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Thomson

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[54] **HEADSET WITH SHEATHED
INSULATED-CONDUCTORS FOR
CONNECTION OF EARPHONES**

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[51] Int. Cl. H04m 1/05

[58] Field of Search.....179/156

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[57] **ABSTRACT**

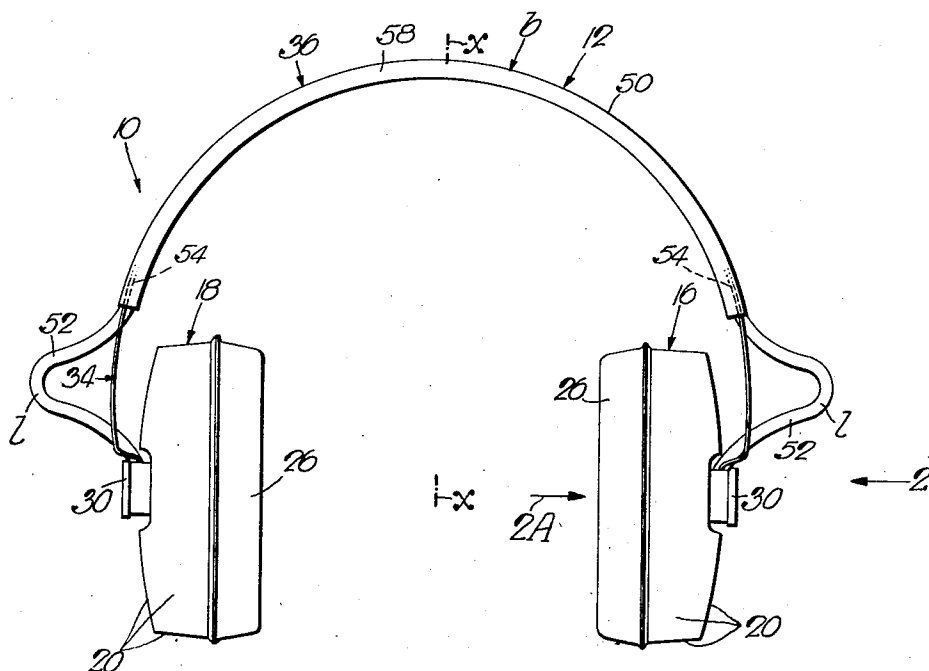
In a headset having a headband and two casings which carry earphones and are hingedly connected with the opposite ends of the headband, insulated conductors which connect the earphones and are sheathed in the headband even into the interiors of the casings.

