which is hereby incorporated herein by reference.

## **BACKGROUND OF THE INVENTION**

### **Filed of the Invention**

[0003] The present invention relates generally to a hearing enhancement system, and more particularly, to a hearing enhancement system whose audio signals are directional.

### **Description of the Related Art**

[0004] A significant portion of our population has a certain degree of hearing loss. This can be due to, for example, heredity, noise exposure or simply aging. Hearing aids have been the traditional approach to ameliorate hearing difficulties. However, out of the 26 to 28 million people who are hearing impaired in the United States, only about 20% of them actually wear any hearing aids.

[0005] One reason people avoid wearing hearing aids is because hearing aids are not expensive. Typically, they range from about a thousand US dollars for a pair of analog hearing aids to five thousand US dollars for a pair of digital hearing aids.

[0006] Another reason for the lack of wide adoption of hearing aids is that there is still a stigma towards wearing them. People who need hearing aids are known as "hearing impaired." When they go to a dispenser for hearing aids, they are still called "patients." If given a choice, most people do not want others to know that they need hearing aids. As a result, many people with mild or moderate hearing loss do not wear one.

[0007] Basically, there are three major types of hearing aids--the "behind-the-ear" (BTE) style, the "in-the-ear" (ITE) style, and the completely-in-the-canal (CIC) style. The BTE hearing aids have a number of advantages. They are more applicable for those with severe hearing loss. Through the use of venting, they reduce to a certain degree the effects of occlusion, which is the hollowness, echoic or stuffed sensation of hearing one's own voice as one talks with a hearing aid inside one's ear. The BTE aids are encapsulated in relatively thick-walled housings. The housing serves to protect

components in the hearing aids from harsh conditions due to temperature, sweat, pressure and impact. However, for those wearing hearing aids, they usually prefer a more inconspicuous type, such as an ITE (or CIC) hearing aid, which is located inside the ear canal.

**[0008]** The ITE (or CIC) designs have other benefits. People who use a telephone typically prefer them because they do not require a telephone loop to work with telephone conversations. People who wear glasses usually also prefer them because the hearing aids do not interfere with the arms of the glasses.

**[0009]** On the other hand, just like the BTE, individual ear molds have to be made for the ITE and the CIC hearing aids. The shell of the ITE hearing aid has to be individually configured based on an impression of the patient's canal. Not only is the hearing aid individually formed, a technician, through experience and craftsmanship, has to custom fit the hearing aid into the patient's canal. For a BTE hearing aid, an ear mold that fits the individual's ear canal is also made. This makes the hearing aid a custom product. If a hearing aid is lost or damaged, it is not as easily replaced.

**[0010]** The repair process can be annoying as well. If a user's hearing aid has to be repaired, the process can take a significant amount of time. Except for well-known brands or for manufacturers that offer a worldwide service, repair parts may not be immediately available. Since most hearing aids are still dispensed through local or regional clinics, they may not have the available parts. Though there is usually a loaner's program that allows the user to borrow a BTE aid during this period, the user may have to live, for days or weeks, with a hearing aid that may not feel comfortable.

**[0011]** Another challenge of an ITE (or CIC) hearing aid is in positioning its receiver and microphone because slight misalignment can lead to feedback and resonance.

**[0012]** Users want the ITE (or CIC) hearing aids to be small to make them inconspicuous. However, the inherent small size of the hearing aids brings along its problems. Due to the small size, the walls of its shell are thinner, making them more vulnerable to damage from heat, sweat and abuse than BTE hearing aids. Further, due to its small size and shape, ITE (or CIC) hearing aids are more difficult to handle. For

example, sometimes it is cumbersome to switch batteries. And, it is also easier to accidentally drop an ITE (or CIC) aid than a BTE hearing aid. Finally, an ITE (or CIC) hearing aid custom-fits into the user's ear canal. The occlusion effects can be quite disturbing, particularly for the first time hearing aid users.

[0013]       Hearing tends to decrease gradually. A person with mildly-decreased hearing normally does not need the same degree of hearing assistance as would one with severely-impaired hearing. Nevertheless, such a person could benefit from mild or moderate enhancement to their hearing.

[0014]       It should be clear from the foregoing that there is still a need for improved techniques to assist those who are hearing impaired.

## SUMMARY OF THE INVENTION

[0015] The present invention pertains to a hearing enhancement system that enhances an individual's hearing based on a directional speaker. Many people are mildly or moderately hearing impaired. The decrease in hearing ability may not be to the point where one needs a dedicated, traditional hearing aid. Even so, it would certainly be advantageous to provide some hearing improvement. A number of embodiments in the present invention are particularly suitable for those with mild or moderate hearing loss.

[0016] One embodiment of the hearing enhancement system includes an interface unit that has the directional speaker and a microphone. In another embodiment, the system also includes a base unit. A user can wear the system on his clothing, and the speaker can be directed towards an ear of the user when worn.

[0017] In one embodiment, the microphone receives audio signals, which are transformed by the system into ultrasonic signals. Then, the directional speaker transmits the ultrasonic signals in air towards an ear of the user. The transmitted signals are transformed back into audio signals by air to form the output audio signals. At least a portion of the output audio signals have higher power with respect to the received audio signals at corresponding frequencies to enhance the hearing of the user.

[0018] The directivity of the audio signals is increased due to the ultrasonic signals. In one embodiment, the directivity is further increased by using a phase array of speaker devices. The array can generate the directional audio signals by constructive interference of signals from the individual devices. Based on the array, the direction of the audio signals can be steered by changing the relative phases among the devices.

[0019] Typically, the hearing of both ears decreases together. Hence, a user might use two interface units, one for the left and the other for the right ear.

[0020] The decrease in hearing may not be uniform across all audio frequencies. As a result, amplifying the received audio signals can be frequency dependent. One approach focuses on amplifying high audio frequencies. Another approach amplifies only a certain band of the audio frequencies. With the lower audio frequencies typically being louder, the band of amplification can be the higher audio frequencies. Since the

directional speaker is not attached to or inserted in the ear, the user can still hear the audio signals directly from the audio source. Not only would such an approach eliminate the occlusion effect, with no hearing aid in the ear canal, the natural resonance of the ear canal (typically around 2700 Hz) boosts the audio signal strength in the 2 to 3 kHz ranges. Furthermore, without the hearing aid in the ear canal, there is no insertion loss due to the hearing aid.

[0021] In a third approach, the user's hearing is profiled so that frequency amplification is tailored to the user. The user's hearing profile can also be stored in a memory device (such as a removable memory card or stick), which can be inserted into the system. The system can then adjust the amplification of the audio signals across the frequencies based on the user's hearing profile. Frequency-dependent amplification has the added advantage of power conservation because certain audio frequencies may not even need amplification.

[0022] A number of embodiments include power management features. One embodiment includes a manual on/off switch allowing the user to turn the system off when desired. In another approach, the system is on-demand. If the signal-to-noise ratio of the incoming audio signals is below a pre-set threshold, the system can be placed in a standby mode (e.g., low power mode).

[0023] Another approach that can manage power is to use a directional microphone. This approach can also improve the signal-to-noise ratio. There can be more than one directional microphone, each pointing at a specific direction.

[0024] The power level of the output audio signals can also be environment dependent. For example, the power of the output audio signals is increased in a noisier environment. But, as the environment becomes very noisy, the amplification can cease or even be decreased.

[0025] The power of the output audio signals can be also increased through different mechanisms. This can be done, for example, by increasing the surface areas of the medium responsible for generating the output audio signals. In embodiments based on ultrasonic transformation, one approach to increase power is to increase the demodulation efficiency. In yet another embodiment, power is increased based on a

phase-array of speaker devices, which further increases the directivity of the audio signals. This embodiment has the added advantage of power reduction. With the audio signals more confined, less power is needed to generate the audio signals. In one embodiment, the output audio signals can also be steered to more accurately target the user's ear.

**[0026]** With the ear canal remaining open, the user can still use a phone directly. But, in one embodiment, when there is an incoming phone call, the system changes its mode of operation and functions as a cell phone. If the system is used as a phone, since the audio signals are transmitted in an open environment, people next to the user might pick up the audio signals. Different approaches can be used to improve privacy. The audio signal propagation angle already serves to provide improved privacy. The virtual or physical cone of the audio signals typically propagates from a lower position (elevation) to a higher position towards the ear of the user. With such a propagation direction, signals reflected from the head tend to radiate upward. This reduces the chance of having bystanders eavesdrop on the conversation.

**[0027]** Privacy can be enhanced based on frequency-dependent amplification because certain frequency ranges may not even be amplified. Another approach to improve privacy is to reduce the power of the output audio signals. Yet another approach to enhance privacy is to further increase the directivity of the audio signals.

**[0028]** With the system being used as a phone, the system can have a directional microphone pointing at the head of the user to pick up the user's voice during a phone conversation.

**[0029]** In private, hearing impaired people sometimes might have a tendency to increase the sound level of audio or video instruments a bit too high. On the other hand, in public, hearing impaired people sometimes might have difficulty hearing. In one embodiment, the system is further designed to pick up, capture or access audio signals from a number of portable or non-portable instruments. Audio signals from these instruments can be transmitted through wire to the system. Alternatively, audio signals from these instruments can be transmitted wireless, such as through WiFi or Bluetooth, to the system. The system then converts the wireless signals to audio signals for the user to

comfortably listen to the signals. Examples of such instruments include home entertainment units, phones, microphones at a conference, and speakers at a movie theaters.

**[0030]** Other aspects and advantages of the present invention will become apparent from the following detailed description, which, when taken in conjunction with the accompanying drawings, illustrates by way of example the principles of the invention.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

- [0031] FIG. 1 shows embodiments of the present invention.
- [0032] FIG. 2 shows a person wearing one embodiment of the present invention.
- [0033] FIG. 3 shows different embodiments regarding frequency-dependent amplification of the present invention.
- [0034] FIG. 4 shows a number of embodiments regarding calibration of the present invention.
- [0035] FIG. 5A shows a number of embodiments regarding power management of the present invention.
- [0036] FIG. 5B shows an embodiment of the interface unit with an electrical connection.
- [0037] FIGS. 6A-6C show different embodiments regarding microphones for use with the present invention.
- [0038] FIG. 7 shows embodiments of the present invention that can also function as a phone.
- [0039] FIG. 8 is a flow diagram of call processing according to one embodiment of the invention.
- [0040] FIG. 9 shows a number of embodiments regarding improving privacy of the present invention.
- [0041] FIG. 10 shows a number of embodiments of the present invention accessing audio signals from other instruments wirelessly or through wired connection.
- [0042] Same numerals in Figures 1-10 are assigned to similar elements in all the figures. Embodiments of the invention are discussed below with reference to Figures 1-10. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

## DETAILED DESCRIPTION OF THE INVENTION

[0043] The present invention pertains to a hearing enhancement system that enhances an individual's hearing. A number of embodiments in the present invention are particularly suitable for those with mild or moderate hearing loss.

