A Boom Assembly for a Microphone of an Earset or Headset

Field of Invention

The present invention relates to a boom for supporting a microphone to receive sound with better quality. In particular, it relates to a microphone with a supporting boom for an earset or a headset.

Background of the Invention

Microphones are widely used for sound or voice input, such as in Karaoke equipments, sound recording systems, voice broadcasting in a meeting, conference, seminar, concert and the like. A microphone (e.g., Isomax headset microphone made by Countryman™) connects with a boom forms an earset (ear-set) and an earset joins together with a speaker makes a headset. Sometimes, earset or headset integrates into a form of a pair of sunglasses. With an earset or headset, a user is relieved from holding the appliance or microphone close to one's head (ear and/or mouth) so that the user can be hands free (handsfree or hands-free) to perform other activities. As a result, earsets (e.g., E6i EarSet microphone manufactured by Countryman™) and headsets (e.g., Motorola wireless headset HS800 series) are widely used in computer gamming, POP music concert, broadcasting, conferencing, and helmet communications (e.g., for an airplane pilot), etc.

Examples of headset or headphone apparatus include a headset for mobile communication devices, a headset for mobile phones, cordless phones, a helmet-set or other head wearing appliances (e.g., spectacle-set with a microphone), a headset for computer, a headset for two-way radio, a headset for AM/FM radio, a headset for Hi-Fi or Karaoke equipments, an earset (earpiece) or headset for voice broadcasting in a meeting, conference, seminar, concert, etc.

In some cases, unlike a presenter in a concert or conference, telephone switchboard operator, telephone marketer, a TV show or a conference, one does not require the microphone to be constantly staying close to a user's mouth. In fact, the microphone is only needed to be close to one's mouth at the time of talking. When not in use, the microphone and its supporting boom are preferred to "disappear" (be out of sight or out of way) so that the normal head movement and

viewing will not be affected. For the same reason of convenience, the earphone is also desired to be as compact as possible or even hidden when not in use. To meet these demands, the current market available headset/headphone are becoming more compact, convenient, light, ergonomic, stylish, which still strives to retain enhanced audio quality, compactness and comfort for usage.

Typically, a headset makes the earphone closely attached to a user's ear and uses a boom for extending a microphone close to his mouth as well as away from the earphone. This conventional solution has been challenged by the fast developing mobile phone technology. Newly presented market available light weight headset products are often without a headband and the microphone being distant from a user's mouth. In fact, most headsets for mobile phones are able to be hooked onto a user's auricle with a housing integrated microphone boom for more convenient operation and better mobility (e.g., Sony Ericsson HBH-660; Jabra BT800 Bluetooth Headset; etc.). The headsets most-in-demand available in the current market for mobile phones have Bluetooth™ enabled cordless or wireless operation, single ear/auricle attaching/hooking mechanism and a shorter microphone boom integrated into a compact housing. The growing concerns and researches indicate the health hazards over mobile phone's radiation in human brains when phone handsets (appliance as the source of electromagnetic radiation) are put close to their ear/brain. With headsets, the source of radiation (handset) is moved away from one's head and thus is considered as the safer way for using mobile phones.

U.S. Patent No.5 850 439 introduces an earpiece with a floppy cable linked microphone as a headset, which can be found in some currently market available products, such as headset for Sony Ericsson J230i phone. Although it is possible to pull this type of sagging cable-attached microphone close to the user's mouth by a hand, it is quite inconvenient because the hand has to be constantly employed to perform this activity during a conversation. The benefit of hands-free for headset is derogated. If the microphone is left dangling below the ear and far from the mouth, the sound reception quality is inevitably compromised as more background noise is introduced and the range of frequency (audible frequency band: 20Hz ~ 20KHz) for voice reception may be narrowed. Besides, one has to speak loud to enable proper reception to the microphone/audio transducer. On

the other hand, when microphone moves too close to the earphone, a potential problem of unstable acoustic feedback resonance in the signals arises.