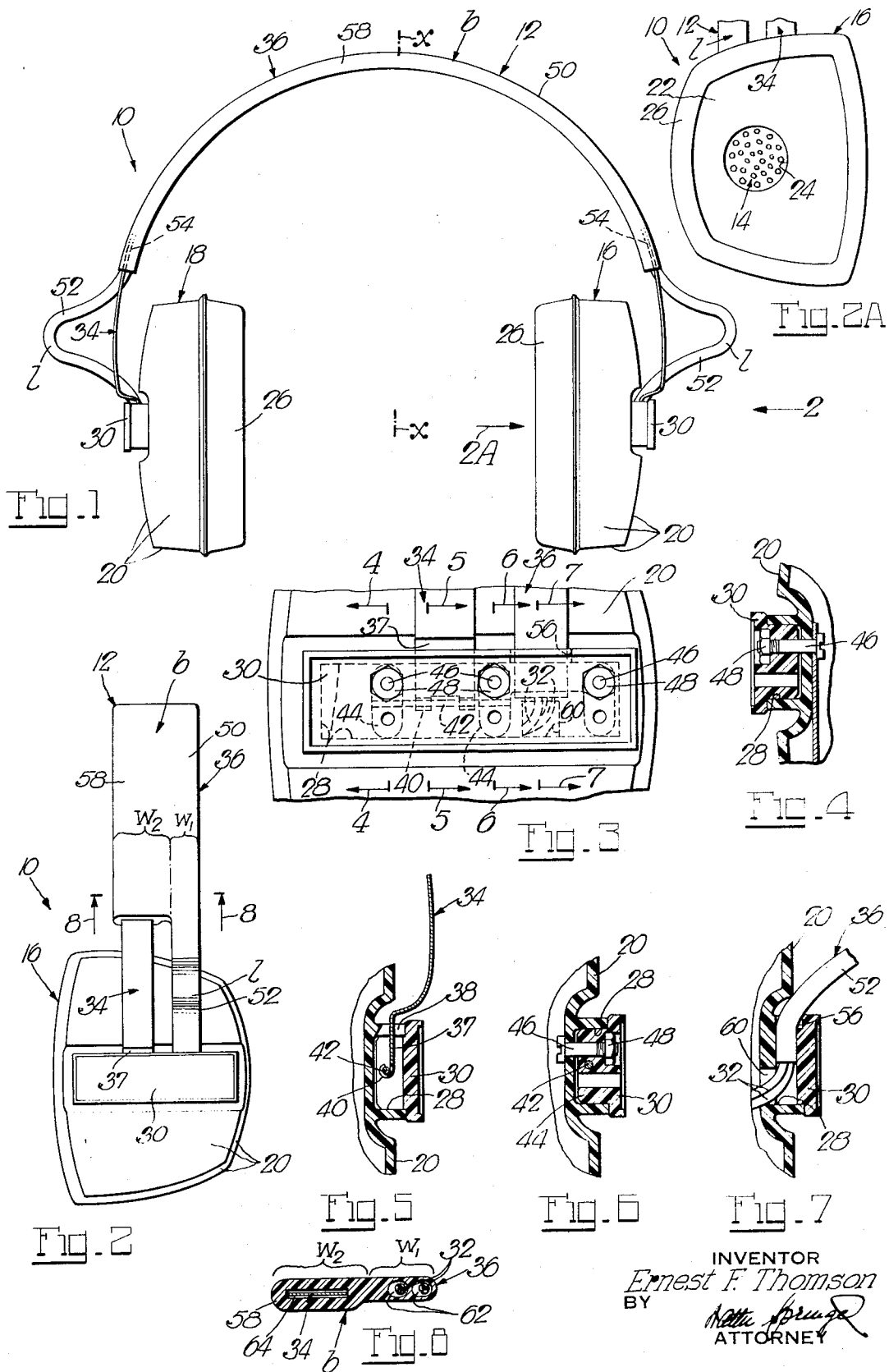
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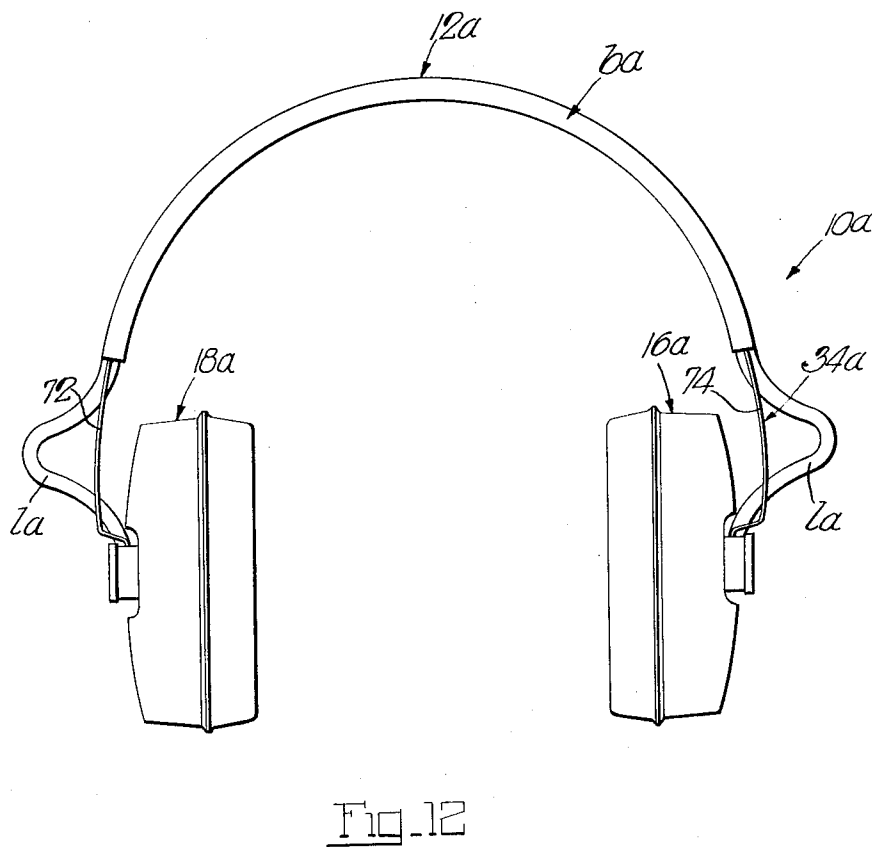
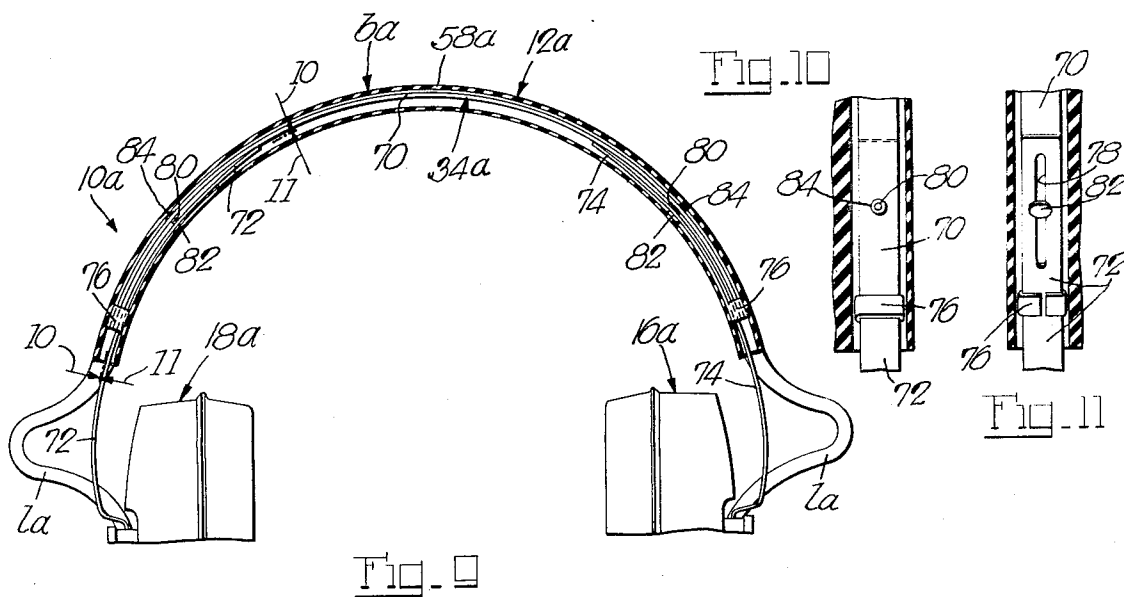
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8 Claims, 13 Drawing Figures