[0044] FIG. 1 shows one embodiment of a hearing enhancement system 10 of the present invention. The hearing enhancement system 10 includes an interface unit 14, which includes a directional speaker 16 and a microphone 18. The embodiment may also include a base unit 12, which has or, can couple to, a power source. The interface unit 14 can electrically couple to the base unit 12. In one embodiment, the base unit 12 can be integrated within the interface unit 14. The coupling can be in a wired (e.g., cable) or a wireless (e.g., Bluetooth technologies) manner.

[0045] FIG. 2 shows a person wearing an interface unit 100 of the present invention on his jacket 102. The interface unit 100 can, for example, be the interface unit 14 shown in FIG. 1. Again, the interface unit 100 includes a directional speaker 104 and a microphone 106. The speaker 104 can be in a line of sight of an ear of the user.

[0046] Consider the scenario where a friend is speaking to the user. In one approach, the microphone 106 picks up the friend's speech, namely, her audio signals. A hearing enhancement system according to the invention can then use the audio signals to modulate ultrasound signals. Then, the directional speaker 104 transmits the modulated ultrasonic signals in air towards the ear of the user. The transmitted signals are demodulated in air to create the output audio signals. Based on ultrasound transmission, the speaker 104 generates directional audio signals and sends them as a cone (virtual cone) 108 to the user's ear. In another approach, the directional speaker 104 includes a physical cone or a horn that directly transmits directional audio signals. In yet another approach, the audio signals from the speaker can be steered to the ear or the ear canal, whose location can be identified through mechanisms, such as pattern recognition. Different embodiments of the directional speakers have been described in U.S. Patent Application No. \_\_\_\_\_, filed concurrently, and entitled "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS," which is hereby incorporated herein by reference.

[0047] Typically, hearing of both ears decreases together. In a sense, this is similar to our need to wear glasses. Rarely would one eye of a person need glasses, while the other eye has 20/20 vision. As a result, there can be two interface units, one for the left ear and another for the right ear. The left ear unit can be on the left shoulder, and the right ear unit can be on the right shoulder. These two interface units can be electrically coupled, or can be coupled to one base unit. Again, the coupling can be wired or wireless. In another approach, the interface unit can be worn by the user as a pendant on a necklace in front of the user. Output audio signals can then be propagated to both ears.

[0048] In one embodiment, the system is designed to operate in the frequency range between 500 Hz to 8 kHz. Typically, a user's hearing impairment is not the same across all audio frequencies. For example, in English, the user might be able to easily pick up the sound of vowels, but not the sound of consonants, such as "S" and "P". FIG. 3 shows different embodiments of the invention regarding frequency-dependent amplification of the received audio signals. Note that amplification is not limited to amplifying the received audio signals directly. For example, in the embodiments using ultrasonic signals to generate output audio signals, amplification can mean the power level of the output audio signals being higher than the received audio signals. This can be through increasing the power of the ultrasonic signals.

[0049] One approach for frequency-dependent amplification assumes that the decreased in hearing typically starts at high frequencies, such as above 2 to 3 kHz. So, hearing may need more assistance at the high frequency range. In this approach, one embodiment amplifies the audio signals so that around the entrance of the ear, the signals can have sound pressure level ("SPL") of about 80 dB from 2 kHz to 4 kHz. For frequencies below 2 kHz, the SPL is lower, such as, for frequencies lower than 500 Hz, the maximum SPL can be below 55 dB. In one embodiment, the SPL of the output audio signals can be 70 dB from 1.5 kHz to 4 kHz, and the 3 dB cutoff is also at 1.5 kHz. With a roll off being 12 dB/octave, at 750 Hz, the SPL becomes about 58 dB.

[0050] Another frequency-dependent amplification approach assumes that most information in the audio signals resides within a certain frequency band. For example, about 70% of the information in the audio signals can be within the frequency range of 1

to 2 kHz. Since the ear canal remains open and the user may only be mildly or moderately hearing impaired, the user can be hearing the audio signals directly from his sender (i.e., without assistance provided by the hearing enhancement system). In this approach, the system filters audio signals in the identified frequency range, such as the 1 to 2 kHz range, and processes them for amplification and transmission to the user. For frequencies not within the frequency band, they are not processed for amplification. The user can pick them up directly from the sender.

**[0051]** Low to mid frequencies, such as those below 2 kHz, are typically louder. Since the hearing enhancement system does not require having any hearing aid inserted into the ear, the low to mid frequencies can be received at the ear unaltered. Frequencies in the mid to high range, such as from 2000-3000 Hz, will be in the natural resonance of the ear canal, which is typically around 2700 Hz. As a result, these frequencies can be increased by about 15 dB. With no hearing aid inserted into one ear, the audio signals do not experience any insertion loss, and there is also no occlusion effect due to the user's own voice.

**[0052]** In a third approach, amplification across frequencies is directly tailored to the hearing needs of the user. This can be done through calibration. This third approach can also be used in conjunction with either the first approach or the second approach.

**[0053]** Frequency-dependent amplification has the added advantage of power conservation because certain frequency bands may not need or may not have amplification.

**[0054]** In one embodiment, the user has the option of manually changing the amplification of the system. The system can also have a general volume controller that allows the user to adjust the output power of the speaker. This adjustment can also be across certain frequency bands.

**[0055]** FIG. 4 shows a number of embodiments regarding calibration of a user's hearing across various frequencies. Calibration enables the system to determine (e.g., estimate) the hearing sensitivity of the user. Through calibration, the user's hearing profile can be generated. The user can perform calibration by himself. For example, the audio frequencies are separated into different bands. The system generates different SPL

at each band to test the user's hearing. The specific power level that the user feels most comfortable would be the power level for that band for the user. After testing is done for all of the bands, based on the power levels for each band, the system creates the user's personal hearing profile. In this calibration process, the system can prompt the user and lead the user through an interactive calibration process.

[0056] In another embodiment, calibration can be done remotely through a web site. The web site can guide the user through the calibration process. This can be done, for example, by the user being positioned proximate to a computer terminal that is connected through the Internet to the web site. The terminal has a speaker or headset that produces audio sounds as part of the calibration process.

[0057] Instead of the user, this calibration process can also be done by a third party, such as an audiologist.

[0058] The user's hearing profile can be stored in the hearing enhancement system. If the calibration is done through a computer terminal, the hearing profile can be downloaded into the hearing enhancement system wirelessly, such as through Bluetooth or infrared technology. The hearing profile can alternatively be stored in a portable media storage device, such as a memory stick. The memory stick could be inserted into the hearing enhancement system, or some other audio generating device, which desires to access the hearing profile and personalizes the system's amplification across frequencies to the user.

[0059] The system can also periodically alert the user for re-calibration. The period can be, for example, once a year. The calibration can also be done in stages so that it is less onerous and less obvious that a hearing evaluation is being performed.

[0060] Since the ear canal is open, the user can be hearing the audio signals both from the sender and the system. In one embodiment, to prevent echoing effect, signal processing speed of the system cannot be too low. Typically, the user would not be able to distinguish two identical sets of audio signals if the difference in arrival times of the two signals is below a certain delay time, such as 10 milliseconds. In one embodiment, the system's signal processing speed is faster than that the certain delay time. One approach to transform the input audio signals to ultrasonic signals depends on analog

signal processing. Another approach to transform the input audio signals to ultrasonic signals depends on digital signal processing.

**[0061]** Since the system might be on continuously for a long duration of time, and can be amplifying across a broad range of the audio frequencies, power consumption can be an issue. FIG. 5A shows a number of embodiments for managing power consumption of the system. One embodiment includes a manual on/off switch, which allows the user to manually turn the system off as he desires. The on/off switch can be on a base unit, an interface unit, or a remote device. This on/off switch can also be voice activated. For example, the system is trained to recognize specific recitation, such as specific sentences or phrases, and/or the user's voice. To illustrate, when the user says sentences like any of the following, the system would be automatically turned on: What did you say? What? Louder. You said what?

**[0062]** The system can be on-demand. In one embodiment, the system can identify noise (e.g., background noise), as opposed to audio signals with information. To illustrate, if the audio signals across broad audio frequency ranges are flat, the system could assume that the input audio signals are noise. In another approach, if the average SPL of the input audio signals is below a certain level, such as 40 dB, the system would assume that there are no audio signals worth amplifying. In any case, when the system recognizes that signals are not to be amplified, the system can then be deactivated, such as to be placed into a sleep mode, a reduced power mode or a standby mode.

**[0063]** With the system operating on-demand, when the sender stops talking for a duration of time, the system can be deactivated. This duration of time can be adjustable, and can be, for example, 10 seconds or 10 minutes. In another approach, only when the signal-to-noise ratio of the audio signals is above a preset threshold would the system be activated (i.e., awakened from the sleep mode, the reduced power mode or the standby mode).

**[0064]** Another approach to manage power consumption can make use of a directional microphone. This approach can improve the signal-to-noise ratio. The gain at specific directions of such a microphone can be 20 dB higher than omni-directional microphones. The direction of the directional microphone can vary with application.

However, in one embodiment, the direction of the directional microphone can be pointing forward or outward from the front of the user. The assumption is that the user typically faces the person talking to him, and thus it is the audio signals from the person in front of him that are to be enhanced.

[0065] The system, namely, the interface unit, can have more than one directional microphone, each pointing in a different direction. FIG. 6A shows an interface unit 202 with four directional microphones pointing in four orthogonal directions. With the microphones in symmetry, the user does not have to think about the orientation of the microphones if the user is attaching the interface unit to a specific location on his clothing.

[0066] FIGS. 6B-6C show interface units 204 and 206, each with two directional microphones pointing in two orthogonal directions. For the two interface units 204 and 206 shown in FIG. 6B-6C, one unit can be on the left shoulder and the other unit on the right shoulder of the user, with the user's head in between the interface units in FIG. 6B and FIG. 6C.

