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.

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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:

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.

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.

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PTO/SB/05 (03-01)
Approved for use through 10/31/2002. OMB 0651-0032
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041504

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.

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

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Washington, DC 20231

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

☑ *Customer Number or Bar Code Label* [Insert Customer No. or Attach bar code label here] or ☐ *Correspondence address below*

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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	C. Douglass Thomas	*Date*	4/15/2004

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15992 U.S. PTO
041504

PTO/SB/17 (10-03)
Approved for use through 07/31/2006. OMB 0651-0032
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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	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	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

		Extra Claims		Fee from below	Fee Paid
Total Claims	27	-20** = 7	X	9	= 63
Independent Claims	2	- 3** = 0	X		=
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	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	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	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				(Complete *(if applicable)*)	
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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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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	

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:

Customer Number 34071
IpVenture, Inc.
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Suite 200-A
Cupertino, CA 95014

Please direct any calls to **C. Douglass Thomas (408) 446-3333.**

Assignee of Interest:

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

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 inventoris certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

(Application No.)	(Country)	(Filing Date)	Priority Benefits Claimed? Yes ___ No ___
None			

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 CHEUNG	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: IPVBP002

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		☐

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

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
XS 9=	63	OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL	448	OR	TOTAL	

CLAIMS AS AMENDED - PART II

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

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

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

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

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

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

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

FORM PTO-875 (Rev 10/03) — Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

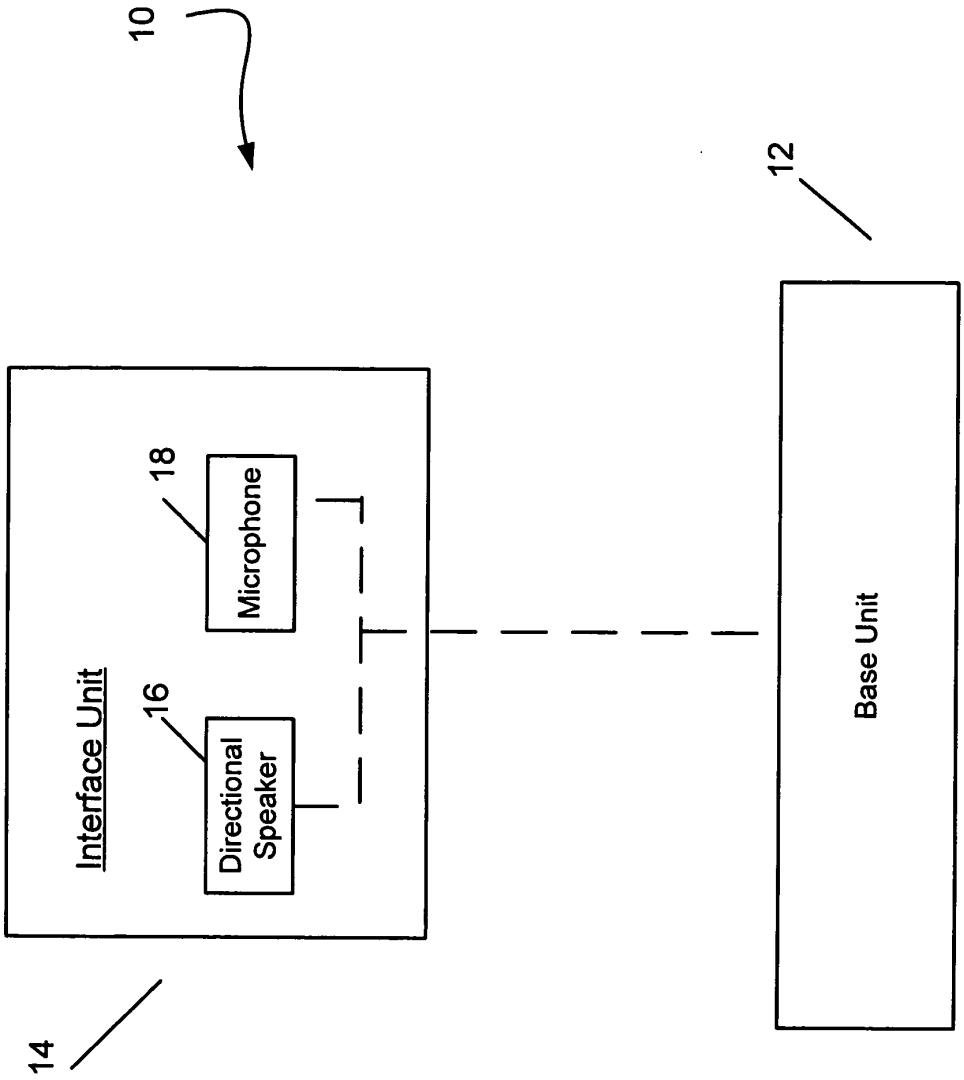
10
12
Interface Unit
18
Microphone
16
Directional Speaker
Base Unit
14

FIG. 1

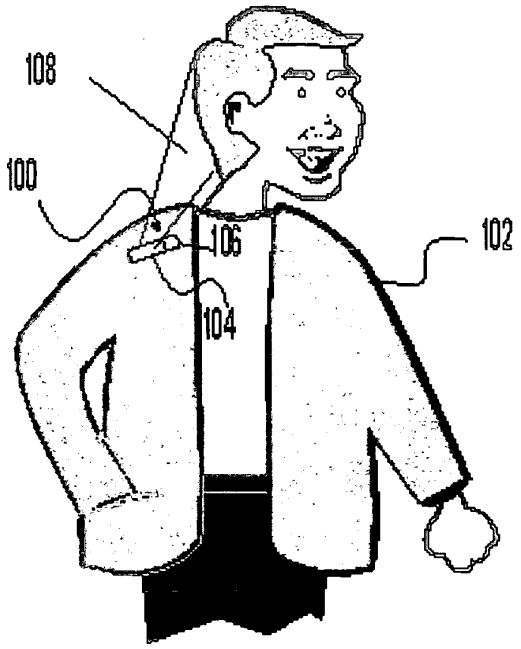

FIG. 2

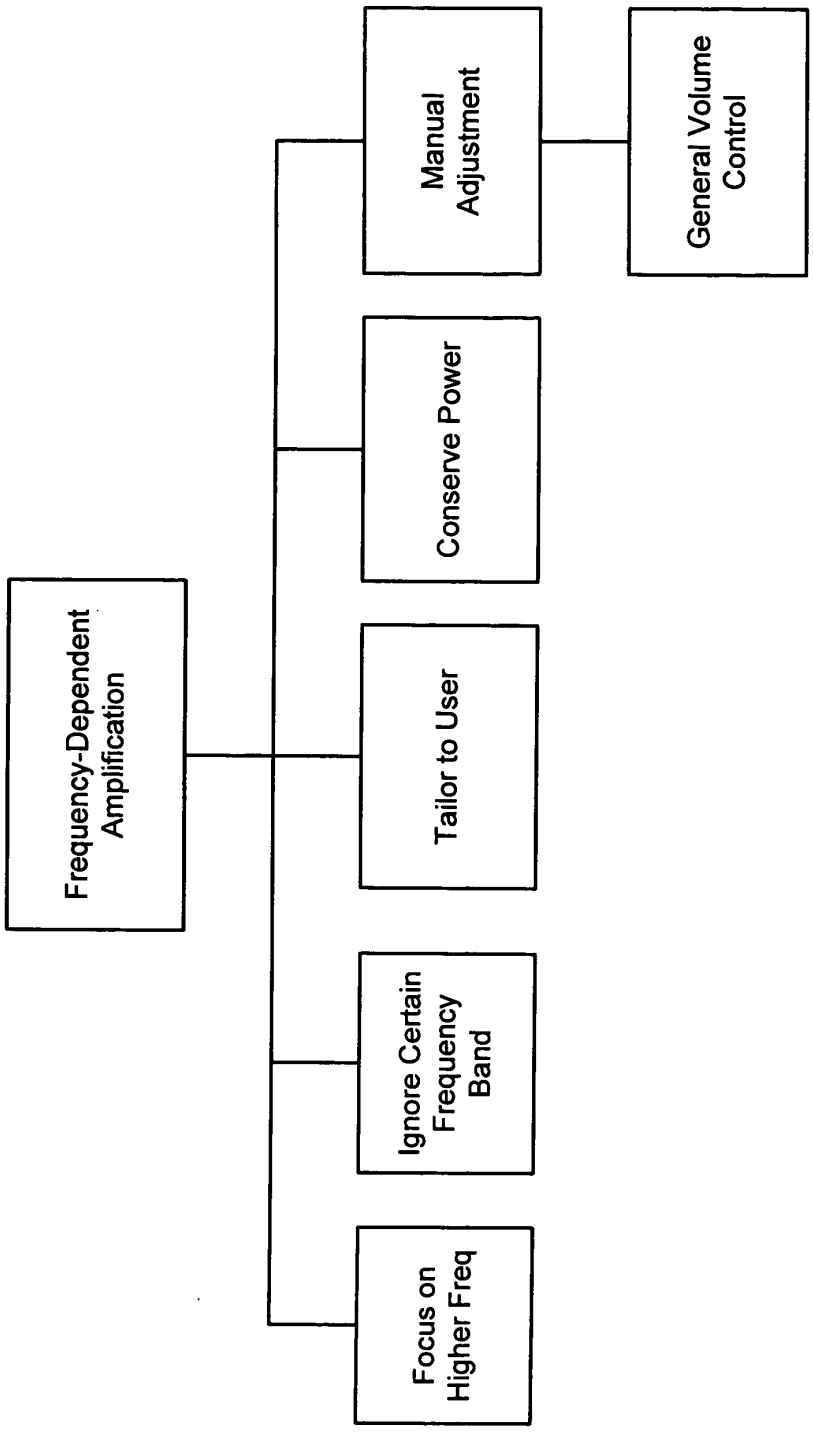
Frequency-Dependent Amplification
Focus on Higher Freq
Ignore Certain Frequency Band
Tailor to User
Conserve Power
Manual Adjustment
General Volume Control