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HEADSET WITH SHEATHED INSULATED-CONDUCTORS FOR CONNECTION OF EARPHONES

This invention relates to headsets with earphones.

Headsets of the type with which the present invention is concerned have a typical headband with suspended casings which carry the earphones, of which the headband is resiliently flexible to adapt itself to a user's head with the earphones in the casings in place over the ears. The earphones are connected by insulated conductors of which intermediate lengths are led over part of the headband and, hence, over a user's head, and the remaining end lengths of these conductors which lead from the headband to the respective earphones are sufficiently long to provide between the headband and respective casings adequate slack for the required pivotal freedom of these casings on the headband, and also, for adjustment of the headset to a user's head of a given size if the headband is extensible and contractable to that end. While these headsets are satisfactory in many respects, they are, however, objectionable in a few respects. Thus, the conductor lengths which lead from the headband to the casings are necessarily left loose to provide adequate slack as needed, but this also leaves them exposed for entanglement with other objects and, even worse, for subjection to inadvertent pull which may well lead to disconnection between the earphones. Further, these dangling conductor lengths, besides having an unsightly appearance on a headset, get all too easily within the grasp of one's hands in applying a headset to, and removing it from, the head in the accustomed manner of manipulating the headset at the casings, thereby even further enhancing possible damage to, or disconnection of, these conductors.

It is a primary object of the present invention to provide a headset of this type which has none of the aforementioned objectionable aspects of prior headsets of this type, and which features a headband that completely sheathes the earphone-connecting insulated conductors between, and even part-way into the interior of, the casings that carry the earphones so that they are completely inaccessible to one's hands and are immune to pull or any other forces exerted on the headband, yet these sheathed conductors provide slack which is fully adequate for the aforementioned purposes.