[0067] The amplification of the system can also depend on the ambient power level, or the noise level of the environment of the system. One approach to measure the noise level is to measure the average SPL at gaps of the audio signals. For example, a person asks the user the following question, "Did you leave your heart in San Francisco?" Typically, there are gaps between every two words or between sentences or phrases. The system measures, for example, the root mean square ("rms") value of the power in each of the gaps, and can calculate another average among all of the rms values to determine the noise level. In one embodiment, the system increases the gain of the system so as to ensure that the average power of the output audio signals is higher than the noise level by a certain degree. For example, the average SPL of the output audio signals can be 10 dB above the noise level.

[0068] In another embodiment, if the average power level of the environment or the ambient noise level is higher than a threshold value, signal amplification is reduced. This average power level can include the audio signals of the person talking to the user. The rationale is that if the environment is very noisy, it would be difficult for the user to

hear the audio signals from the other person anyway. As a result, the system should not keep on amplifying the audio signals independent of the environment. For example, if the average power level of the environment is more than 75 dB, the amplification of the system is reduced, such as to 0 dB.

[0069] Another power management approach is to increase the power of the audio signals. One embodiment to create more power is to increase the surface area of the medium responsible for generating the output audio signals. For example, if audio signals are generated by a piezoelectric film, one can increase the surface area of the film to increase the power of the signals.

[0070] A number of embodiments are based on ultrasonic demodulation or mixing. To increase the output power of such embodiments, one can again increase the surface area of the medium generating the ultrasonic signals. As an example, a 1-cm diameter bimorph can give 140 dB ultrasonic SPL. The device may need about 0.1 W of input power. Ten such devices would increase output power by about 20 dB.

[0071] Another approach to increase power is to increase the demodulation or mixing efficiency of the ultrasonic signals by having at least a portion of the transformation performed in a medium other than air. Depending on the medium, this may make the directional speaker more power efficient. Such approaches have been described in the concurrently-filed application entitled, "DIRECTIONAL WIRELESS COMMUNICATION SYSTEMS."

[0072] The system (interface unit and /or the base unit) can include one or more rechargeable batteries. These batteries can be recharged by coupling the system to a battery charger. Another feature of the system that may be provided is one or more electrical connections on the system so as to facilitate electrical connection with a battery charger. For example, when the power source for the system is a rechargeable battery, the ability to charge the battery without removing the battery from the system is advantageous. Hence, in one embodiment, the system includes at least one connector or conductive element (e.g., terminal, pin, pad, trace, etc.) so that the electrical coupling between the rechargeable battery and the charger can be achieved. In this regard, the electrical connector or conductive element is provided on the system and electrically

connected to the battery. The placement of the electrical connector or conductive element on the system serves to allow the system to be simply placed within a charger. Consequently, the electrical connector or conductive element can be in electrical contact with a counterpart or corresponding electrical connector or conductive element of the charger.

[0073] FIG. 5B shows an embodiment of the interface unit 150 with an electrical connection 152 and a cover 154. The interface unit 150 can be the interface unit 14 shown in FIG. 1. The electrical connection 152 can be a USB connector. With the cover 154 removed, the connection 152 can be used, for example, to couple to a battery charger to recharge a battery within the interface unit 150.

[0074] In one embodiment, the charger can be considered a docking station, upon which the system is docked so that the battery within the system can be charged. Hence, the system can likewise include an electrical connector or conductive element that facilitates electrical connection to the docking station when docked.

[0075] With the ear canal remaining open, the user can still use a phone directly. However, in one embodiment, the system, which can include the base unit, can also have the electronics to serve as a cell phone. FIG. 7 shows such an embodiment. When there is an incoming phone call, the system can change its mode of operation and function as a cell phone. The system can alert the user of an incoming call. This can be through, for example, ringing, vibration or a blinking light. The user can pick up the call by, for example, pushing a button on the interface unit. Picking up the call can also be through an activation mechanism on the base unit or a remote control device.

[0076] FIG. 8 is a flow diagram of call processing 400 according to one embodiment of the invention. The call processing 400 is performed using the system. For example, the system can be the system shown in FIG. 1.

[0077] The call processing 400 begins with a decision 402 that determines whether a call is incoming. When the decision 402 determines that there is no incoming call, the call processing 400 waits for such a call. Once the decision 402 determines that a call is incoming, the system is activated 408. Here, the wireless communications capability of the system is activated (e.g., powered-up, enabled, or woken-up). The user

of the system is then notified 410 of the incoming call. In one embodiment, the notification to the user of the incoming call can be achieved by an audio sound produced by the system (via a speaker). Alternatively, the user of the system could be notified by a vibration of the system, or a visual (e.g., light) indication provided by the system. The base unit could also include a ringer that provides audio sound and/or or vibration indication to signal an incoming call.

**[0078]** Next, a decision 412 determines whether the incoming call has been answered. When the decision 412 determines that the incoming call has not been answered, the base unit can activate 414 a voice message informing the caller to leave a message or instructing the caller as to the unavailability of the recipient.

**[0079]** On the other hand, when the decision 412 determines that the incoming call is to be answered, the call can be answered 416 at the base unit. Then, a wireless link is established 418 between the interface unit and the base unit. The wireless link is, for example, a radio communication link such as utilized with Bluetooth or WiFi networks. Thereafter, communication information associated with the call can be exchanged 420 over the wireless link. Here, the base unit receives the incoming call, and communicates wirelessly with the interface unit such that communication information is provided to the user via the system. The user of the system is accordingly able to communicate with the caller by way of the system and, thus, in a hands-free manner.

**[0080]** A decision 422 then determines whether the call is over (completed). When the decision 422 determines that the call is not over, the call processing 400 returns to repeat the operation 420 and subsequent operations so that the call can continue. On the other hand, when the decision 422 determines that the call is over, then the system is deactivated 424, and the wireless link and the call are ended 426. The deactivation 424 of the system can place the system in a reduced-power mode. For example, the deactivation 424 can power-down, disable, or sleep the wireless communication capabilities (e.g., circuitry) of the system. Following the operation 426, as well as following the operations 406 and 414, the call processing 400 for the particular call ends.

**[0081]** If the system also functions as a phone, the system can have a directional microphone pointing at the head of the user. One such embodiment is shown in FIG. 6A.

[0082] Operating the system as a phone can create different concerns as opposed to operating the unit as a hearing enhancement system. Since the audio signals are transmitted in an open environment, people in the user's immediate neighborhood might pick up some of the audio signals. If the SPL is 80 dB when the signals reach the user's head, signals reflected from the head can be 60 dB. Such a level may be heard by people in the immediate vicinity of the user. The user might not want people to pick up what he is hearing. In other words, the user may prefer more privacy.

[0083] FIG. 9 shows a number of embodiments regarding improving privacy of the present invention. The audio signal propagation angle can inherently improve privacy. The cone of the audio signals typically propagates from low to high in order to get to an ear of the user. For example, from the user's shoulder to an ear of the user, the elevation angle can be 45 degrees. One advantage of such a propagation direction is that most of the audio signals reflected from the head radiate towards the sky above the head. This reduces the chance of having the audio signals being eavesdropped particularly when the signal power is going down as the square of the propagation distance. Various other propagation directions can be utilized, as discussed in greater detail below.

[0084] Privacy can be enhanced based on frequency-dependent amplification. Since certain audio frequencies may not be amplified, and may be relatively low in SPL, their reflected signals can be very low. This reduces the probability of the entire audio signals being heard by others.

[0085] Another approach to improve privacy is to reduce the highest power level of the output audio signals to below a certain threshold, such as 70 dB. This level may be sufficient to improve the hearing of those who have mild hearing loss.

[0086] Yet another approach to enhance privacy is to further focus the beam of the audio signals. For the embodiment based on transforming ultrasonic frequencies, narrowing the cone can be done, for example, by increasing the carrier frequency of the audio signals. Typically, the higher the carrier frequency, the narrower the cone, such as a cone created by 100 kHz signals typically being narrower than a cone created by 40 kHz signals. Not only can the cone be narrowed, sidelobes can also be suppressed.

Another approach to narrow the cone is to increase the gain of the cone or the horn that generates the audio signals.

[0087] A focused beam has the added advantage of better power conservation. With the audio signals restricted to a smaller cone, less power is needed to generate the audio signals.

[0088] In private, such as at home, hearing impaired people sometimes might have a tendency to increase the sound level of audio or video instruments a bit too high. On the other hand, in public, hearing impaired people sometimes might have difficulty hearing. In one embodiment, the system is further designed to pick up, capture or access audio signals from portable or non-portable instruments, with the interface unit serving as a personalized listening unit.

[0089] Audio signals from these instruments can be transmitted through wire to the system. The interface unit can provide an electrical input for connecting to the instrument by wires. If transmission is wireless, the system can be designed to include the electronics to capture wireless signals from the instruments through a wireless local area network, such as WiFi or Bluetooth. The audio signals from these instruments can be up-converted and transmitted as a WiFi signal to be picked up by the system. The system then down-converts the WiFi signal to re-generate the audio signals for the user.

[0090] FIG. 10 shows examples of such other portable or non-portable instruments. The instruments can be used in a private environment, such as at home, or attached to the user. This can include entertainment units, such as televisions, stereo systems, CD players, or radios. As an example, assume the user is working at the backyard and the stereo system is in the living room. Based on this technique, the user can enjoy the music without the need to crank up its volume. Private use can include a phone, which can be a desktop phone with a conference speaker or a cell phone. As yet another example, the system can function as the headset of a phone, and can be coupled to the phone in a wireless manner, such as through WiFi or Bluetooth.

[0091] Regarding public use, the user can be at a conference or a theater. The system can be coupled to the conference microphone or the theater speaker wirelessly, and thus be capable of capturing and enhancing the audio signals therefrom.

**[0092]** In a number of embodiments described, the directional speaker generates ultrasonic signals in the range of 40 kHz. One of the reasons to pick such a frequency is for power efficiency. However, to reduce leakage, cross talk or to enhance privacy, in other embodiments, the ultrasonic signals utilized can be between 200 kHz to 1 MHz. It can be generated by multilayer piezoelectric thin films, or other types of solid state devices. Since the carrier frequency is at a higher frequency range than 40 kHz, the absorption/attenuation coefficient by air is considerably higher. On the other hand, privacy is enhanced and audible interference to others is reduced.