For some headsets or earsets, there is stiff boom (stem, shaft, arm, pole, rod, etc) provided to support the microphone to maintain or adjust microphone's position or distance with respect to the source of sound, such as a narrator's mouth. The stem, usually in a rigid form, sometimes takes a telescopic form so that the distance between two ends of the stem can be adjusted. U.S. Patent No.2003/0 003 969A1 presented a headset with an extendable telescoping arm as the boom for extending and retracting the microphone. However, a substantially bulky telescoping arm is cumbersome for wearing even in a retracted mode and awkward for operating (e.g., extending and retracting). Furthermore, a telescopic microphone boom (pole, stem) needs two hands for effectively adjusting its length, which is cumbersome when a user is wearing the earset or headset.

As an alternative, the boom may be detachable from microphone boom assembly of an earset or headset so that booms with several standard lengths can be provided to offer earset or headset with varied distances for a microphone. This requires a user to keep multiple microphone booms together with the earset or headset and it is very inconvenient. The frequent connecting and disconnecting also pose problems of reliability and quality in frequent coupling.

The headset disclosed in U.S. Patent No.6 097 827 has a microphone boom that can slide and rotate. However, the microphone boom disclosed has a fixed length which is obstructive when the user is not talking. The boom with fixed length, though it can be rotated to move away from mouth, is still bulky to be attached to on one's ear.

USD 264 587S introduces a hinged boom which can be folded/unfolded and reduce the boom/s size for less hindrance. The folded microphone boom still does not offer superior benefit over the current market available headset with short microphone boom, such as Sony Ericsson's Bluetooth™ Headset HBH-PV705.

USD 494 154S gives a design of a headset whose microphone boom can be pivoted to be kept away from face area when not in use. This arrangement still

involves a boom with fixed length and is inevitably bulky especially during transportation and for one auricle fixing.

An earset or headset whose microphone boom can be regulated in length is welcomed because the microphone can be moved out of sight when not in use and be at the mouth's vicinity when in use. A solution to provide the earset and headset with a better audio reception quality and compactness is thus called for.

Summary of the Invention

The present invention aims to provide a new and useful microphone boom assembly for an earset or headset, or the like. The present invention also aims to provide a new and useful method for using the microphone boom assembly for an earset or headset, or the like.

In general terms, the present invention provides a microphone boom assembly for supporting a microphone which is able to regulate or change the effective length of the resilient boom by winding or unwinding movements.

The present invention is thus defined in the independent claims. Some preferred features of the invention are defined in the dependent claims.

In accordance with an aspect of the present invention, there is provided a boom assembly for a microphone of (for) an earset or headset, the boom assembly comprising a resilient boom for supporting a microphone (preferably at an end), and a winding mechanism (winder mechanism) which has a guide for the boom and the winding mechanism is coupled (e.g., attached, fixed, clipped, screwed, etc) to the boom, whereby the winding mechanism can wind or unwind the boom for adjusting the boom's exposed or effective length. The guide may be optionally formed by a part of a housing or other part of the winding mechanism. Here, the effective length is measured for the remote terminal point (may be mounted with a microphone) to the entering point on a winding drum or winding chamber. The exposed length defines the boom portion outside the housing of the winding mechanism.

This may have a number of advantages. A resilient boom keeps a default form, preferably to be substantially straight. The extended part, which is outside a winding drum (unwound) or preferably external to the housing of the winding

mechanism, holds a microphone to be close to a user's mouth. Therefore, a user does not have to bend the boom to form a proper shape in order to make a microphone at his mouth's vicinity every time in use. This is important for conversation with privacy or at low voice volume with less ambient noise interference. It is also convenient because no repeated bending or shaping activity is necessary.

The springing or resilient boom may be formed by a pair twisted spring steel wires so that it will maintain its profile (e.g., slightly curved or straight) even heavy shock or unintended external knocking or bending is incurred. The widely available capsule (miniature, e.g., B3 lavalier microphone made by Countryman™) type microphones are normally light weight so that a thin and springing wire can hold the microphone steadily and resistant to external disturbance, such as bumping. In other words, a non-malleable (resilient or springing) boom, which does not change its profile according to a non-destructive bending, is very suitable for regulating the distance between the winding mechanism and a released far end automatically where a microphone can be held. A resilient boom is able to be extracted or unwound to a pre-set (pre-adjusted) position by its repeatable profile consistently while a malleable cable (e.g., made of copper or tin) is not.