It is another object of the present invention to provide a headset of this type of which the aforementioned featured headband is formed in two complementary parts, of which one part is a curved spring band which lends to the headband the required resilient flexibility, and with the ends of which the casings are hingedly connected, and the other part is a flexible conduit of which an intermediate length extends along, and is mounted on, an intermediate length of the spring band, and the remaining end lengths of the conduit loop outwardly from the spring band and extend with their ends into the casings and are firmly anchored therewithin, with the insulated conductors extending entirely through the conduit for their connection of the earphones. With this arrangement, the conduit is, by virtue of its mount on the spring band and anchorage to the casings, as much a part of the headband as is the spring band, and the outward loops of the conduit and conductor lengths therein are not subject to damage or

disconnection from the earphones by grasping hands in applying the headset to the head and removing it therefrom, yet these loops yield readily to pivotal motion of the casings on the headband, and also to adjustment of the headset to a user's head of a given size.

It is a further object of the present invention to provide a headset of this type of which the aforementioned flexible conduit part of the headband is provided with a sleeve which is longitudinally coextensive with the aforementioned intermediate length of the conduit, and is passed over the spring band. With this arrangement, the conduit is with its sleeve mounted on the spring band, and the spring band has a sufficient fit in the sleeve for a relatively firm mount of the flexible conduit on the spring band.

Another object of the present invention is to provide a headset of this type of which the aforementioned conduit and sleeve of one part of the headband are formed by adjacent widths of a preferably molded band of rubber or like material, with the conduit and sleeve formations of this band being of the full length and of the aforementioned intermediate length, respectively, of the conduit, and the sleeve formation having a through-passage of substantially rectangular cross-section reception of the spring band. With this arrangement, the band-type conduit and sleeve blends with the band-type spring, and also forms a comfortable cushion between the spring band and the user's head.

Further objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

FIG. 1 is a front view of a headset embodying the invention;

FIG. 2 is a side view of the headset as seen in the direction of the arrow 2 in FIG. 1;

FIG. 2A is a fragmentary side view of part of the headset as seen in the direction of the arrow 2A in FIG. 1;

FIG. 3 is a fragmentary enlarged side view of one of the earphones of the headset;

FIGS. 4 to 7 are fragmentary sections taken on the lines 4—4, 5—5, 6—6 and 7—7, respectively, of FIG. 3;

FIG. 8 is a section taken on the line 8—8 of FIG. 2;

FIG. 9 is a fragmentary front view of an adjustable headset with complementary parts of its headband being shown in elevation and in section, respectively;

FIGS. 10 and 11 are fragmentary sections taken FIGS. the lines 10—10 and 11—11, respectively, of FIG. 9; and in

FIG. 12 is a front view of the headset of FIG. 9 in differently adjusted condition.

Referring to the drawings, and more particularly to FIG. 1, 2 and 2A thereof, the reference numeral 10 designates a headset which has among its major components a headband 12 and a pair of earphones 14 is casings 16 and 18 which are hingedly connected with the opposite ends of the headband.

The casings 16 and 18 are in this instance identical, except for reverse outline when viewed from their hearing side, with each casing 16 and 18 having an outer wall 20 and an inner wall 22 which is apertured at 24

for exposure of the earphone 14 (FIG. 2A). The casings 16 and 18 also have attached to their inner walls 22 ear muffles 26 which cover the user's ears and exclude all sound not generated in the earphones 14, and they are further provided in their outer walls 20 with channel formations 28 and covers 30 thereon which serve for hinged connection of the casings with the ends of the headband and for lead-in of insulated conductors 32 which electrically interconnect the earphones (FIGS. 3 to 7).

It is an important feature of the invention that the earphone-connecting conductors are completely sheathed outside the casings 16 and 18. To this end, and further in accordance with the invention, the headband 12 is formed in two complementary parts, of which one part is a spring 34 and the other part is a flexible conduit 36 which sheathes the conductors 32.