**[0093]** A number of embodiments of directional speakers have also been described where the resultant propagation direction of the ultrasonic waves is not orthogonal to the horizontal, but at, for example, 45 degrees. The ultrasonic waves can be at an angle so that the main beam of the waves is approximately pointed at an ear of the user. In another embodiment, the propagation direction of the ultrasonic waves can be approximately orthogonal to the horizontal. Such a speaker does not have to be on a wedge or a step. It can be on a surface that is substantially parallel to the horizontal. For example, the speaker can be on the shoulder of a user, and the ultrasonic waves propagate upwards, instead of at an angle towards an ear of the user. If the ultrasonic power is sufficient, the waves would have sufficient acoustic power even when the speaker is not pointing exactly at the ear.

**[0094]** In one embodiment, the ultrasonic beam is considered directed towards the ear as long as any portion of the beam, or the cone of the beam, is immediately proximate to, such as within 7 cm of, the ear. The direction of the beam does not have to be pointed at the ear. It can even be orthogonal to the ear, such as propagating up from one's shoulder, substantially parallel to the face of the person.

**[0095]** The advantages of the invention are numerous. Different embodiments or implementations may yield different advantages. Different embodiments of the invention can provide one or more of the following advantages: (a) users are provided with non-invasive, hands-free wireless communications capability; (b) the user's ear remains free from any inserted objects and thus is free from the annoying occlusion effects, enabling the user to continue to hear sounds without interference; (c) the system can be

inconspicuous due to its relatively small form factor, such as 2" by 3"; (d) the system can be inconspicuous, and would not be seen as a hearing enhancing device because it can be mistaken as a cell phone; (e) the system would not create feedback and resonance due to misalignment in its positioning as in many of the existing hearing aids; (f) the system can have a shape easy to adapt to the profile of a human being, such as in a shape comfortably residing on the shoulder of a user; (g) the system is relatively inexpensive, compared to existing hearing aids - - this can, for example, be due to the lack of requiring an individually-fitted ear mold; and (h) the system is relatively easy to handle, such as to change or to recharge batteries, depending on the embodiment.

**[0096]** A number of embodiments have been described where a device is attachable to the clothing worn by a user. In one embodiment, attachable to the clothing worn by a user includes wearable by the user. For example, the user can wear a speaker on his neck, like a pendant on a necklace. This also would be considered as attachable to the clothing worn by the user. From another perspective, the necklace can be considered as the "clothing" worn by the user, and the device is attachable to the necklace.

**[0097]** The various embodiments, implementations and features of the invention noted above can be combined in various ways or used separately. Those skilled in the art will understand from the description that the invention can be equally applied to or used in other various different settings with respect to various combinations, embodiments, implementations or features provided in the description herein.

**[0098]** The invention can be implemented in software, hardware or a combination of hardware and software. A number of embodiments of the invention can also be embodied as computer readable code on a computer readable medium. The computer readable medium is any data storage device that can store data, which can thereafter be read by a computer system. Examples of the computer readable medium include read-only memory, random-access memory, CD-ROMs, magnetic tape, optical data storage devices, and carrier waves. The computer readable medium can also be distributed over network-coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

**[0099]** Numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by those skilled in the art that the invention may be practiced without these specific details. The description and representation herein are the common meanings used by those experienced or skilled in the art to most effectively convey the substance of their work to others skilled in the art. In other instances, well-known methods, procedures, components, and circuitry have not been described in detail to avoid unnecessarily obscuring aspects of the present invention.

**[00100]** Also, in this specification, reference to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one embodiment of the invention. The appearances of the phrase “in one embodiment” in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Further, the order of blocks in process flowcharts or diagrams representing one or more embodiments of the invention do not inherently indicate any particular order nor imply any limitations in the invention.

**[00101]** Other embodiments of the invention will be apparent to those skilled in the art from a consideration of this specification or practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

*What is claimed is:*

## CLAIMS

1. A hearing enhancement system for a user comprising:  
an interface unit that has a directional speaker attachable to clothing worn by the user and a microphone;  
wherein  
the microphone receives input audio signals, which are transformed into ultrasonic signals;  
the speaker transmits the ultrasonic signals;  
at least a portion of the ultrasonic signals is transformed into output audio signals by interaction with air;  
the speaker directs the output audio signals towards at least one ear of the user from the worn position of the speaker; and  
a portion of the input audio signals is amplified more than another portion to enhance the hearing of the user.
2. A hearing enhancement system as recited in claim 1 wherein the amplification is frequency dependent.
3. A hearing enhancement system as recited in claim 2 wherein the amplification focuses on higher audio frequencies.
4. A hearing enhancement system as recited in claim 2 wherein certain frequencies of the input audio signals are not amplified.
5. A hearing enhancement system as recited in claim 2 wherein the amplification depends on at least one characteristic of the hearing of the user.
6. A hearing enhancement system as recited in claim 5 wherein the at least one characteristic of the hearing of the user is determined through calibration.

7. A hearing enhancement system as recited in claim 1 wherein the system can be de-activated by the user.
8. A hearing enhancement system as recited in claim 1 wherein the system can be activated depending on at least one word said by the user.
9. A hearing enhancement system as recited in claim 1 wherein depending on the power level of the input audio signals, the system can be in a standby mode.
10. A hearing enhancement system as recited in claim 1 wherein depending on the average power level of the input audio signals, the system can be in a standby mode.
11. A hearing enhancement system as recited in claim 1 wherein the microphone is a directional microphone.
12. A hearing enhancement system as recited in claim 1 wherein the amplification reduces if the average power level of the input audio signals is higher than a preset threshold.
13. A hearing enhancement system as recited in claim 1 wherein the system further includes a rechargeable battery.
14. A hearing enhancement system as recited in claim 1 wherein the system also can function as a phone.
15. A hearing enhancement system as recited in claim 1 wherein the speaker is a phase array.
16. A hearing enhancement system as recited in claim 1 wherein the system can also access audio signals from another instrument through a wire connection, or wirelessly through a wireless local area network.

17. A hearing enhancement system as recited in claim 16 wherein the another instrument is a portable instrument.
18. A hearing enhancement system as recited in claim 16 wherein the instrument is an entertainment unit.
19. A hearing enhancement system as recited in claim 16 wherein the instrument is a phone.
20. A hearing enhancement system as recited in claim 16 wherein the instrument is related to a microphone at an event.
21. A hearing enhancement system as recited in claim 16 wherein the instrument is related to a speaker at an event.
22. A hearing enhancement system for a user comprising:  
a directional speaker attachable to clothing worn by the user;  
a microphone; and  
a computing unit operatively coupled to the directional speaker and the microphone,  
wherein the microphone receives input audio signals, and the computing unit transforms the input audio signals into modified audio signals by modifying certain frequencies differently than other frequencies to enhance the ability of the user to hear the input audio signals, and provides the modified audio signals to the directional speaker,  
wherein the directional speaker outputs ultrasonic signals based on the modified audio signals.
23. A hearing enhancement system as recited in claim 22, wherein at least a portion of the ultrasonic signals output by the directional speaker are transformed into output audio signals by interaction with air.

24. A hearing enhancement system as recited in claim 22, wherein the directional speaker directs the ultrasonic signals towards at least one ear of the user from the worn position of the directional speaker.
25. A hearing enhancement system as recited in claim 22, wherein the computing unit is integral with the directional speaker.
26. A hearing enhancement system as recited in claim 22, wherein the computing unit is separate from the directional speaker but operatively couples with the directional speaker over a wireless link.
27. A hearing enhancement system as recited in claim 22, wherein the computing unit has a reduced power mode and a normal power mode, and wherein the computing unit can be automatically switched between the power modes based on characteristics of the input audio signals, thereby reducing power consumption by the computing unit.

## **DIRECTIONAL HEARING ENHANCEMENT SYSTEMS**

### **ABSTRACT OF THE DISCLOSURE**

A hearing enhancement system that enhances a user's hearing based on a directional speaker is disclosed. In one embodiment, the system can include an interface unit that has a directional speaker and a microphone. The microphone captures input audio signals that are transformed into ultrasonic signals. The speaker transmits the ultrasonic signals, which are transformed into output audio signals by interaction with air. At least a portion of the output audio signals are modified to enhance the hearing of the user. Based on the system, the user's ear remains free from any inserted objects and thus is free from annoying occlusion effects. Compared to existing hearing aids, the system is relatively inexpensive. In another embodiment, the system can also be used as a phone. In yet another embodiment, the system can also access audio signals from other portable or non-portable instruments, wired or wirelessly, such as from home entertainment units, phones, microphones at a conference or speakers at a movie theater.