FIG. 3

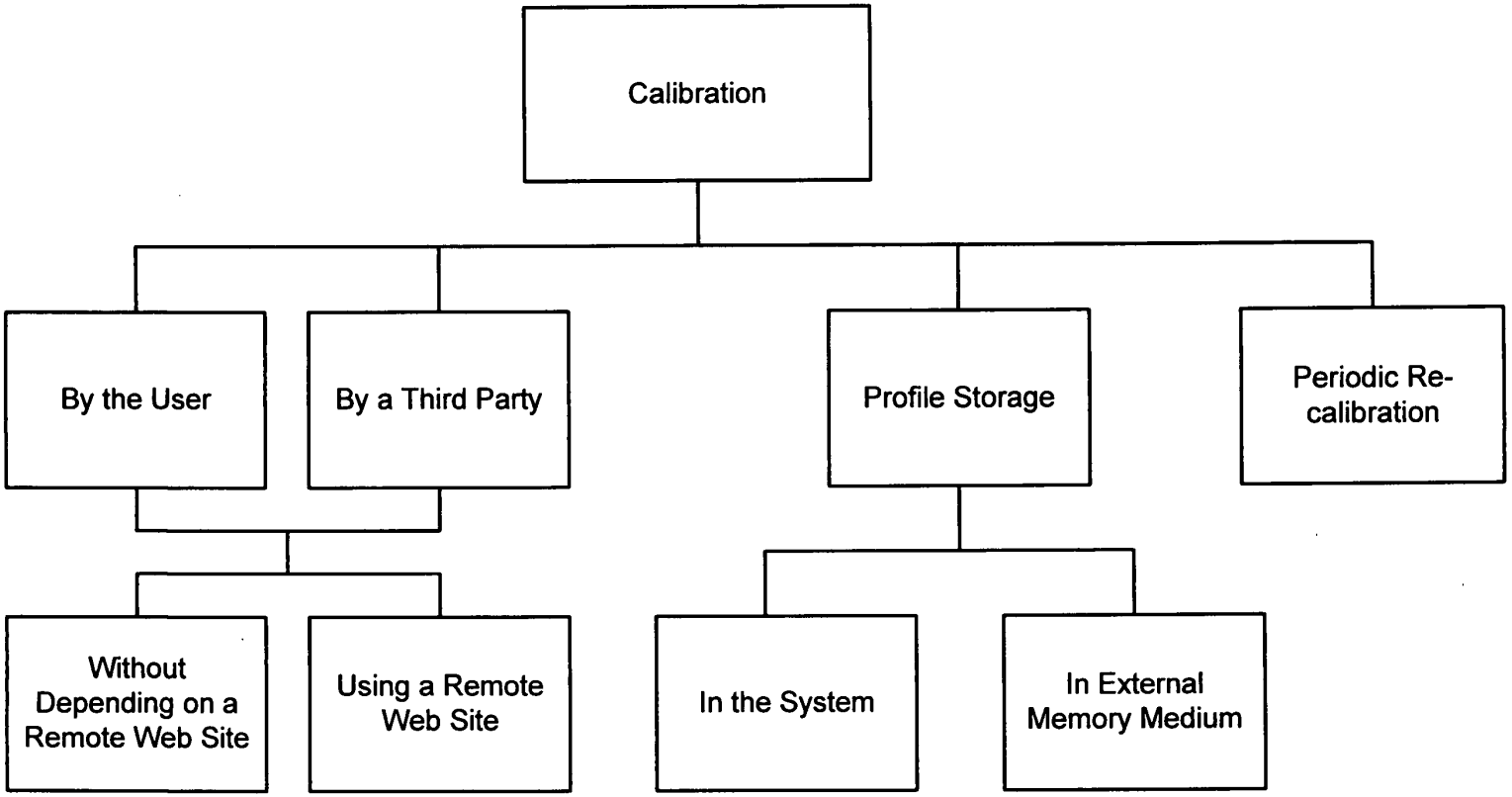

FIG. 4

EX1009 - Page 40

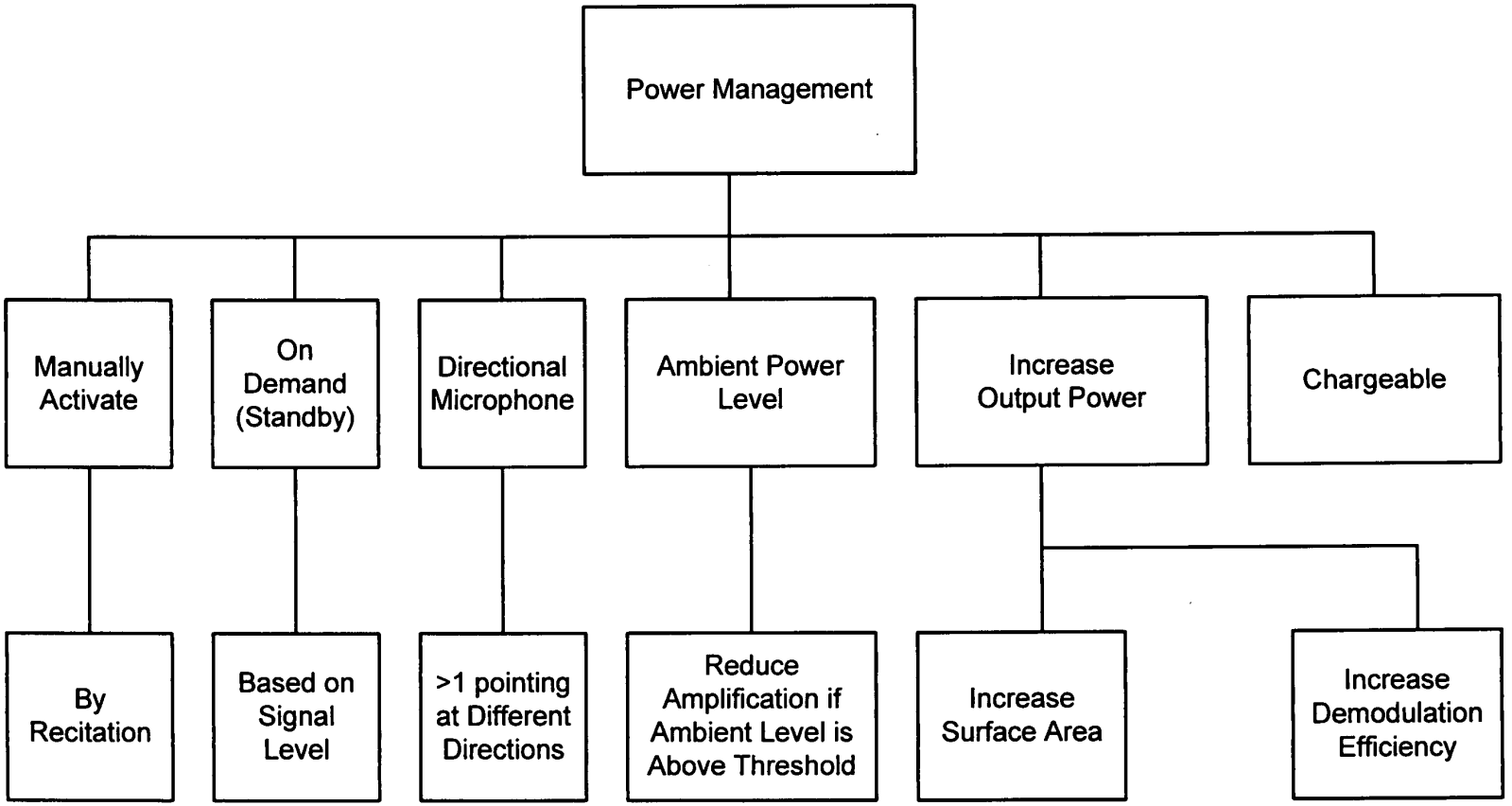

FIG. 5A

EX1009 - Page 41

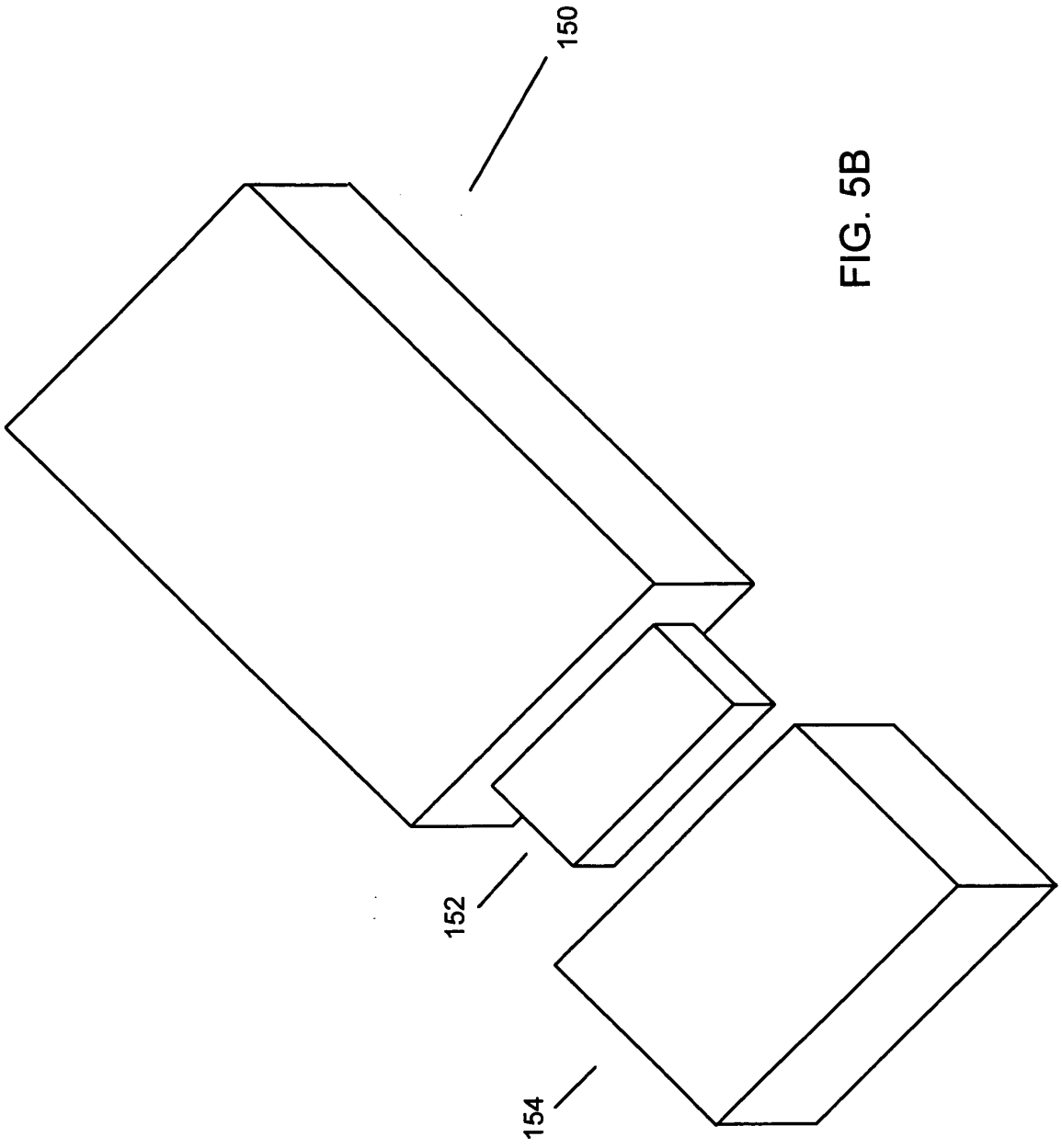

FIG. 5B

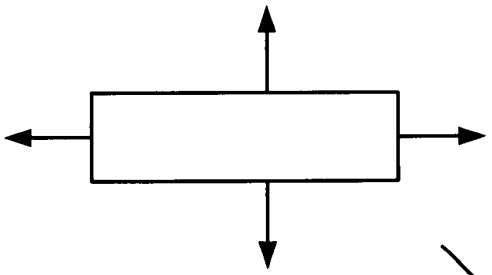