Furthermore, a resilient boom does not require a normally two hands' forming process for the boom before using, which is beneficial repeating extending and retracting of the boom. On the contrary, a malleable (pliable) material made boom will have to be straightened or untwisted whenever an extended boom is needed. If there is a housing to conceal the winding mechanism, which makes it neat and aesthetic, the exposed length becomes the effective length because the distance between the guide and the remote terminal for picking up voice is an effective distance for the extended boom part as an outlet of the housing is used as a guide. The exposed effective length is preferred and this is made possible by the resilience of the boom. Preferably, an end of the boom, at the opposite end of the remote end, is to be connected or fixed (fastened) to the winding mechanism (e.g., a drum, spindle, or axis) for winding. A more advantageous winding manner will be more than one round or turn (multiple loops closely packed of winding) on a spool (reel) or inside the spool (cylinder).

According to a preferred embodiment, the boom is formed by a tube for channelling sound to a microphone. A tube (hose, pipe) picks up sound at the remote terminal and transmit to another end into a housing of the winding mechanism. A microphone may be provided at winding mechanism end and transducer to convert the sound to electrical signals for processing. This arrangement may be more robust because the microphone is protected by the housing and the exposed boom (outside the housing) may withstand strong disturbance.

According to another preferred embodiment, wherein the boom is formed by a wire or wires. Although other resilient structures are possible, wires with insulation sleeves or coatings are possible to be made very thin, similar to threads or strings. A light weight boom and its assembly are possible to be made for avoiding a burdensome or obstructive earset or headset.

According to yet a further preferred embodiment, a part, more preferably to be the front portion (a part that is close to the remote end where a microphone may reside) of the boom is malleable for being formed into a profile extemporaneously. Similar to a drinking straw, the front portion may be bent by a single hand so that the user may perform some local adjustment at the vicinity of the mouth for fine tuning. This may further help to prevent a microphone from picking up breathing noise as the microphone being too close to the user's mouth.

Preferably, an electric cable is provided for connecting a microphone to transmit signals and the cable is bonded together with the wire or wires of the boom. In this arrangement, signal wires and boom wire/s are bonded (e.g., sealed, sleeved, twisted, glued, or braided, etc) together so that they can be slim and move collectively.

Preferably, the wire or wires forming the boom is used to transmit signals for/of a microphone. Since the boom wire/s is/are possible to be made of steel alloy, which is resilient, those electrically conductive wires are also be used for conveying electrical signals for the microphone. Therefore, the boom can possibly be made even slimmer.

Preferably, the winding mechanism includes a damper for regulating movements of the boom. The damper may exert a resistance to the boom by friction so that the retracting motion powered by a torsion spring may be slowed down and makes a more elegant product. The damper may be combined with the guide as a single part which may further reduce the appliance's size.

Preferably, the boom assembly has a housing and the guide is formed by a part of the housing, such as an outlet of the housing. A case conceals the parts and protects the interior. On the other hand, the apparatus looks tidier and becomes stronger.

Preferably, the winding mechanism is mechanically driven, such as by a coil (torsion) spring. The (spiral) torsion spring may always pull the boom back to a housing of the winding mechanism, which may be a part of the earset or headset with an ear hook. Therefore, there may be no external power supply needed (e.g., by a battery or cabled supply) and it may be achieved with low cost.

Preferably, the winding mechanism is electrically driven, such as by an electric motor. A compact motor provides an opportunity for hands-free electrical control, which may be remotely or wirelessly executed. It may not require a hand's direct pulling on the boom or microphone for extending at an eye-level.

Preferably, a combination of electrical and mechanical powered boom's movement is beneficial. For example, a pulling out motion may be executed by a hand and the retracting motion may be driven by a motor. Open options for boom driving mechanism make the system more robust because a system can be used as a backup.