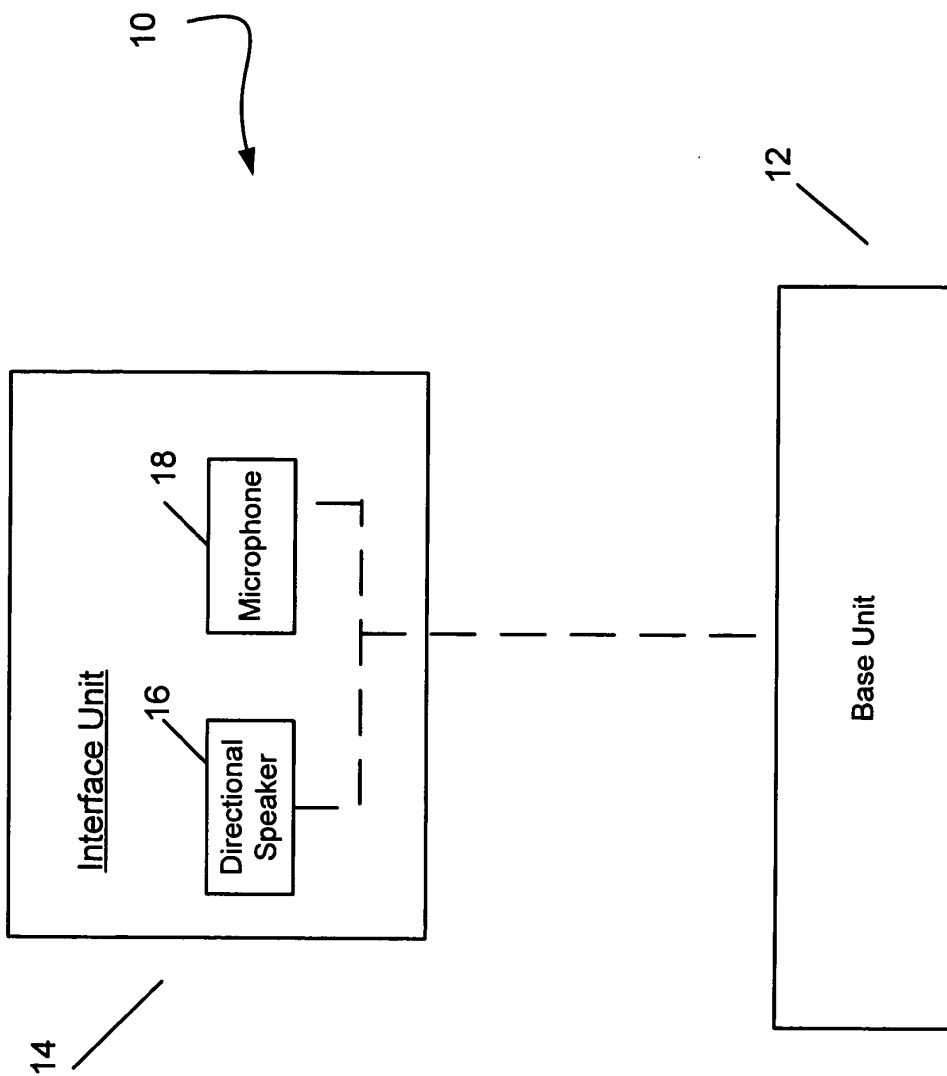


FIG. 1

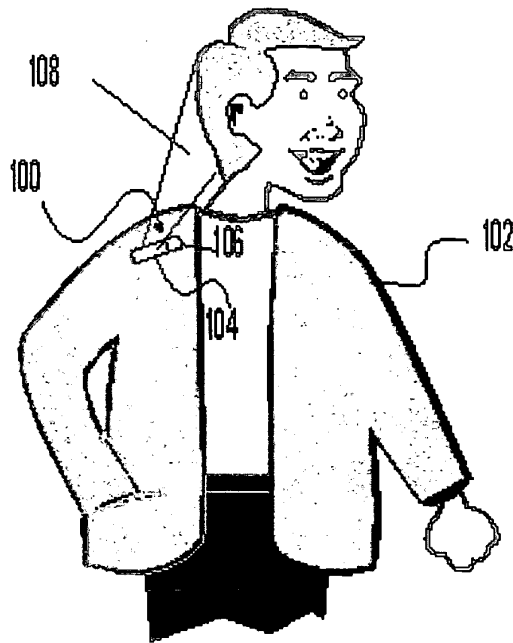


FIG. 2

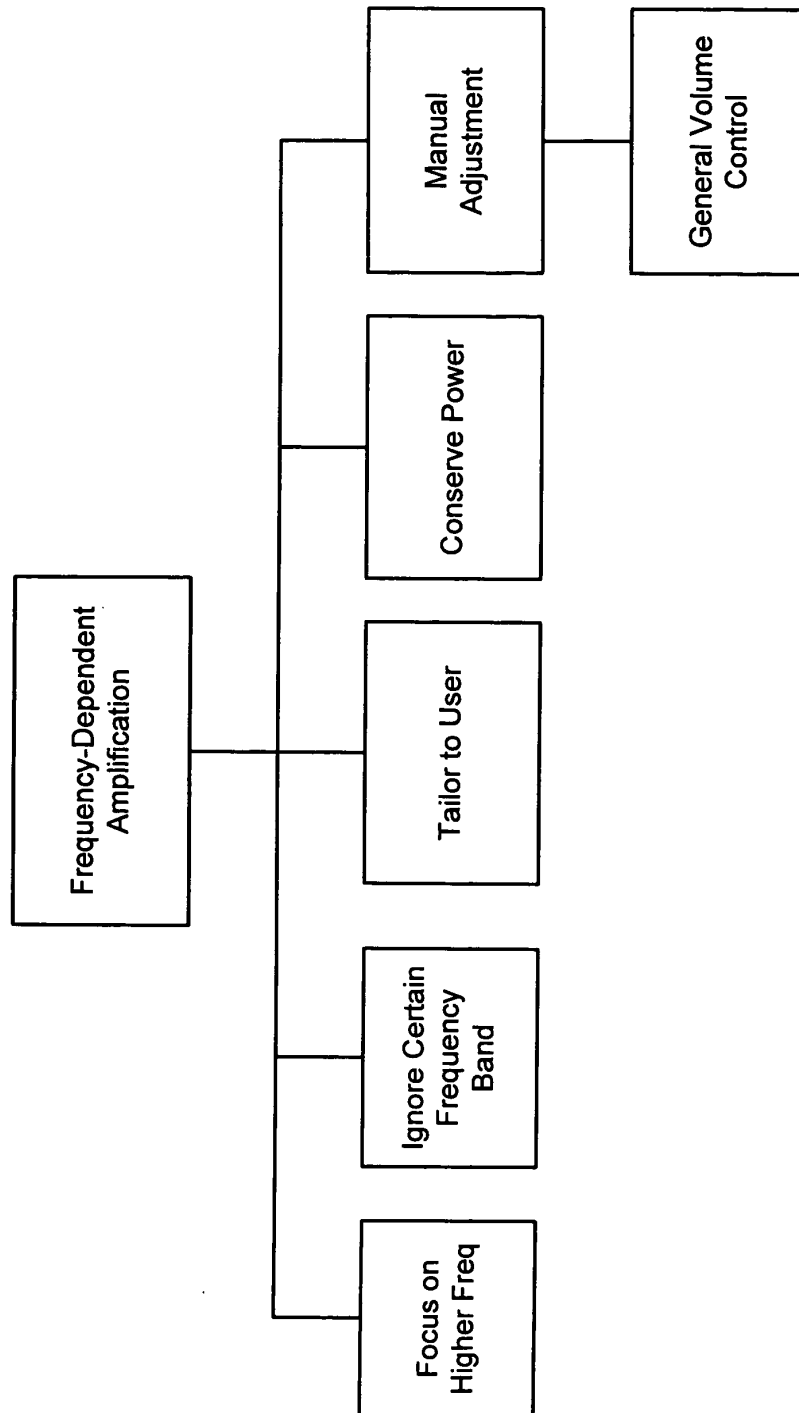


FIG. 3

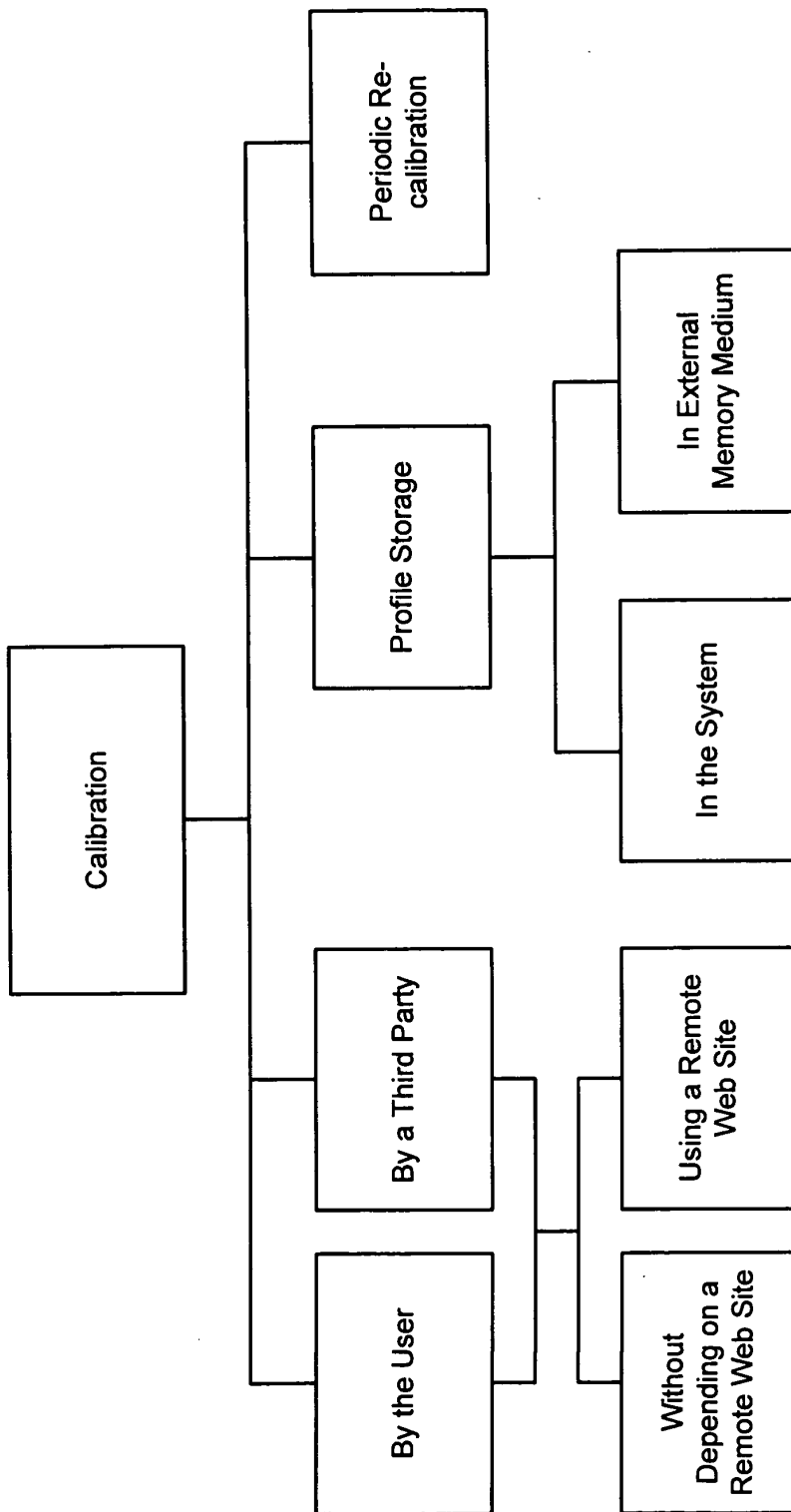


FIG. 4