FIG. 6A

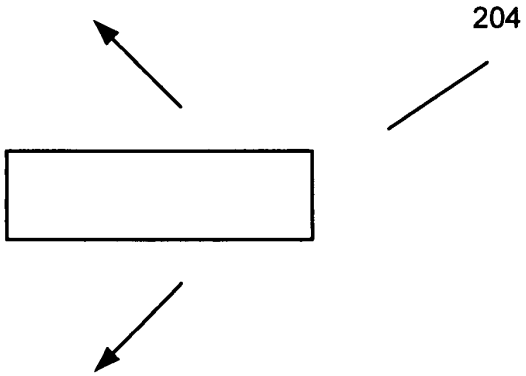

FIG. 6C

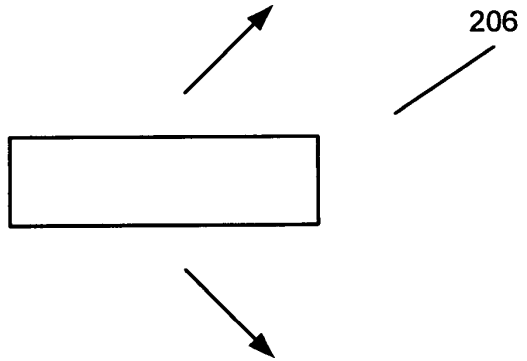

FIG. 6B

EX1009 - Page 43

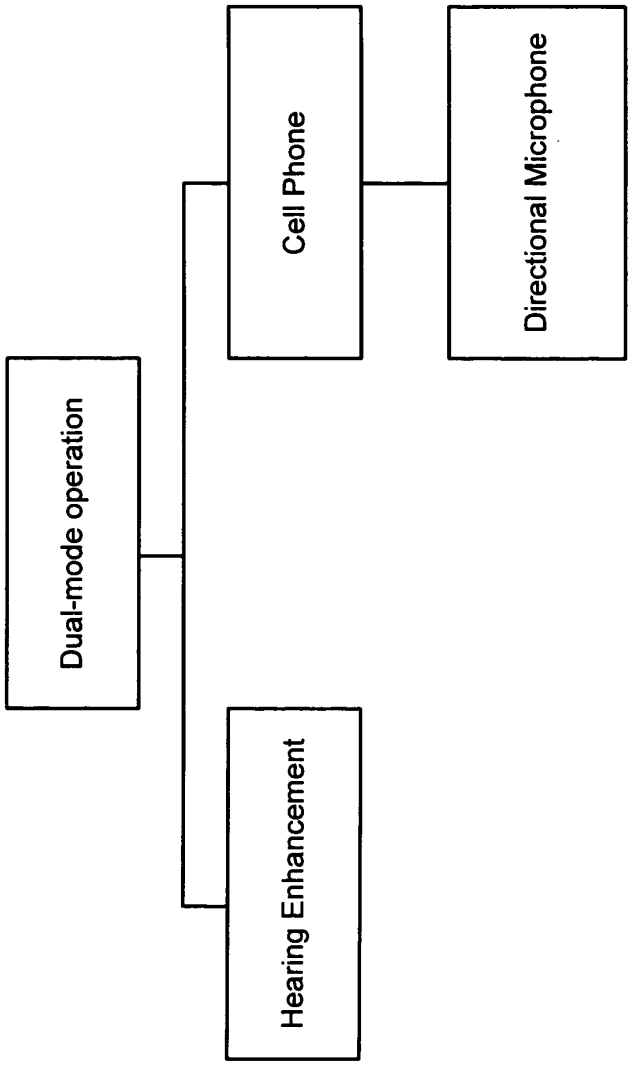
Dual-mode operation
Cell Phone
Directional Microphone
Hearing Enhancement