Preferably, the winding mechanism further comprises a brake or stopper means for holding the boom with an effective length or at a suitable position. Different users have different preference for the length of an extended microphone. The length may vary even with the same user at different situations. A brake may come in the form of a ratchet with pawl or a friction disc brake so that the boom may be adjusted for its exposed or effective length. Alternatively, a stopper may cooperate with some index slots on an edge (rim) of reel or drum for holding the

rotation of the spool. The brake mechanism may be achieved mechanically or electro-mechanically.

Preferably, the boom assembly or the boom assembly further comprises a circuitry for controlling, such as regulating the electric motor, processing the microphone's signals, wireless communication or other functional operations. The circuitry may terminals for receiving a power supply and terminals for connecting to the motor. A more complex circuitry with signal processing capabilities is possible to perform some intelligent operations, such as varying the boom's advancing speed, remembering user's preferred boom's length, communicating to a handset. Optionally, the winding mechanism may have its own circuitry or be integrated with the assembly's as one.

Preferably, the winding mechanism has a drum, a spool or a reel for winding the boom into a regular profile. A spool for winding may make the coiling process easier and the boom may be wound in a more orderly manner. The drum may have some wings or guards at ends of the spool to prevent the boom from escaping a middle winding portion.

Preferably, the drum or spool has a groove (canal, channel) at its internal or external (e.g., on a surface) for guiding a boom in a winding process or keeping a wound boom. A groove for housing the wound (coiled) boom may avoid the boom being mounted up unevenly on the drum so that the curled boom may become more compact.

Preferably, the winding mechanism has a sound insulation means for muffling winding or unwinding noise. The sound insulation system may be integrated with a part of the assembly's sound insulation system. Winding and unwinding may generate noise and it is much desirable reduce or eliminate those undesired sound. A foam, leather or other sound proof material may be suitable for making the housing for the winding mechanism or the earset/headset. Consequently, a user may enjoy only conversation or music, not the winding racket.

Preferably, an earset for voice reception comprises a microphone being connected to an end of the boom, and the boom assembly. A microphone may in-built

(integrated) with the boom or via a suitable interface (e.g., screwing, clipping, etc). This may make an earset with a microphone with variable positions.

Preferably, a headset for hands-free communication comprises a speaker for giving audio signals and the earset. This may greatly enhance the hands-free function of a headset because a single hand may be able to change the boom's length even when the headset is wearing on a user's head or clipped on the ear.

Preferably, the circuitry of the device (earset or headset) is enabled to communicate to a handset or equipment via a wired or wireless communication means. Infrared, Bluetooth, cabled or other wired/wireless communication method permits the device to correspond with a single or multiple equipment or stations. For example, a speaker may communicate with a plurality of receivers (e.g., handsets, computers, etc) in a conference so that each member of the audience, journalists, or broadcast service providers may simultaneously receive the voice broadcast. The speaker is not restricted to be stationed to a booth where a conventional microphone stand resides.

Preferably, the handset and the device forms a single set (pair, group, package) of equipment either separated or integrated, such as a mobile phone handset with a headset for hands-free operations or helmet-set. This one-to-one communication may be suitable for a student in a classroom whose headset is only able to communicate with the teacher's. In some situations, this communication may be encrypted for better security.

Preferably, the handset is mobile or portable. This may be the most suitable method for a mobile phone user whose headset and handset are identified with each other. It is also possible for walky-talky (two-way radio) or other means of communication.

Preferably, the handset is equipped to adjust the effective or exposed length of the boom via the wired or wireless communication means. This may be a very useful feature because a mobile phone user may be able to extend a microphone without raise his hand onto the headset. He is simply enabled to adjust the boom by the handset near his waist. For another example, the OSIM massage chair iDesire ROBO may be enabled to extend or withdraw its microphone by a control panel

instead of raising a user's hand to a far back position for pulling the microphone, which may be quite uncomfortable or inconvenient.

Preferably, the boom or booms connects to a screen at an end. This effectively facilitates a screen to be adjusted in position, distance or angle with respect to the viewer. Multiple booms may be better for holding a screen steady or perform more complicated motions, functions, angles, etc. Both ears and eyes of the user may be taken care of in a better way.

A method is provided for using the assembly or device according to above descriptions.