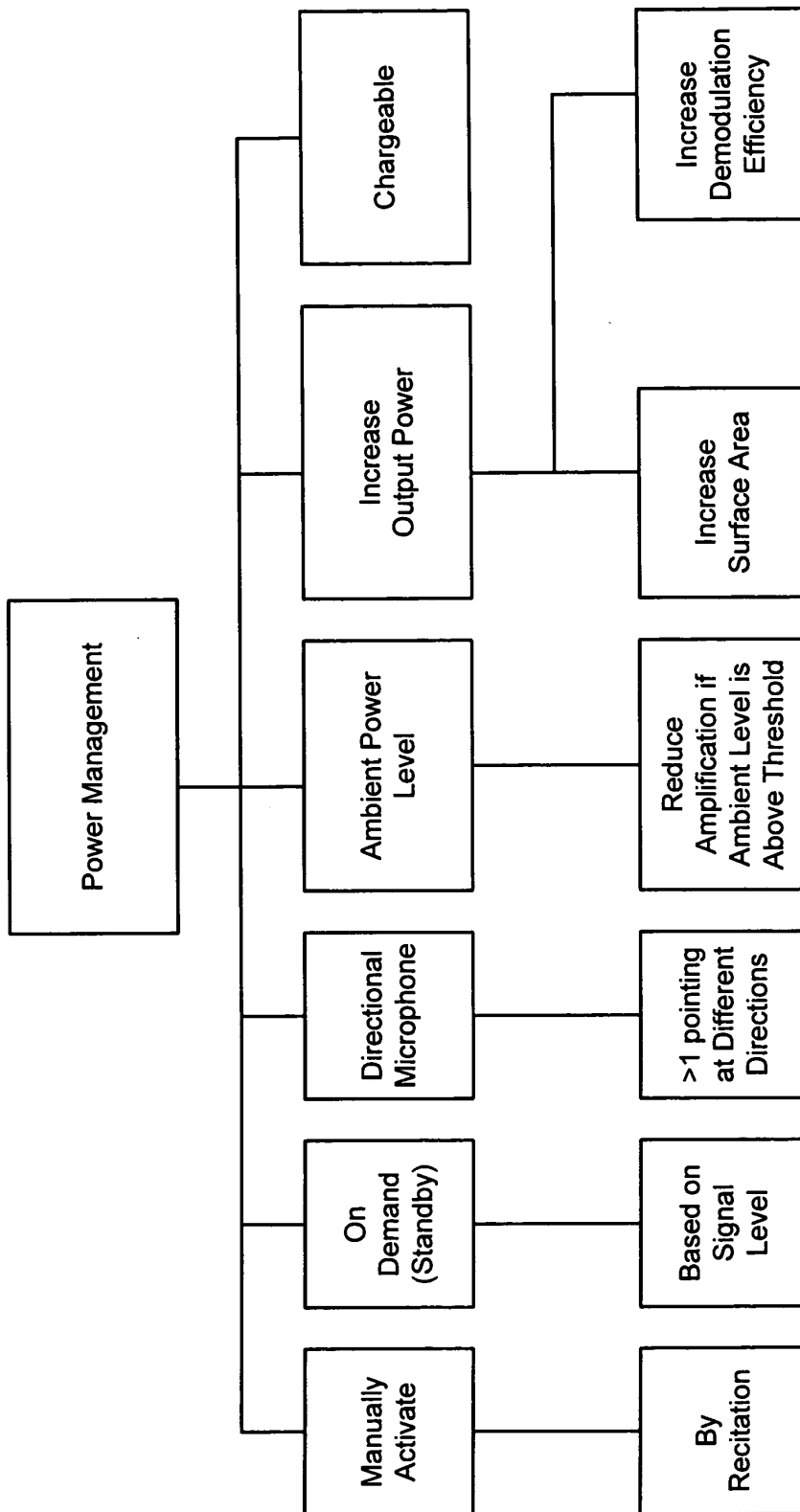


FIG. 5A

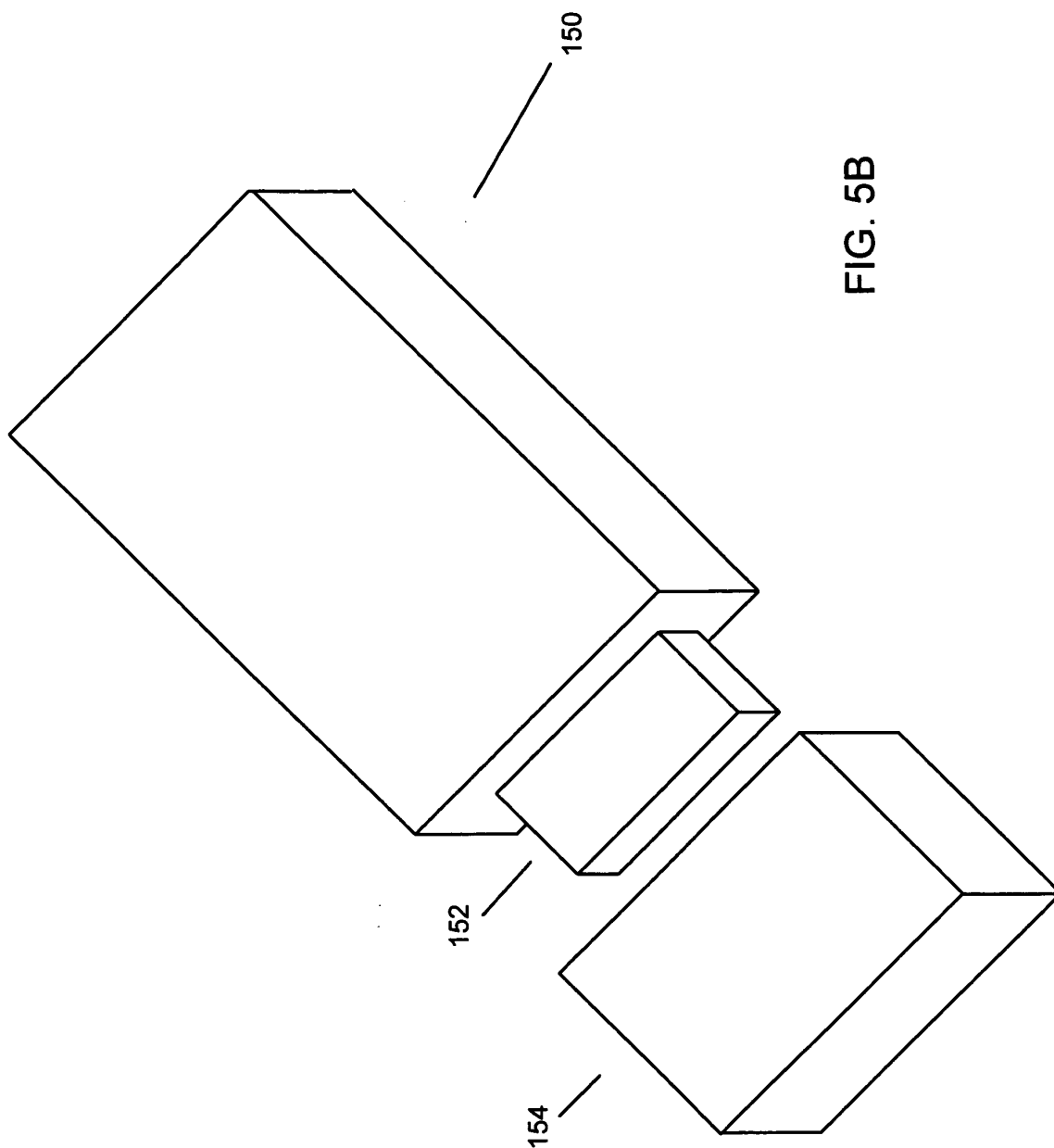
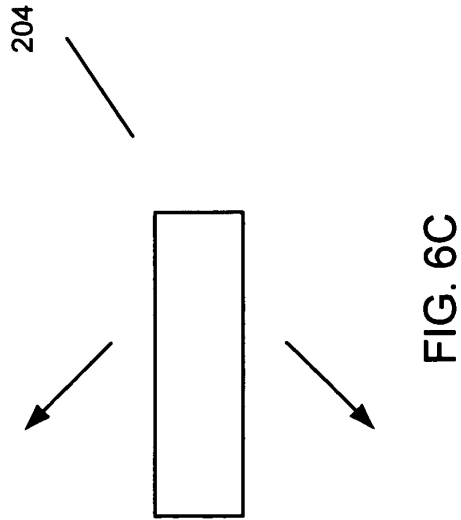
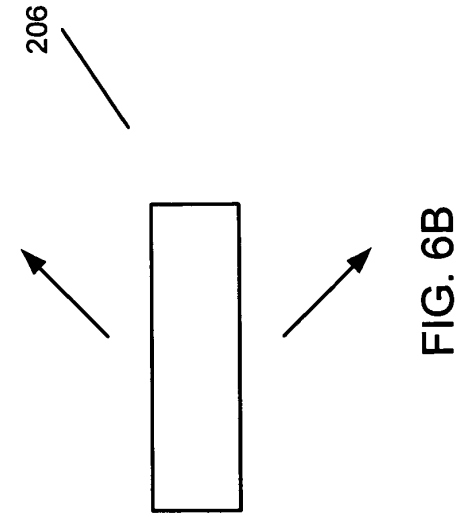
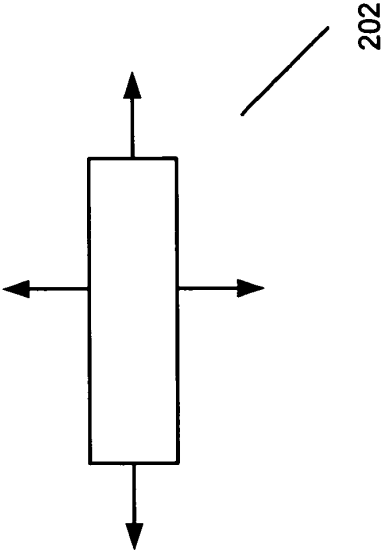