FIG. 7

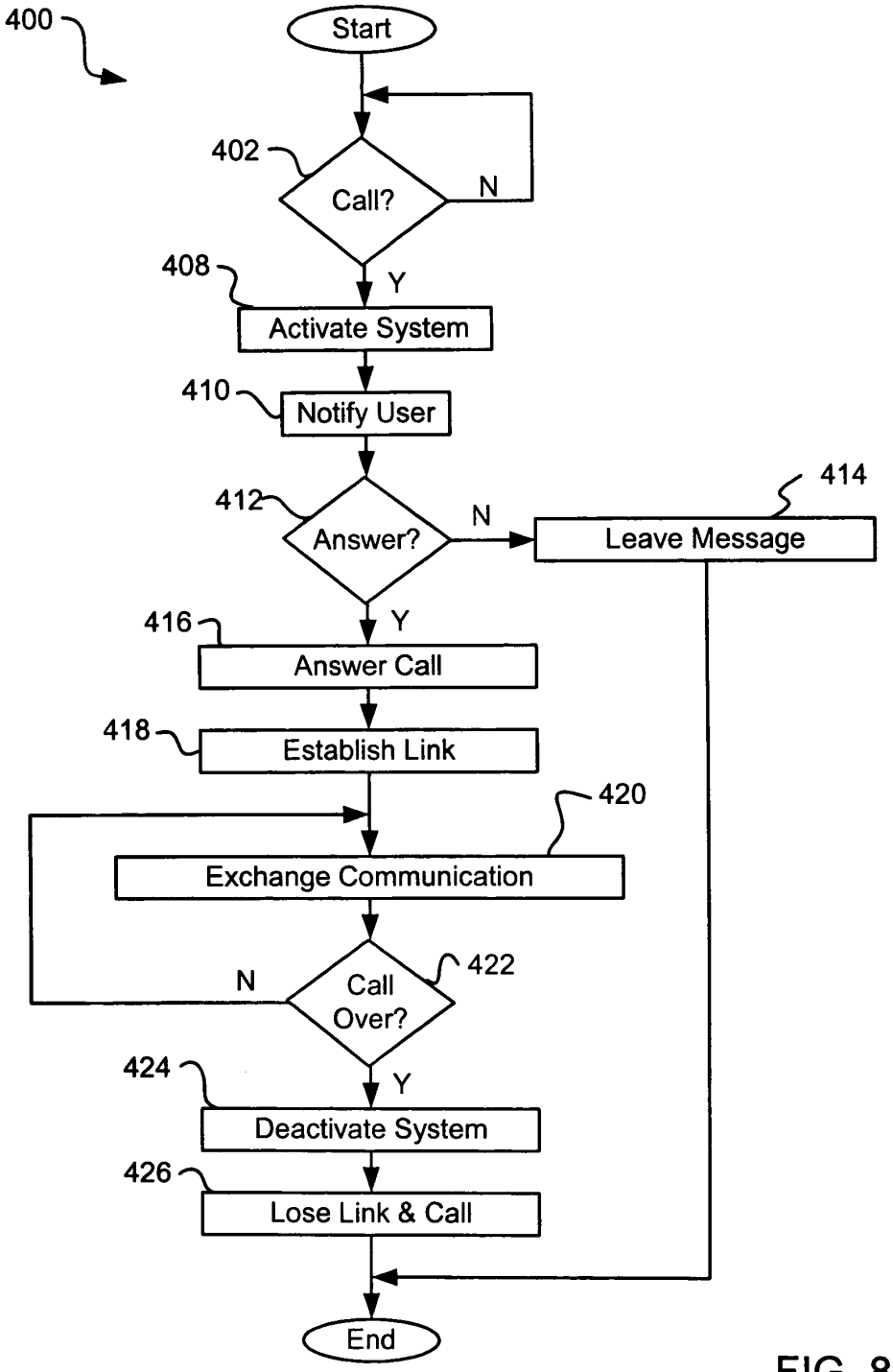
400
Start
402
Call?
N
Y
408
Activate System
410
Notify User
412
Answer?
N
414
Leave Message
Y
416
Answer Call
418
Establish Link
420
Exchange Communication
N
Call Over?
422
Y
424
Deactivate System
426
Lose Link & Call
End

FIG. 8

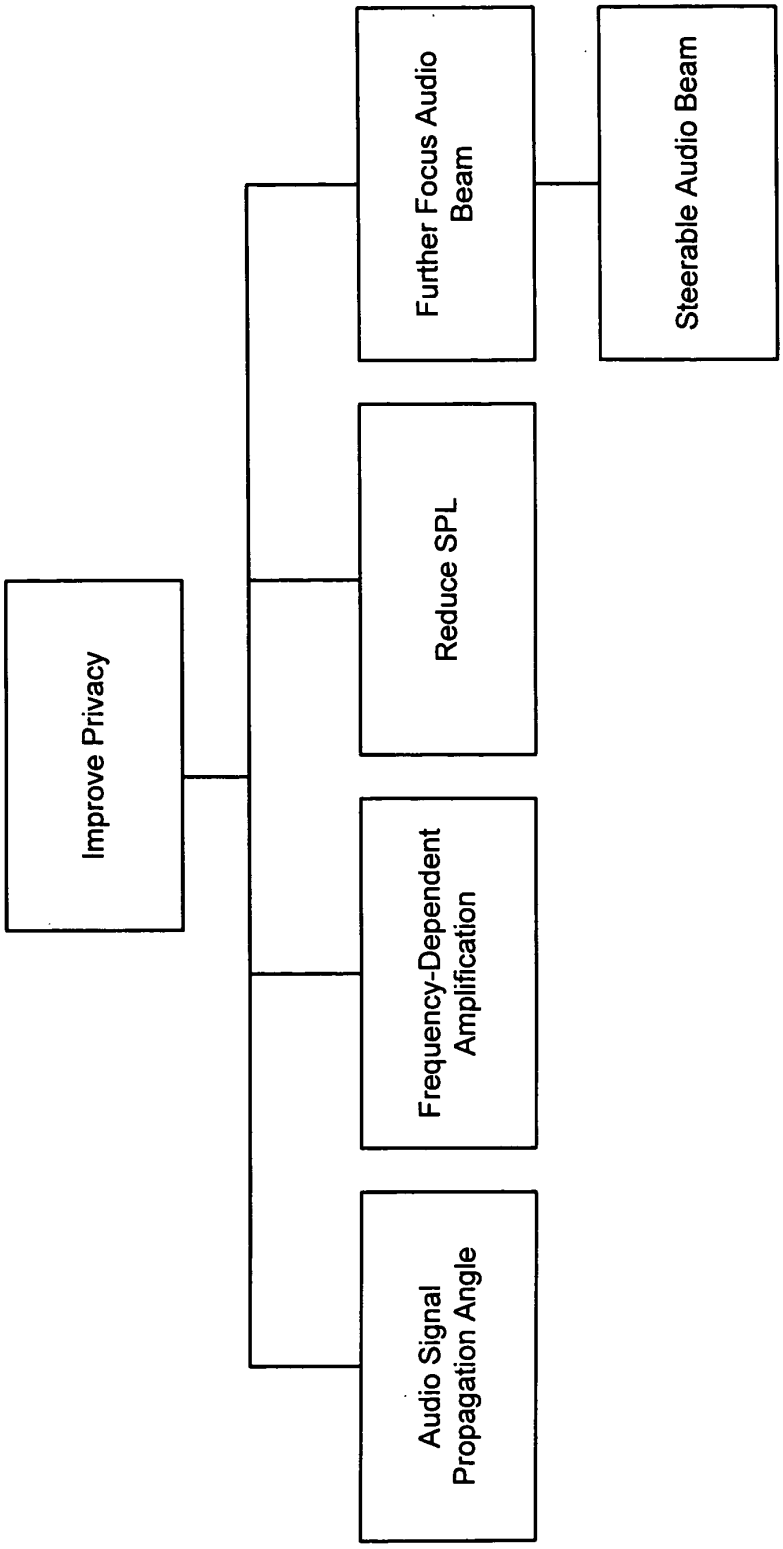
Improve Privacy
Audio Signal Propagation Angle
Frequency-Dependent Amplification
Reduce SPL
Further Focus Audio Beam
Steerable Audio Beam