Brief Description of the Drawings

While the specification concludes with claims particularly pointing out, which is regarded as the present invention, the advantages of this invention may be more readily ascertained from following descriptions of the invention when read in conjunction with the accompanying drawings in which:

Figure 1 is a schematic illustration for the embodiment of a headset or earset with a winding mechanism in the operation of extending or unwinding the boom;
Figure 2 displays the winding mechanism in the process of coiling or winding the boom;
Figure 3 presents the isometric view of a boom retracted or withdrawn headset using a coin electric DC motor;
Figure 4 exhibits the side view of a boom extended or uncoiled headset using the coin electric DC motor;
Figure 5 expresses a headset with a windable or coilable boom and headband;
Figure 6 exemplifies a headset with a windable boom and the wound (wrapped, twisted) boom is stored in an irregular form inside a boom collection chamber;
Figure 7 introduces another example of changing the effective lengths of the microphone boom by rotating of the drum and the boom is in the process of lengthening the effective length; and
Figure 8 establish a situation where the boom is being retracted via a drum's rotation.

Detailed Descriptions of Some Preferred Embodiments

The present inventions will now be described more fully hereinafter with reference to accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

Figure 1 shows a schematic side view of a headset or earset in accordance with a preferred embodiment. The thin boom wires (19) are made of a pair of resilient cables (rods, poles, threads etc) (19) and has a microphone (1) attached to its end. Passing through a stopper or guide (3) with friction resistance, this boom (19) can be gently extended and retracted by coiling around the drum or spool (17). The guide (3) helps to direct the movement and position of the boom (19). In addition, the friction provided by this block (3) dampens the shocks of a moving boom (19). Thirdly, this stopper (3) holds the microphone (1) and its boom (19) at a minimum withdrawn position (see figure 2) so that the microphone (1) will not be pulled back into a housing or onto the drum (17). The drum (17) has teeth or slots (5) at its circumference so that it also becomes a ratchet ring acted with a catch or pawl (7). When the drum (17) spins counter-clockwise, the pawl (7) allows the drum or spool (17) to slide (slip, pass) through without blockage and uncoil/release/extract the boom (19). The ratchet ring (17) is driven by a torsion spring (coil spring) built with a constant retracting force and is made of carbon steel so that it will curl the boom (19) in clockwise at any position. This type of coil spring (spiral coil return spring) stores energy of winding and it is sometimes called the motor spring. The coil spring can either be positioned inside the barrel (17) or outside (e.g., next to it) for operation. Further, a bearing supported spindle (not shown) makes the rotational movements of the ratchet (17) smoother. To extend the microphone (1) to a desired position, a user just need to pull the boom (19), which may be aided by a holder for a hand (not shown) on the boom (19) or microphone (1), and stop the boom (19) at any required position. The catch (7) is held to be constantly coupled together in a tooth (slot, gap) of ratchet (17) by a cylindrical spring (13) which pushes on a base (15). By transmitted spring force (upwards) via a pivot (9), the pawl (7) is held constantly touching and digging into

the ratchet (17) downwards thus hold the drum (17) to be stationary by default. The release of the pawl (7) from the insertion between teeth (5) is achieved by a button's (11) downward movement to compress the spring (13) so that the boom (19) can be retracted and wrapped around the reel (17).

When the microphone (1) is not required as the conversation is finished, the boom (19) can be wound back onto the drum (17). According to figure 2, when user depresses the button (11) towards its base (15), which compresses the cylindrical spring (13) via a pivot (9), the catch (7) is detached from the ratchet's teeth (5). As a result, this drum (17) is rotated (spin) back clockwise powered by the coiled spring motor till the microphone body (1) is pushed against the stopper (3) with gentle and silent movement over the entire sliding process by the help from friction resistance block (3).

By the arrangement explained according to figure 1 and 2, the length of the boom (19) can be adjusted to have any suitable extents within the boom's full length thus enables the microphone (1) to be located at any desired position according to a user's preference. This winding mechanism can be integrated/hidden into a housing for earphone, earpiece, sunglass, earset or headset, etc so that the device or assembly becomes compact and neat. This winder (winding) mechanism for coiling the boom (19) is suitable for wrapping string, twine, cord, thread, yarn, rope, wire, ribbon, tape, etc. onto a spool, bobbin, reel, etc The winding mechanism illustrated in figure 1 & 2 can hold a rotational movement, as a brake. Such a brake system can be performed mechanically, electro-mechanically or magnetically, etc and an example can be found in US 2003/0 038 201A1.