FIG. 5B



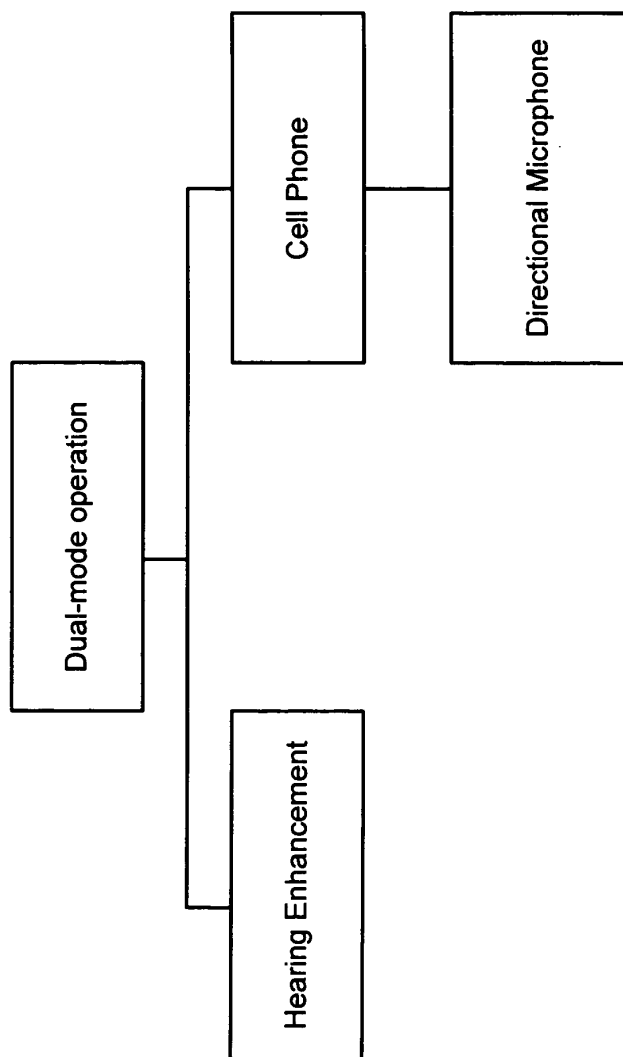
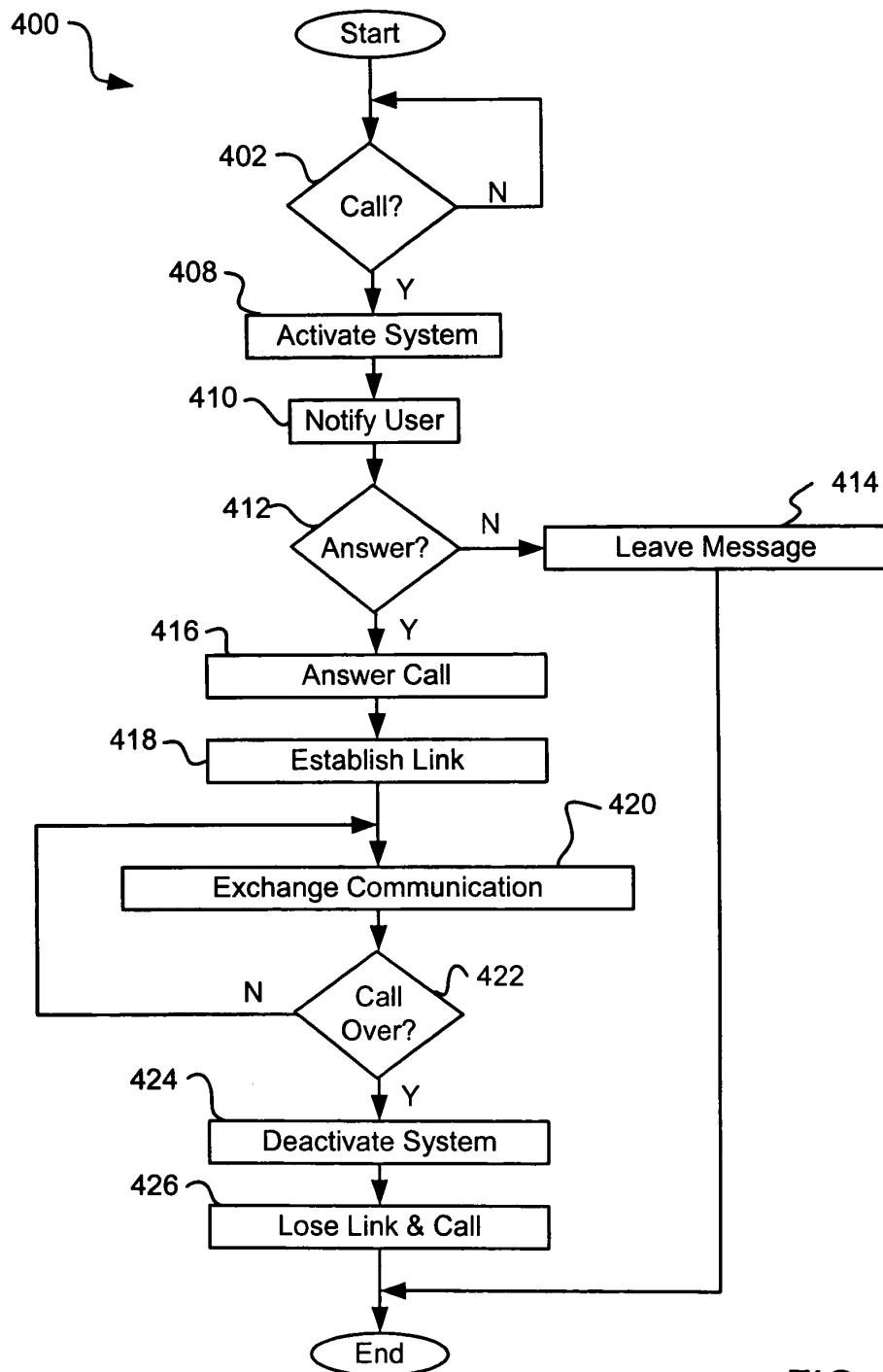