FIG. 9

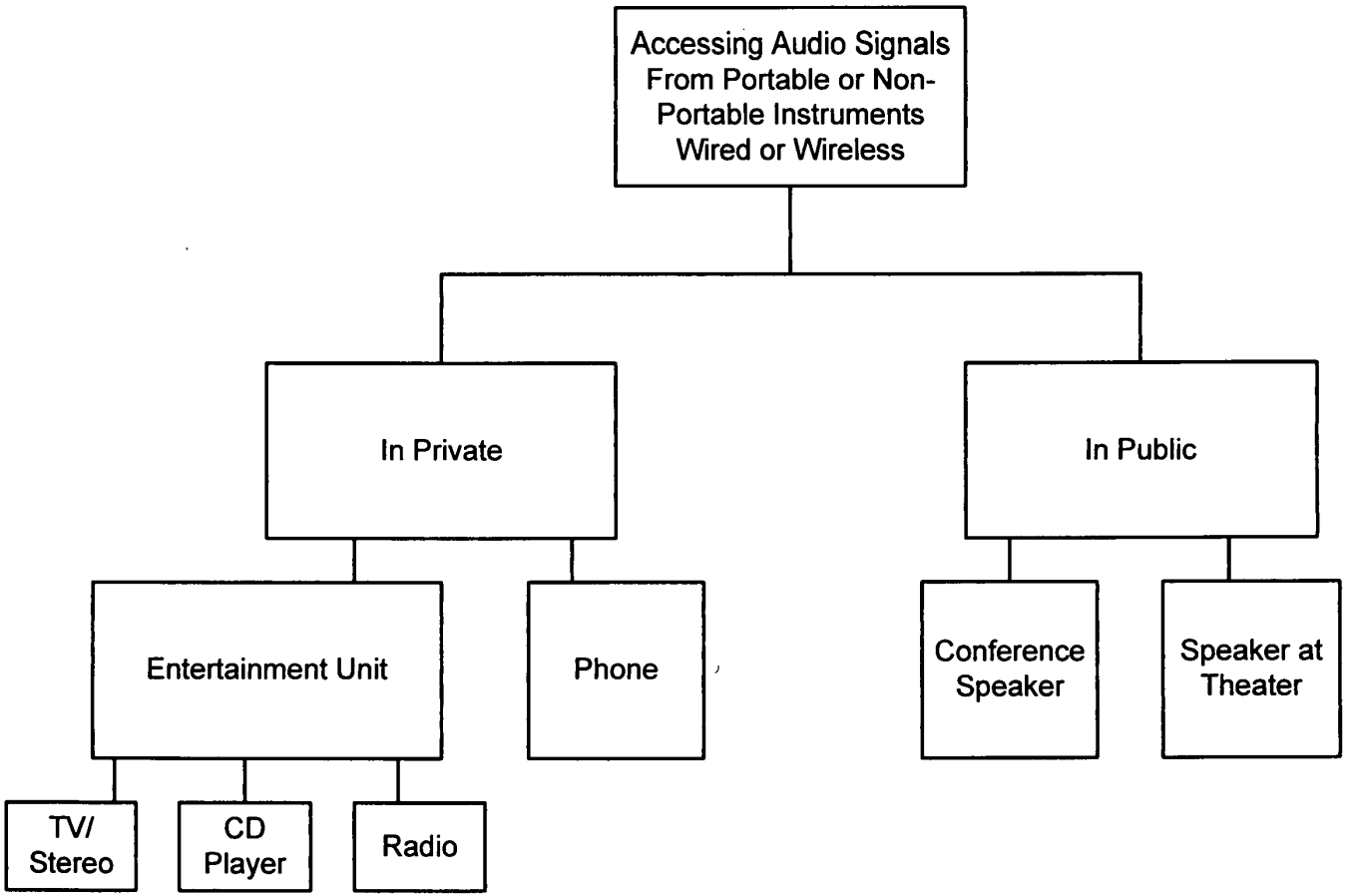

FIG. 10

EX1009 - Page 47

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.

PAGE 4/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

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.

PAGE 5/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

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.

PAGE 6/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

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.

PAGE 7/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

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.

PAGE 8/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

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

PAGE 9/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

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DEC 14 2004

Fax

To:	USPTO: GAU 2644	**From:**	C. Douglass Thomas, ph. 650.903.9200
Fax:	703.872.9306	**Pages:**	9 (including this page)
Phone:		**Date:**	12/14/2004
Re:	10/828,527	**CC:**	

☑ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Transmitted herewith for filing is: (1) an Amendment Transmittal (1 page); and (2) a Preliminary Amendment (pp. 1-7).

PAGE 1/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CHEUNG et al.
Application No.: 10/826,527
Filed: April 15, 2004
Title: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS

Attorney Docket No.: IPVBP002
Examiner:
Group: 2644

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 After Amendment		Highest Previously Paid For	Present Extra	Small Entity Rate Fee	Large Entity Rate Fee
Total Claims	27	MINUS	27	0	x 25 = 0.00	x 25 = 0.00
Independent 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 Thomas
Reg. No. 32,947

Ph: (650) 903-9200

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DEC 14 2004

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CHEUNG et al.

Application No.: 10/826,527

Filed: April 15, 2004

Title: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS

Attorney Docket No.: IPVBP002

Examiner:

Group: 2644

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.

PAGE 3/9 * RCVD AT 12/14/2004 8:57:44 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/1 * DNIS:8729306 * CSID:650 903 9800 * DURATION (mm-ss):03-00

OIPE JC15 JAN 21 2005 PATENT & TRADEMARK OFFICE

IFW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CHEUNG et al.
Application No.: 10/826,527
Filed: April 15, 2004
Title: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS

Attorney Docket No.: IPVBP002
Examiner:
Group: 2644

CERTIFICATE OF MAILING
I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail to: Commissioner for Patents, Washington, DC 20231 on January 18, 2005

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. 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.

This Information Disclosure Statement is: (i) filed within three (3) months of the filing date of the above-referenced application, (ii) believed to be filed before the mailing date of a first Office Action on the merits, or (iii) believed to be filed before the mailing of a first Office Action after the filing of a Request for Continued Examination under §1.114. Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement.

Respectfully submitted,

C. Douglass Thomas
Reg. No. 32, 947

OIPE JAN 2 1 2005 PATENT & TRADEMARK OFFICE

Form 1449 (Modified) 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
	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	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.

Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
Information Disclosure Statement By Applicant	Applicant	Cheung et al.
	Filing Date	April 15, 2004
	Group	2644
(Use Several Sheets if Necessary)		Page 2 of 4

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

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

	A	"Audio Spotlight - Put sound where you want it," Holosonic Research Labs, Inc., 2002, www.holosonics.com/technology.html (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. Berktay, "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.

Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
Information Disclosure Statement By Applicant	Applicant	Cheung et al.
	Filing Date	April 15, 2004
	Group	2644
(Use Several Sheets if Necessary)		Page 3 of 4

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	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.
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	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.
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	AF	Nextel i60c Phone Details, http://nextelonline.nextel.com, downloaded April 22, 2003, pp. 1-2
	AG	Nextel-Direct Connect, http://nextelonline.nextel.com/services/directconnect-popup.html, 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.
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	AR	V.P. Kuznetsov, "Equations of Nonlinear Acoustics," Soviet Physics-Acoustics, Vol. 16, No. 4, April-June 1971, pp. 467-470.

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.

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

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.

OIPE JC103 FEB 2 2 2005 PATENT & TRADEMARK OFFICE

IFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CHEUNG et al.
Application No.: 10/826,527
Filed: April 15, 2004
Title: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS

Attorney Docket No.: IPVBP002
Examiner:
Group: 2644

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail to: Commissioner for Patents, Washington, DC 20231 on February 18, 2005

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.

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.

This Information Disclosure Statement is: (i) filed within three (3) months of the filing date of the above-referenced application, (ii) believed to be filed before the mailing date of a first Office Action on the merits, or (iii) believed to be filed before the mailing of a first Office Action after the filing of a Request for Continued Examination under §1.114. Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement.

Respectfully submitted,

C. Douglass Thomas
Reg. No. 32, 947

OIPE
FEB 2 2 2005
PATENT & TRADEMARK OFFICE
JC103

Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
Information Disclosure	Applicant	Cheung et al.
Statement By Applicant	Filing Date	April 15, 2004
	Group	2644
(Use Several Sheets if Necessary)		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	Translation 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.

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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5150 El Camino Real, A22
Los Altos, CA 94022
Tel: 650-903-9200
Fax: 650-903-9800

IpVenture, Inc.

Fax

To:	United States Patent & Trademark Office	**From:**	Patricia Tate
Fax:	571-273-8300	**Pages:**	4 (including cover)
Phone:		**Date:**	8/11/2005
Re:	Application No. 10/826,527	**Inventor**	Kwok Wai Cheung, et al
Filed:	April 15, 2004	**Group No.**	2644

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Please see attached Information Disclosure Statement. Thank you.