The boom's coiling/winding and uncoiling/unwinding mechanism is not restricted by mechanical means only. Many equivalent executions can also be realised to loop and un-loop the boom (19). Figure 3 and figure 4 give the example of an electric motor powered system.

Referring to figure 3, the headset can retract the boom (19) to any desired position. The headset includes an earphone cap (muffle, headphone or headset cap) (27) houses a winding mechanism inside. The cap (compartment) also encloses a loudspeaker/earphone/speakerphone (25) for listening, supporting springs (13), a fixed pivot (33), buttons (29 & 31), an insert stopper (35), a ratchet

or gear (37), a coin electric motor (21), a flexible and resilient boom (19) and an exposed microphone (1). When a user wants to shift the microphone (1) by winding the boom (19) onto the ratchet (37) coupled drum (21), he can press a button (29 or 31) so that the stopper (35) leaves a notch of the gear (37). In the present case, the gear (37) revolves counter-clockwise and coils (withdraws) the boom (19) onto the drum (37) by a coin electric motor (21) powered by a battery (23) so that the effective length of the boom (19) is reduced. The electric power can be supplied via any other electric energy storage or generating means such as solar panel or active carbon based capacitor etc. The required electric motor (21) is preferred to be small so that it can be installed into the cap (27) of an earphone and also powerful enough to rotate the reel/drum/spool/pulley (37) with the boom (19), such as coin motors. According to the figure 3, the button (29) depressed will electrically initiates the gear-coupled motor (21) to turn round counter clockwise (PCBs & wiring not shown). In the case with earphone, the friction to damp the microphone movement can also be executed by friction strip/s, a friction block (3), a friction hole in the cap as the friction block. To prevent noise generated by the unwinding/winding process, the ear cap (27) is preferably to have noise insulation means (e.g., foams, leather, etc), such as by completely a sealed housing except for the speaker phone.

Referring to figure 4, the headset can release the boom (19) to any required length within the limit of boom's full length to suit any comfortable distance for voice communication with quality sound reception. A user can press the button (29 or 31) to transmit the motion by pulling the pawl (35) off the notch of the gear (37) via the pivot (33) because the pawl (35) is normally held inserted to a notch of the ratchet by a spring (13). This action releases the locking of the gear-coupled drum (37) and permits it to revolve. When the button (31) is pressed down, the coin motor (21) is also activated to swivel clockwise so that the boom (19) is extended outside the earphone cap (27). The boom (19) will be restored to its original straight form due to its resilience. The extending and retracting movement of the boom (19) can be activated and deactivated at any time when either button (29 & 31) is triggered. If there is no button forced down, the insert stopper (35) will hold the ratchet (37) at its present location and be stationary by default. In the case of conversation when an extended microphone (1) is needed, a user can force down

the button to realise extract the boom (19) so that the microphone (1) can be located at a comfortable boom length for talking. The full length of extension for the boom (19) is only limited by its own available length while the full retraction of the boom is limited by the headphone cap (27) pushing against the microphone (1), which in fact acts as a stopper. A sensor, stopper switch or sensor switch may be installed for the stopper control and other purposes. The headphone cap (27) can also include the function of resistance block for boom's gentle sliding by dampening the movements. Based on the principle explained above, one can also choose to have a single button with bi-stable position or software with microprocessor/s (IC chip/s) to accomplish boom's (19) coiling and uncoiling. With some software packages, the headset/earset can remember certain pre-set boom extended positions or lengths so that a user can program the device to suit certain usage conditions. The controlling processes can be performed by a handset which remotely communicates with the headset or earset via Bluetooth or infrared.