FIG. 7



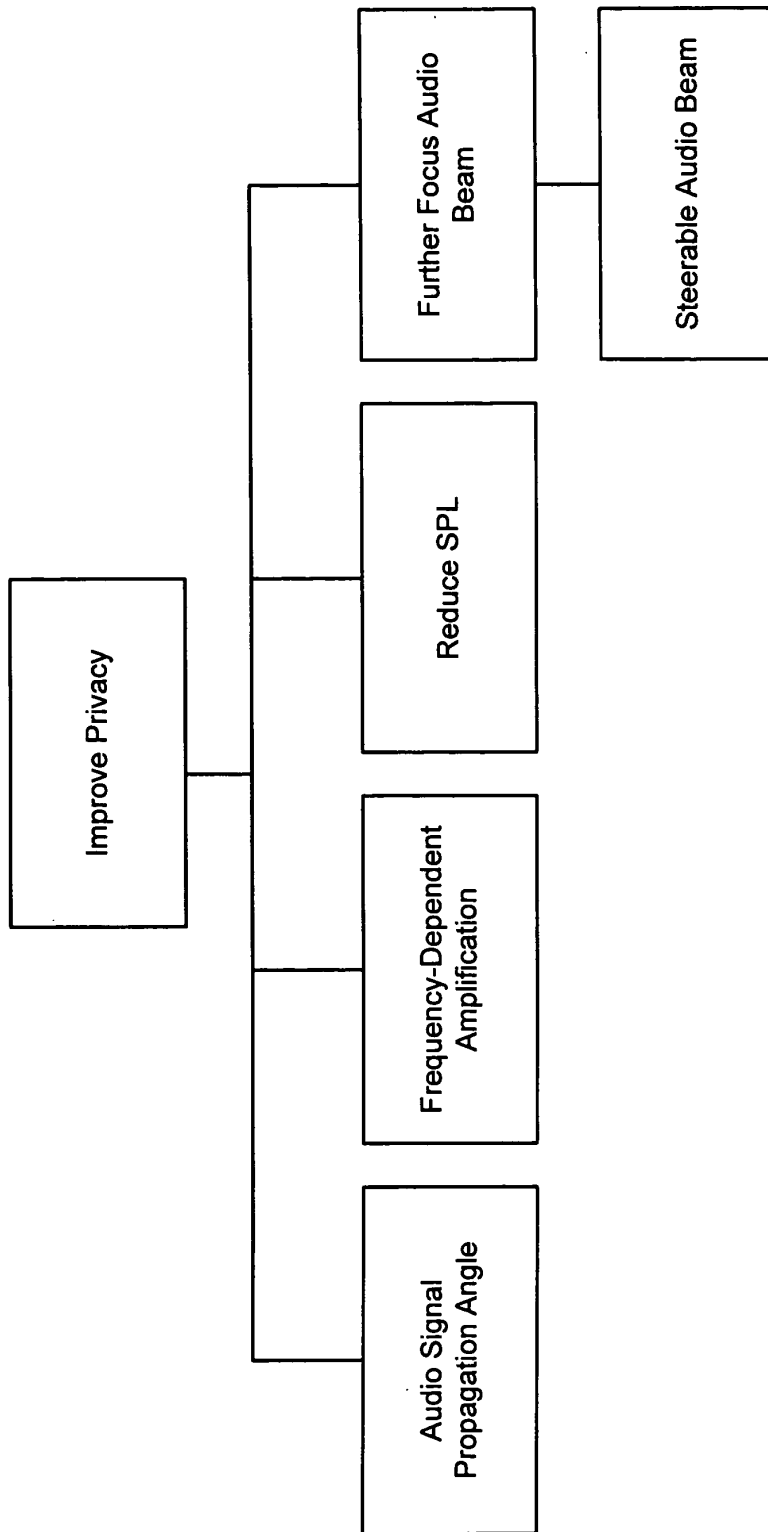


FIG. 9

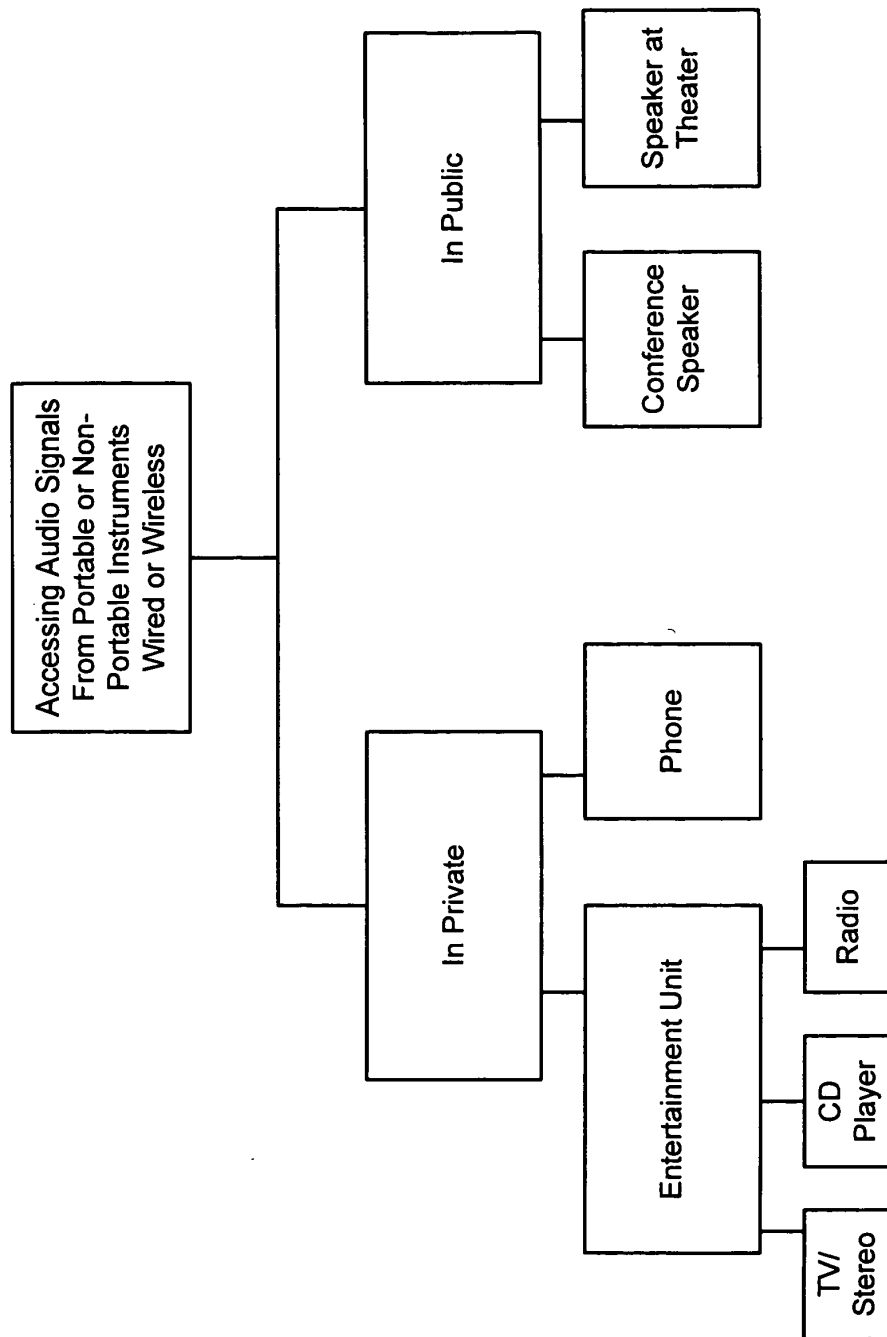


FIG. 10

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of: Cheung et al.

Attorney Docket No.: IPVBP002

Application No.: To be assigned

Examiner: To be assigned

Filed: April 15, 2004

Group: To be assigned

Title: DIRECTIONAL HEARING  
ENHANCEMENT SYSTEMS

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**POWER OF ATTORNEY BY ASSIGNEE AND 37 CFR §3.73 STATEMENT**

Commissioner for Patents  
Washington, D. C. 20231

Sir:

**IpVenture, Inc.** is the assignee of the above-referenced patent application by virtue of an assignment document. The assignment document is/was recorded:

☐ at Reel           , Frame(s)

☐ on

☒ submitted concurrently herewith

The assignee represents, pursuant to 37 C.F.R. §3.73(b), that the undersigned is a representative authorized and empowered to sign on behalf of the assignee.

Pursuant to 37 C.F.R. §§1.36 and 3.71, the assignee hereby revokes all powers of attorney previously given and hereby appoints all practitioners who are associated with the **Customer Number 34071** as principal attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Please send all correspondence for this application as follows:

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Date April 15 2004

  
\_\_\_\_\_  
Name: C. Douglass Thomas  
Title: Chairman  
IpVenture, Inc.

## DECLARATION FOR ORIGINAL U.S. PATENT APPLICATION

Attorney's Docket No. **IPVBP002**

As a below-named inventor, I hereby declare that:

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

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **"DIRECTIONAL HEARING ENHANCEMENT SYSTEMS"**, the specification of which,

(check one)

1. ☒ is attached hereto.
2. ☐ was filed on \_\_\_\_\_ as  
U.S. Application No. \_\_\_\_\_  
and was amended on \_\_\_\_\_.
3. ☐ was filed on \_\_\_\_\_ as  
International PCT Application Serial No. \_\_\_\_\_  
and was amended on \_\_\_\_\_.

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

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, CFR § 1.56.

I hereby claim foreign priority benefits under Title 35, United States code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

### Prior Foreign Application(s)

None

(Application No.)

(Country)

(Filing Date)

Priority Benefits Claimed?

Yes \_\_\_ No \_\_\_

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

### Provisional U.S. Applications

60/462,570

(Application No.)

April 15, 2003

(Filing Date)

60/469,221

(Application No.)

May 12, 2003

(Filing Date)

60/493,441

(Application No.)

August 8, 2003

(Filing Date)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in

Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

**Prior U.S. Application(s)**

None (Application No.) (Filing Date) (Status - patented, pending, abandoned)

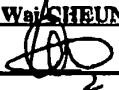
**Send Correspondence To:**

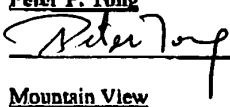
**Customer Number: 34071**

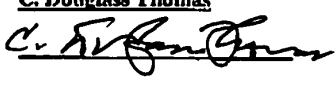
**Direct Telephone Calls To:**

**C. Douglass Thomas at telephone number (408) 446-3333**

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

Typewritten Full Name of First Inventor: Kwok Wai SHEUNG Citizenship: Hong Kong SAR, China  
Inventor's signature:  Date of Signature: APR. 13, 04  
Residence: (City) Hong Kong, SAR (State/Country) China  
Post Office Address: Flat 3A, Block 10, 23 Shan Tong Road, Tai Po, Hong Kong SAR, China

Typewritten Full Name of First Inventor: Peter P. Tong Citizenship: USA  
Inventor's signature:  Date of Signature: April 13, 2004  
Residence: (City) Mountain View (State/Country) CA/US  
Post Office Address: 1807 LimeTree Lane, Mountain View, CA, 94040

Typewritten Full Name of Second Inventor: C. Douglass Thomas Citizenship: USA  
Inventor's signature:  Date of Signature: 4/13/2004  
Residence: (City) Campbell (State/Country) CA/US  
Post Office Address: 1193 Capri Drive, Campbell, CA, 95008

PATENT APPLICATION SERIAL NO. \_\_\_\_\_

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE  
FEE RECORD SHEET

04/21/2004 EHAILE1 00000027 10826527

|            |           |
|------------|-----------|
| 01 FC:2001 | 385.00 OP |
| 02 FC:2202 | 63.00 OP  |

PTO-1556  
(5/87)

\*U.S. Government Printing Office: 2002 — 489-267/69033

# PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2003

Application or Docket Number

1PVBP002

## CLAIMS AS FILED - PART I

|                                                           | (Column 1)    | (Column 2)   |
|-----------------------------------------------------------|---------------|--------------|
| TOTAL CLAIMS                                              | 27            |              |
| FOR                                                       | NUMBER FILED  | NUMBER EXTRA |
| TOTAL CHARGEABLE CLAIMS                                   | 27 minus 20 = | * 7          |
| INDEPENDENT CLAIMS                                        | 2 minus 3 =   | * -          |
| MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/> |               |              |

\* 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    |
|-----------|--------|
| BASIC FEE | 385.00 |
| XS 9=     | 63     |
| X43=      |        |
| +145=     |        |
| TOTAL     | 448    |

| RATE      | FEE    |
|-----------|--------|
| BASIC FEE | 770.00 |
| XS18=     |        |
| X86=      |        |
| +290=     |        |
| TOTAL     |        |

## CLAIMS AS AMENDED - PART II

|                                                                         | (Column 1)                                | (Column 2)                                  | (Column 3)       |
|-------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------|------------------|
| AMENDMENT A                                                             | CLAIMS<br>REMAINING<br>AFTER<br>AMENDMENT | HIGHEST<br>NUMBER<br>PREVIOUSLY<br>PAID FOR | PRESENT<br>EXTRA |
| Total                                                                   | *                                         | Minus                                       | **               |
| Independent                                                             | *                                         | Minus                                       | ***              |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |                                           |                                             |                  |

SMALL ENTITY

OR  
OTHER THAN  
SMALL ENTITY

| RATE                | ADDI-<br>TIONAL<br>FEE |
|---------------------|------------------------|
| XS 9=               |                        |
| X43=                |                        |
| +145=               |                        |
| TOTAL<br>ADDIT. FEE |                        |

| RATE                | ADDI-<br>TIONAL<br>FEE |
|---------------------|------------------------|
| XS18=               |                        |
| X86=                |                        |
| +290=               |                        |
| TOTAL<br>ADDIT. FEE |                        |

|                                                                         | (Column 1)                                | (Column 2)                                  | (Column 3)       |
|-------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------|------------------|
| AMENDMENT B                                                             | CLAIMS<br>REMAINING<br>AFTER<br>AMENDMENT | HIGHEST<br>NUMBER<br>PREVIOUSLY<br>PAID FOR | PRESENT<br>EXTRA |
| Total                                                                   | *                                         | Minus                                       | **               |
| Independent                                                             | *                                         | Minus                                       | ***              |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |                                           |                                             |                  |

| RATE                | ADDI-<br>TIONAL<br>FEE |
|---------------------|------------------------|
| XS 9=               |                        |
| X43=                |                        |
| +145=               |                        |
| TOTAL<br>ADDIT. FEE |                        |

| RATE                | ADDI-<br>TIONAL<br>FEE |
|---------------------|------------------------|
| XS18=               |                        |
| X86=                |                        |
| +290=               |                        |
| TOTAL<br>ADDIT. FEE |                        |

|                                                                         | (Column 1)                                | (Column 2)                                  | (Column 3)       |
|-------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------|------------------|
| AMENDMENT C                                                             | CLAIMS<br>REMAINING<br>AFTER<br>AMENDMENT | HIGHEST<br>NUMBER<br>PREVIOUSLY<br>PAID FOR | PRESENT<br>EXTRA |
| Total                                                                   | *                                         | Minus                                       | **               |
| Independent                                                             | *                                         | Minus                                       | ***              |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/> |                                           |                                             |                  |

| RATE                | ADDI-<br>TIONAL<br>FEE |
|---------------------|------------------------|
| XS 9=               |                        |
| X43=                |                        |
| +145=               |                        |
| TOTAL<br>ADDIT. FEE |                        |

| RATE                | ADDI-<br>TIONAL<br>FEE |
|---------------------|------------------------|
| XS18=               |                        |
| X86=                |                        |
| +290=               |                        |
| TOTAL<br>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.