PAGE 1/4 * RCVD AT 8/11/2005 8:23:01 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-12

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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:
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 August 11, 2005.
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, 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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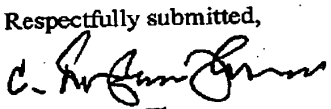
PAGE 2/4 * RCVD AT 8/11/2005 8:23:01 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-12

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

PAGE 3/4 * RCVD AT 8/11/2005 8:23:01 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-12

Form 1449 (Modified) **Information Disclosure Statement By Applicant** (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.						
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Foreign Documents

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

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

	A	
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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
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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

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JAN 12 2007

FAX

TO:	FROM:
Commissioner for Patents, Mail Stop:	C. Douglass Thomas Ph: 650-903-9200, Fax: 650-903-9800
COMPANY: United States Patent Office	**DATE:** 1/12/2007
FAX NUMBER: 571-273-8300	**NO. OF PAGES (INCLUDING COVER):** 4
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:

Information Disclosure Statement	2 pages
Form 1449	1 page

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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: 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: 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, 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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PAGE 2/4 * RCVD AT 1/12/2007 9:04:41 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-2/14 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-32

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

PAGE 3/4 * RCVD AT 1/12/2007 9:04:41 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-2/14 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-32

Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
Information Disclosure Statement By Applicant	Applicant	CHEUNG et al.
	Filing Date	April 15, 2004
	Group	2644
(Use Several Sheets if Necessary)		Page 1 of 1

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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	Subc lass	Translation Yes	Translation No

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

	A	
	B	
	C	
	D	
	E	
	F	
	G	

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.

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

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

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

CLAIM		DATE									
Final	Original	03/08/2007									
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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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

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

EXAMINER	
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.

Office Action Summary	Application No.	Applicant(s)	
	10/826,527	CHEUNG ET AL.	
	Examiner	Art Unit	
	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) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

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

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. <u>In the instance that the Applicant elects the Invention of Group II:</u>

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

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APR 0 3 2007

FAX

TO:	FROM:
Commissioner for Patents, Mail Stop:	Peter P. Tong Ph: 650-903-9200 Ext. 102 Fax: 650-903-9800
COMPANY:	**DATE:**
United States Patent Office	4/3/2007
FAX NUMBER:	**NO. OF PAGES (INCLUDING COVER):**
571-273-8300	3
PHONE NUMBER:	**SENDER'S REFERENCE NUMBER:**
	IPVBP002
RE:	**RECIPIENT'S REFERENCE NUMBER:**
Response	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 0 3 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:

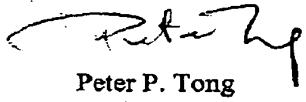
In response to the Restriction Requirement dated March 22, 2007, to expedite the prosecution of the above-identified application, Applicants hereby elect, with traverse, group II, claims 1-13 and 15-27 to prosecute in the application.

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.

PAGE 2/3 * RCVD AT 4/3/2007 7:58:09 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-10

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

PAGE 3/3 * RCVD AT 4/3/2007 7:58:09 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-10

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; USPAT; EPO; JPO	OR	OFF	2007/05/16 14:38
S2	96	(ultrasonic and (microphone sensor)) and S1	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/16 14:39
S3	79	S2 and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 09:53
S4	46	demodulat$4 near4 ultraso$3 near8 air	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/16 15:19
S5	2	S1 and S4	US-PGPUB; USPAT; 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; USPAT; USOCR	OR	OFF	2007/05/16 16:13
S7	4	(voice near3 activat$4) and S2	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	OFF	2007/05/30 14:09
S8	2250	(381/312-316,320-322,329).CCLS.	US-PGPUB; USPAT; EPO; JPO	OR	OFF	2007/05/18 09:50
S9	96	(ultrasonic and (microphone sensor)) and S8	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 09:50
S10	0	((voice near3 activat$4) near3 on) and S9	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	OFF	2007/05/18 09:51
S11	0	(voice near3 activat$4 near3 on) and S9	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	OFF	2007/05/18 09:52

EAST Search History

S12	0	(voice near3 activat$4 near3 power) and S9	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	OFF	2007/05/18 09:52
S13	1	(voice near3 activat$4 same power) and S9	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	OFF	2007/05/18 09:52
S14	5	(voice near3 activat$4 same power) and S8	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	OFF	2007/05/18 09:52
S15	4	S14 and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:35
S16	2420	(sound same pressure same (level threshold)) same (standby sleep off on activat$3 power)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:52
S17	43	S16 and S8	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:35
S18	32	S17 and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:52
S19	73	(sound same pressure same (level threshold)) same (standby sleep)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:55
S20	36	S19 and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:55
S21	10	(sound same pressure same (level threshold)) same (standby)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:57
S22	7	S21 and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:57
S23	45	(sound same pressure same standby)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:57
S24	0	(S8 and S23) and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:58
S25	0	("3851"/$.ccls. and S23) and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:58
S26	2	("381"/$.ccls. and S23) and @ad<="20030415"	US-PGPUB; USPAT; EPO; JPO	OR	ON	2007/05/18 10:58

EAST Search History

S27	9	(US-20040202339-$).did. or (US-6631197-$ or US-6631196-$ or US-6275596-$ or US-4920570-$ or US-4622440-$ or US-6041128-$ or US-5321758-$ or US-4955729-$). did.	US-PGPUB; USPAT	OR	OFF	2007/05/18 11:12
S28	3	S27 and directional	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	OFF	2007/05/18 11:14
S29	7	cheung.in. and tong.in. and 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" "4955729")".pn"	USPAT	OR	OFF	2007/05/30 14:10
S32	4	("6631196" "5321758" "6275596" "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; USPAT; EPO; JPO	OR	OFF	2007/05/30 14:12
S36	88	S35 and (rechargeable near3 battery)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	OFF	2007/05/31 12:51

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

SEARCHED			
Class	Subclass	Date	Examiner
381	312-316,320-322,329	5/16/07; 5/18/07; 5/30/07; 5/31/07	DP

SEARCH NOTES		
Search Notes	Date	Examiner
East search	"	"
Inventor name sarch	"	"

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10826527	CHEUNG ET AL.
	Examiner	**Art Unit**
	Pendleton, Dionne H	2615

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

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

CLAIM		DATE								
Final	Original	03/08/2007	05/31/2007							
	1	÷	✓							
	2	÷	✓							
	3	÷	✓							
	4	÷	✓							
	5	÷	✓							
	6	÷	✓							
	7	÷	✓							
	8	÷	✓							
	9	÷	✓							
	10	÷	✓							
	11	÷	✓							
	12	÷	✓							
	13	÷	✓							
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	25	÷	✓							
	26	÷	✓							
	27	÷	✓							

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UNITED STATES DEPARTMENT OF COMMERCE
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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

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

EXAMINER	
PENDLETON, DIONNE	

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.

Office Action Summary	Application No.	Applicant(s)	
	10/826,527	CHEUNG ET AL.	
	Examiner	Art Unit	
	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 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 negatived 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 clam 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.

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

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.

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
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Notice of References Cited	Application/Control No. 10/826,527	Applicant(s)/Patent Under Reexamination CHEUNG ET AL.	
	Examiner Dionne H. Pendleton	Art Unit 2615	Page 1 of 1

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*	B	US-2004/0202339	10-2004	O'Brien et al.	381/312
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*	D	US-5,321,758	06-1994	Charpentier et al.	381/317
*	E	US-6,631,196	10-2003	Taenzer et al.	381/316
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Form 1449 (Modified) Information Disclosure Statement By Applicant (Use Several Sheets if Necessary)	Atty. Docket No.	IPVBP002
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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.

Form 1449 (Modified) **Information Disclosure Statement By Applicant** (Use Several Sheets if Necessary)	Atty. Docket No.	IPVBP002
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Form 1449 (Modified)	Atty. Docket No.	IPVBP002
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Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
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Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
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Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
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Amendments to the Drawings:

In the Drawings:

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

PAGE 5/20 * RCVD AT 9/7/2007 9:10:36 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/11 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-04

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.

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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.[1] 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 ...."[2] 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."[3]

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

[1] See Taenzer's Abstract.
[2] Col. 5, lines 1-3 in Taenzer.
[3] 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 ....[4]
- 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 ....[5]
- [A]udio acoustic energy is not produced in the air ....[6]
- 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.[7]
- 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.[8]
- 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. [9]
- 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.[10]

---

[4] Col. 4, lines 59-61 in Taenzer.
[5] Col. 5, lines 1-3 in Taenzer.
[6] Col. 5, lines 29-30 in Taenzer, with emphasis added.
[7] Col. 7, lines 24-28 in Taenzer, with emphasis added.
[8] Col. 12, lines 8-13 in Taenzer, with emphasis added.
[9] Col. 12, lines 41-48 in Taenzer, with emphasis added.
[10] 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

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.[11] Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".[12] 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.

---

[11] See Fretz's Abstract.
[12] Col. 6, lines 39-41 of Fretz.

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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

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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, 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

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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 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

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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

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FAX

TO:	FROM:
Commissioner for Patents, Mail Stop:	Peter P. Tong Ph: 650-903-9200, Fax: 650-903-9800
COMPANY: United States Patent Office	**DATE:** 9/7/2007
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 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 After Amendment		Highest Previously Paid For	Present Extra	Small Entity Rate Fee	Large Entity Rate Fee
Total Claims	27	MINUS	27	00	x 25 =	x 50 =
Independent 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

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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 via facsimile to: Commissioner for Patents, Alexandria, VA 22313-1450 on September 7, 2007.
Signed: Patricia Tate
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 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.