The winding and unwinding movement for the microphone boom can also be executed by other possible equivalent means. Normal machine elements, such as rack & pinion, power/motion transmission screw threads, shaft/spool/axis, various types of chains, steelflex, waldron, hydraulic, pneumatic powered elements, etc are all possible replacement for the preferred embodiments. Regarding to torsion spring, normal carbon-steel alloys can be replaced by special alloys (iron-nickel-chrome with the addition of cobalt-molybdenum-glucinum), and also by cold-rolled alloys (structural hardening). These specially alloyed steel can form a torsion spring with up to 200~300 millimetres in length and 0.05~0.2 or 0.3~0.5 millimetres in thickness. Such springs are stainless with a high elastic limit. They are but slightly subject to permanent bending, and there is scarcely any risk of their breaking. Some of them are also practically non-magnetic which is possible to avoid being magnetised by a permanent magnet of the speaker (25).

The winding and unwinding of a microphone boom can be executed both/either automatically and/or semi-automatically. For example, a user can use a hand to pull the boom out and stop the microphone at the any position via a ratchet (5) based winding mechanism. A user can also choose to release the pawl (7) to mechanically retrieve the microphone boom (19) via a torsion spring propelled drum (17). If a coin motor is employed, the extending motion, the withdrawing

motion or both can be achieved by a remote wired/wireless communication with the handset. Clearly, purely coil spring driven winding mechanism requires no electric power supply and this is a very important advantage because a compact headset or earset may not have room for an extra battery or frequently changed battery may cause inconvenience to a user. The precious battery power may be reserved for electrical communications only.

As for mobile phones, Bluetooth becomes more and more popular. Bluetooth uses a 2.4GHz connection and doesn't require cables or an infrared connection. With Bluetooth wireless headsets, one can talk can talk up to 10 metres away from your wireless phone. It is possible for a headset to communicate with multiple stations or handsets. In addition, there's no line of sight required between the handset/phone and Bluetooth headset. Bluetooth's benefits go beyond wireless headsets, as some Bluetooth-equipped wireless phones allow one to transfer data between a phone with a PC or PDA without worrying about wires. Thus, it is further feasible to have voice controlled devices communicating with the headset with a windable or coilable microphone boom.

A windable boom (19) includes the application of holding other types of appliances at a terminal, such as a display screen. In the application for extending or retracting a screen or some other device, multiple booms holding a screen at two bottom corners are preferred because the screen is heavier than a microphone. The extendable and retractable boom makes communication interfacial devices (e.g., a microphone, a screen, etc) be more flexible to adjust their distance with a user's head, ears, mouth or eyes.

One can introduce a substantially non-symmetrical/non-cylindrical drum or spool, such as a bar with rectangular or oval cross-section for coiling or winding the microphone boom (19). A barrel with grooves on its external surface for guiding the winding process and putting the boom in a neat manner is preferred.

As shown in figure 5, the headset has a housing (27), a headband (2), a microphone (voice transducer) (1), a boom (19), a battery (23) for supplying electricity to a circuitry (not shown), and a (boom) winding mechanism. The boom (19) exposed outside the housing (27) retains a default (natural) straightened profile, which can be curved for other headset if required. The boom (19) is held

to be close to a user's mouth due to its resilience (spring force) and will spring back to the original shape if disturbed by a non-destructive force. In some situations, the boom wire/s (19) can be formed by shape memory alloys, such as titanium-nickel and copper-based alloys, etc. Different metal wires (e.g., shape memory alloy & spring steel) can be braided together for boom's better performance for profile keeping.

Referring to figure 6, the resilient microphone boom (19) is wound/folded/wrapped around without a drum inside a shell or container (41). According figure 6, the boom (19) is pulled back into a boom collection chamber (41) and folded/wound into an irregular form (45). This is executed by a pair of friction wheels (39) for griping the boom (19) to extend or withdraw the microphone (1). These wheels also act as a guide for guiding the outward movement of the boom (19). Although a boom collection chamber (41) with certain guiding groove/s internally can help to keep the boom (19) in a tidy or orderly form, it is also feasible to adopt irregular winding/folding mechanism for the thin resilient boom (19), especially when the boom (19) is made of "shape memory" metal alloy/s or other resilient materials (e.g., carbon steel alloys). Electrical terminals connection for the microphone is made via electrical connectors (43).