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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

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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.

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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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PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number
HPVBP002
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		☐

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

SMALL ENTITY TYPE ☐			OR	OTHER THAN SMALL ENTITY	
RATE	FEE			RATE	FEE
BASIC FEE	385.00	OR		BASIC FEE	770.00
XS 9=	63	OR		XS18=	
X43=		OR		X86=	
+145=		OR		+290=	
TOTAL	448	OR		TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1)		(Column 2)	(Column 3)
9/7/07	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				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

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

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

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

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

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

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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 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.

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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 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.

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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.

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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)

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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.

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New Sheet

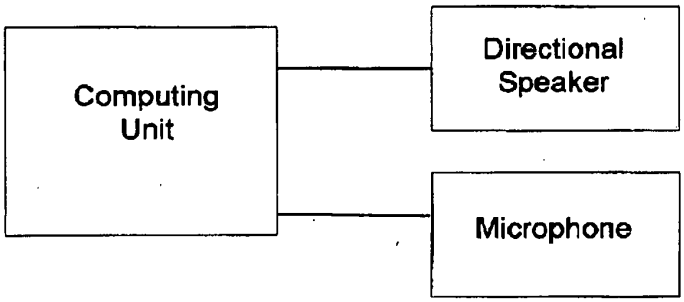

Fig. 11

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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 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.

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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.[1] 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 ...."[2] 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."[3]

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

[1] See Taenzer's Abstract.
[2] Col. 5, lines 1-3 in Taenzer.
[3] 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 ....[4]
- 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 ....[5]
- [A]udio acoustic energy is not produced in the air ....[6]
- 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.[7]
- 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.[8]
- 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.[9]
- 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.[10]

---

[4] Col. 4, lines 59-61 in Taenzer.
[5] Col. 5, lines 1-3 in Taenzer.
[6] Col. 5, lines 29-30 in Taenzer, with emphasis added.
[7] Col. 7, lines 24-28 in Taenzer, with emphasis added.
[8] Col. 12, lines 8-13 in Taenzer, with emphasis added.
[9] Col. 12, lines 41-48 in Taenzer, with emphasis added.
[10] 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.[11] Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".[12] 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.

[11] See Fretz's Abstract.
[12] Col. 6, lines 39-41 of Fretz.

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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

PAGE 16/18 * RCVD AT 9/5/2007 5:54:16 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/16 * DNIS:2739497 * CSID:650 903 9800 * DURATION (mm-ss):06-46

DRAFT

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

PAGE 17/18 * RCVD AT 9/5/2007 5:54:16 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/16 * DNIS:2739497 * CSID:650 903 9800 * DURATION (mm-ss):06-46

IFW

OIPE IAP42 SEP 07 2007 PATENT & TRADEMARK OFFICE

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FAX

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

OIPE IAP42 SEP 07 2007 PATENT & 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

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.

PAGE 2/18 * RCVD AT 9/5/2007 5:54:16 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/16 * DNIS:2739497 * CSID:650 903 9800 * DURATION (mm-ss):06-46

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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.

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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

PAGE 9/21 * RCVD AT 9/7/2007 9:16:25 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-24

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.

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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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FAX

TO: Commissioner for Patents, Mail Stop:	**FROM:** Peter P. Tong Ph: 650-903-9200, Fax: 650-903-9800
COMPANY: United States Patent Office	**DATE:** 9/7/2007
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 Transmittal	1 page
Amendment A	18 pages
New Sheet Figure 11	1 page

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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 After Amendment		Highest Previously Paid For	Present Extra	Small Entity Rate Fee	Large Entity Rate Fee
Total Claims	27	MINUS	27	00	x 25 =	x 50 =
Independent 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

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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 via facsimile to: Commissioner for Patents, Alexandria, VA 22313-1450 on September 7, 2007.
Signed: Patricia Tate
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.

PAGE 3/21 * RCVD AT 9/7/2007 9:16:25 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-24

New Sheet

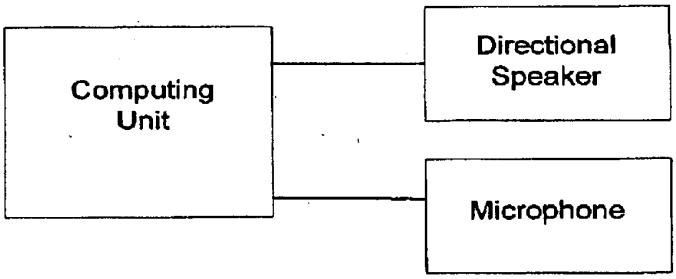

Fig. 11

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.

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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.[1] 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 ...."[2] 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."[3]

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

[1] See Taenzer's Abstract.
[2] Col. 5, lines 1-3 in Taenzer.
[3] 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 ....[4]
- 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 ....[5]
- [A]udio acoustic energy is not produced in the air ....[6]
- 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.[7]
- 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.[8]
- 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.[9]
- 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.[10]

[4] Col. 4, lines 59-61 in Taenzer.
[5] Col. 5, lines 1-3 in Taenzer.
[6] Col. 5, lines 29-30 in Taenzer, with emphasis added.
[7] Col. 7, lines 24-28 in Taenzer, with emphasis added.
[8] Col. 12, lines 8-13 in Taenzer, with emphasis added.
[9] Col. 12, lines 41-48 in Taenzer, with emphasis added.
[10] 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

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.[11] Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".[12] 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.

[11] See Fretz's Abstract.
[12] Col. 6, lines 39-41 of Fretz.

PAGE 16/21 * RCVD AT 9/7/2007 9:16:25 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-24

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

PAGE 17/21 * RCVD AT 9/7/2007 9:16:25 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-24

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

PAGE 18/21 * RCVD AT 9/7/2007 9:16:25 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-24

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

PAGE 19/21 * RCVD AT 9/7/2007 9:16:25 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-24

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

PAGE 20/21 * RCVD AT 9/7/2007 9:16:25 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):04-24

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number
TPVBP002
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		☐

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

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
XS 9=	63	OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL	448	OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A — 9/7/07

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 27	Minus	** 27	=
Independent	* 2	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

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	

AMENDMENT B — 9/5/07

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 27	Minus	** 27	=
Independent	* 2	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

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

AMENDMENT C

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

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

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

FORM PTO-875 (Rev 10/03)

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

34071 7590 09/14/2007

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

EXAMINER	
PENDLETON, DIONNE	
ART UNIT	**PAPER NUMBER**
2627	
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.

Interview Summary	Application No.	Applicant(s)	
	10/826,527	CHEUNG ET AL.	
	Examiner	Art Unit	
	Dionne H. Pendleton	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 Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

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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OCT 10 2007

FAX

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

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.

PAGE 1/3 * RCVD AT 10/10/2007 9:07:19 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-02

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OCT 10 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CHEUNG et al.

Application No.: 10/826,527

Filed: April 15, 2004

Title: DIRECTIONAL HEARING ENHANCEMENT SYSTEMS

Attorney Docket No.: IPVBP002

Examiner: PENDLETON, DIONNE

Group: 2615

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: Patricia Tate
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.

PAGE 2/3 * RCVD AT 10/10/2007 9:07:19 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-02

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

PAGE 3/3 * RCVD AT 10/10/2007 9:07:19 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/18 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):01-02

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; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/11/26 09:02

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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

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

Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
Information Disclosure Statement By Applicant	Applicant	CHEUNG et al.
	Filing Date	April 15, 2004
	Group	2627
(Use Several Sheets if Necessary)		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	Translation No

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

	A	American Technology Corporation, HyperSonic Sound, January 22, 2002, www.atacsd.com
	B	Brain, Marshall, How USB Ports Work, October 11, 2002, www.howstuffworks.com/usb.
	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.

PAGE 8/17 * RCVD AT 1/17/2008 8:57:06 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-42

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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: 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: Patricia Tate

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.

PAGE 2/17 * RCVD AT 1/17/2008 8:57:06 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-42

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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

PAGE 3/17 * RCVD AT 1/17/2008 8:57:06 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-42

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.

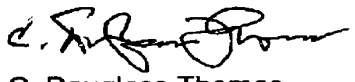
--

PAGE 4/17 * RCVD AT 1/17/2008 8:57:06 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-42

REMARKS

The specification has been amended to update certain application numbers.

Respectfully submitted,



C. Douglass Thomas
Reg. No. 32,947

(650) 903-9200

PAGE 5/17 * RCVD AT 1/17/2008 8:57:06 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-42

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Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
Information Disclosure	Applicant	CHEUNG et al.
Statement By Applicant	Filing Date	April 15, 2004
	Group	2627
(Use Several Sheets if Necessary)		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	Translation No

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

	A	American Technology Corporation, HyperSonic Sound, January 22, 2002, www.atacsd.com
	B	Brain, Marshall, How USB Ports Work, October 11, 2002, www.howstuffworks.com/usb.
	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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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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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.

PAGE 6/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-5/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):06-24

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

PAGE 7/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-5/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):06-24

REMARKS

The specification has been amended to update certain application numbers.

Respectfully submitted,

C. Douglass Thomas
Reg. No. 32,947

(650) 903-9200

PAGE 5/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-5/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):06-24

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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: Patricia Tate

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.

PAGE 2/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-5/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):06-24

RECEIVED PATENT
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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

PAGE 3/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-5/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):06-24

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PAGE 4/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-5/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):06-24

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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:

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PAGE 6/17 * RCVD AT 1/17/2008 8:57:06 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-42

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

PAGE 7/17 * RCVD AT 1/17/2008 8:57:06 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/15 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-42

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

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.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

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

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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

34071 7590 03/24/2008

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

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,527	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

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.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

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

4a. The following fee(s) are submitted:
☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

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

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

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).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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

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

U.S. PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10826527	CHEUNG ET AL.
	Examiner	Art Unit
	Pendleton, Dionne H	2627

ORIGINAL		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
381	381	H 0 4 R 25 / 00 (2006.01.01)	
		H 0 4 M 1 / 00 (2006.01.01)	
CROSS REFERENCE(S)		H 0 4 B 1 / 10 (2006.01.01)	

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
381	55	313	320	189	373
379	412				
455	308				

Pendleton, Dionne H 11/26/2007 (Assistant Examiner) (Date)		Total Claims Allowed: 27
(Legal Instruments Examiner) (Date)	WAYNE YOUNG SUPERVISORY PATENT EXAMINER (Primary Examiner) (Date) 11/26/07	O.G. Print Claim(s): 1 / O.G. Print Figure: 2

Form 1449 (Modified)	Atty. Docket No.	IPVBP002
	Application No.:	10/826,527
Information Disclosure	Applicant	Cheung et al.
Statement By Applicant	Filing Date	April 15, 2004
	Group	2644
(Use Several Sheets if Necessary)		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 - Cannot cite w/o pub'd
/DP/	AU	Z.A. Gol'dberg, "Certain Second-Order Quantities in Acoustics," SOV PHYS ACOUST, Vol. 3, 1957, pp. 157-162.

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.

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

SEARCHED

Class	Subclass	Date	Examiner
381	312-316,320-322,329	5/16/07; 5/18/07; 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

Notice of Allowability	Application No.	Applicant(s)	
	10/826,527	CHEUNG ET AL.	
	Examiner	Art Unit	
	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)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

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 froth 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.

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

D. Pendleton

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER

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

CONFIRMATION NO. 2158

Bib Data Sheet

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/826,527	04/15/2004 RULE	381	2615	IPVBP002

APPLICANTS

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

dc/D.P.

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

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

oic/DP

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

None/DP

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 06/25/2004

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☒ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged Examiner's Signature Initials	CHINA	11	27	2

ADDRESS
34071

TITLE
Directional hearing enhancement systems

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

OK TO ENTER: /DP/

RECEIVED PATENT
CENTRAL FAX CENTER
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

PAGE 3/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):06-24

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.

--

PAGE 4/21 * RCVD AT 1/17/2008 9:24:43 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-5/19 * DNIS:2738300 * CSID:650 903 9800 * DURATION (mm-ss):05-24

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10826527	CHEUNG ET AL.
	Examiner	**Art Unit**
	Pendleton, Dionne H	2615

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

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

CLAIM		DATE								
Final	Original	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			✓						

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

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
/DP/	1.	2003/0182104 A1	Sept-03	Muesch			
	2.						
	3.						
	4.						
	5.						
	6.						
	7.						
	8.						
	9.						
	10.						

bm 7/31/08

Foreign Documents

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

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

	A	
	B	
	C	
	D	
	E	
	F	
	G	
	H	
	I	
	J	
	K	
	L	
	M	
	N	
	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.

OIPE MAY 08 2008 PATENT & TRADEMARK OFFICE

OIPE MAY 08 2008 PATENT & TRADEMARK OFFICE

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
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STRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed whe propriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address licated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" intenance fee notifications.

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

34071 7590 03/24/2008

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

05/09/2008 RMEBRAH1 00000003 10826527

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

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I hereby certify that this Fee(s) Transmittal is being deposited with the Unit States Postal Service with sufficient postage for first class mail in an envelo addressed to the Mail Stop ISSUE FEE address above, or being facsim transmitted to the USPTO (571) 273-2885, on the date indicated below.

PATRICIA TATE	(Depositor's nam
Patricia Tate	(Signatur
MAY 8, 2008	(Dat

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

TLE 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 R 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

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 f 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: IPVENTURE, INC.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): LOS ALTOS, CA

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

The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Depoait 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).

OTE: 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 erest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date MAY 8, 2008

Typed or printed name PETER P. TONG Registration No. 35,757

is 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 proce 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, a bmitting 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 comple s 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. ox 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 145 exandria, Virginia 22313-1450.

nder 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.

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

TO: Commissioner for Patents, Mail Stop: Issue Fee	**FROM:** C. Douglass Thomas Ph: 650-903-9200, Fax: 650-903-9201
COMPANY: United States Patent Office	**DATE:** 5/8/2008
FAX NUMBER: 571-273-2885	**NO. OF PAGES (INCLUDING COVER):** 3
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:

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.

PAGE 1/3 * 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

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UNITED STATES DEPARTMENT OF COMMERCE
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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;

OIPE
MAY 19 2009
PATENT & TRADEMARK OFFICE

COPY

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)

Certificate
MAY 21 2009
of Correction

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 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:

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

--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--

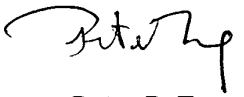
Column 16, line 27 (claim 23, line 15) "unit is configured to modify the output audio signals at least by modifying certain frequencies differently"
should be

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

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,



Peter P. Tong
Registration No. 35,757

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

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:

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Column 14, line 57 (claim 5, line 7) "can change the amplification in view" should be
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MAY 19 2009
PATENT & 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

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.[1] 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 ...."[2] 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."[3]

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

[1] See Taenzer's Abstract.
[2] Col. 5, lines 1-3 in Taenzer.
[3] 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 ....[4]
- 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 ....[5]
- [A]udio acoustic energy is not produced in the air ....[6]
- 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.[7]
- 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.[8]
- 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. [9]
- 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.[10]

---

[4] Col. 4, lines 59-61 in Taenzer.
[5] Col. 5, lines 1-3 in Taenzer.
[6] Col. 5, lines 29-30 in Taenzer, with emphasis added.
[7] Col. 7, lines 24-28 in Taenzer, with emphasis added.
[8] Col. 12, lines 8-13 in Taenzer, with emphasis added.
[9] Col. 12, lines 41-48 in Taenzer, with emphasis added.
[10] 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.[11] Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".[12] 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.

---

[11] See Fretz's Abstract.
[12] 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

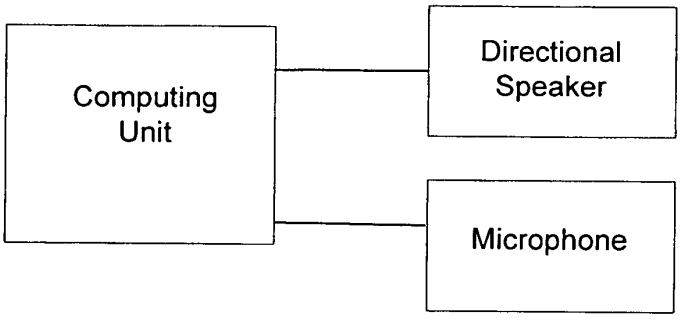


Fig. 11

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.

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
--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--

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

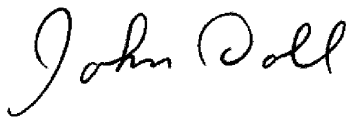
PATENT NO. : 7,388,962 B2
APPLICATION NO. : 10/826527
DATED : June 17, 2008
INVENTOR(S) : Cheung et al.

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
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

PTO/SB/44 (09-07)
Approved for use through 08/31/2010. OMB 0651-0033
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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

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:

In the Claims:

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

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

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

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)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	IPVBP002_Request_and_Cert_Corr_11-20.pdf	168088 450f656fe2df8a166984624ba681300ef68357b9	no	3

Warnings:

Information:	
Total Files Size (in bytes):	168088

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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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

IPVENTURE, INC.
4010 Moorpark Avenue
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San Jose, CA 95117

EXAMINER	
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
www.uspto.gov

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

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.

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