The microphone (1) performs the function of transforming the sound from mechanical vibrations to electrical signals – audio signals, which is therefore termed as an acoustic transducer. However, the same function can also be realized by a boom (19) made of tube to channel voice/sound to a transducer/microphone (1) located inside the headset housing (27). This technology is revealed by patent US6 778 676 B2. For the sake of reduce bulkiness by making this sound tube boom (19) windable, which is the same function of coiling a microphone supporting wires/rods for transmitting signals, the windable boom (19) for a microphone can be made. At bending portion where twisting or bending is needed, a structure used for the elbow portion of a drinking straw can be adopted and it is explained in US6 745 949 B2.

Figure 7 & 8 gives another example of rotated drum (17) for changing the effective length of a boom (19) by winding. In this arrangement, the boom (19) changes its effective length without bending. With electrical cabling wire connections (43) in

side the housing (27), which is similar to the cord winders found in vacuum cleaners, signal or electric power can be readily transmitted between the headset and handset. The moving of the boom (19) can be achieved by rack & pinion or other equivalent mechanisms the like.

The examples are specific embodiments set forth herein are for illustrative purpose only and are not intended to limit the scope of present invention. Additional variation and modification with the scope of the claimed invention will be apparent to one of ordinary skill in the art in view of the teachings set forth herein.

Claims

1. A boom assembly for a microphone of an earset or headset, the boom assembly comprising:
a resilient boom for supporting a microphone, and
a winding mechanism which has a guide for the boom and the winding mechanism is coupled to the boom,
whereby the winding mechanism can wind or unwind the boom for adjusting the boom's effective length.

2. The boom assembly according to claim 1, wherein the boom is formed by a tube for channelling sound to a microphone.

3. The boom assembly according to claim 1, wherein the boom is formed by a wire or wires.

4. The boom assembly according to any one of the preceding claims, wherein a front part of the boom is malleable for being formed into a profile extemporaneously.

5. The boom assembly according to claim 3, wherein there is an electric cable provided for connecting a microphone to transmit signals and the cable is bonded together with the wire or wires of the boom.

6. The boom assembly according to claim 3, wherein the wire or wires forming the boom is used to transmit signals for a microphone.

7. The boom assembly according to claim 1, wherein the winding mechanism includes a damper for regulating movements of the boom.

8. The boom assembly according to claim 1, wherein the boom assembly has a housing and the guide is formed by a part of the housing, such as an outlet of the housing.

9. The boom assembly according to claim 1 or 7, wherein the winding mechanism is mechanically driven, such as by a coil spring, electrically driven, such as by an electric motor or in combination of both.

10. The boom assembly according to claim 1, 7, or 9, wherein the winding mechanism further comprises a brake or stopper means for holding the boom with an effective length or at a suitable position.

11. The boom assembly according to claim 1 or 8, wherein the boom assembly further comprises a circuitry for controlling, such as regulating the electric motor, processing the microphone's signals, wireless communication or other functional operations.

12. The boom assembly according to claim 1, 7, 9, or 10, wherein the winding mechanism has a drum or spool for winding the boom into a regular profile.

13. The boom assembly according to claim 12, wherein the drum or spool has a groove at its internal or external for guiding a boom in a winding process or keeping a wound boom.

14. The boom assembly according to claim 1, 7, 9, 10, or 12, wherein the winding mechanism has a sound insulation means for muffling winding or unwinding noise.

15. An earset for voice reception comprising:
a microphone being connected to an end of the boom, and
the boom assembly according to any one of the preceding claims.

16. A headset for hands-free communication comprising:
a speaker for giving audio signals, and
the earset according to claim 15.

17. A device according to claim 15 or 16, wherein the circuitry is enabled to communicate to a handset or equipment via a wired or wireless communication means.

18. The device according to claim 17, wherein the handset and the device forms a single set of equipment either separated or integrated.

19. The device according to claim 17, wherein the handset is mobile or portable.

20. The device according to claim 17, 18 or 19, wherein the handset is equipped to adjust the effective or exposed length of the boom via the wired or wireless communication means.

21. The boom assembly according to claim 1, wherein the boom connects to a screen at an end.