The spring 34, which is in the preferred form of a spring band, is curved and has an axis of symmetry x about which opposite half-lengths of the spring band are symmetrical (FIG. 1). Short endlengths 37 of the spring band 34 are inwardly offset and extend through apertures 38 into the channel formations 28 on the casings 16 and 18 wherein they are at 40 hingedly connected with pins 42 between spaced lugs 44 on the covers 30 (FIGS. 3 and 5). The covers 30 are suitably secured to the channel formations 28 on the casings, as by screws 46 and nuts 48, for example (FIGS. 3, 4 and 6). The spring band 34 establishes the desired resilient flexibility of the headband 12.

The flexible conduit 36 has an intermediate length 50 and opposite endlengths 52 continuous with the intermediate length 50, of which the intermediate conduit length 50 extends along, and is mounted on, a symmetrical intermediate length 54 of the spring band 34, and the endlengths 52 extend to and through apertures 56 on the channel formations 28 on the casings and are firmly anchored therewithin by being clamped between the bottoms of these channel formations 28 and the covers 30 thereon (FIGS. 3 and 7). For its preferred mount on the spring band 34, the flexible conduit 36 is provided with a sleeve formation 58 which is coextensive with the intermediate conduit length 50 and through which the spring band 34 extends preferably with a substantial fit for a relatively firm mount of the conduit 36 on the spring band 34 through intermediation of the sleeve formation 58 (FIGS. 1, 2 and 8). The opposite endlengths 52 of the conduit 36 are of equal longitudinal extents and such that they form outward loops l between the spring band 34 and the respective casings 16 and 18 (FIG. 1). The insulated conductors 32 fully extend through the flexible conduit 36 including the loops l thereof, and they extend from the channel formations 28 on the casings 16 and 18 through apertures 60 into the interior of these casings wherein they are electrically connected with the respective earphones 14.

The flexible conduit 36 and its sleeve formation 58 are in the preferred form of a flexible band b (FIGS. 1, 2 and 8) which is preferably molded of rubber or a like material, with the conduit 36 and the sleeve formation 58 being formed by adjacent widths w_1 and w_2 of the band. Further, and as shown in FIG. 8, the conduit part 36 of the band b is provided with individual through-passages 62 for the insulated conductors 32, with these

conductors having preferred sliding freedom in the respective through-passages 62 for their ready initial passage therethrough as well as to avoid any binding of the same in these passages. Also, the through-passage 64 in the sleeve part 58 of the band b is of substantially rectangular cross-section for substantially fitted reception of the spring band 34 (FIG. 8), although this fit is preferably sufficiently loose to permit initial sliding of the spring band through this passage with relative ease without, however, giving rise to any creeping of the sleeve part of the band b on the spring band in accustomed use and handling of the headset, once the loop ends of the band b are anchored in the casings 16 and 18.

The loops l of the conduit part 36 of the band b and the conductors 32 therein afford entirely adequate slack for whatever take-up is required for pivoting of the casings 16 and 18 and flexing of the spring band 34 in applying the headset to and adjusting it on, as well as removing it from, the head and in otherwise handling the headset. Further, owing to the mount of the band b with an intermediate length thereof on the spring band 34 and with its ends in the casings 16 and 18, and the sliding freedom of the conductors 32 in the band b , such slight pull to which the latter may be subjected from any cause whatever is without any effect on the conductors and their connections with the earphones. Also, and as appears in FIG. 1, 2 and 8, the band b blends with the band-type spring 34, and also forms a comfortable cushion between the spring band 34 and a user's head. Moreover, the loops l of the band b are laterally offset from the spring band 34 (FIG. 2) so that the hinge connections 40, 42 between the ends of the spring band and respective casings 16 and 18 are also offset from the anchored loop ends in these casings, wherefore these loop ends may advantageously be anchored in these casings substantially at the level of the hinge connections 40, 42 (FIGS. 3, 5 and 7) for maximum pivotal freedom of the casings on the headband and least distortion of the loops l and conductors 32 therein in pivoting the casings.

Reference is now had to FIG. 9 which shows a headset 10a that is in all respects like the described headset 10 of FIG. 1, except that the spring band 34a is extensible and contractable for adjustment of the headset to a user's head of a given size. To this end, the spring band 34a is formed in separate parts 70, 72 and 74, of which the part 70 is a leaf-type spring of the required resilient flexibility for the headband 12a, and the parts 72 and 74 are metal bands which usually are less resilient than the spring 70 and are adjustably connected with the spring 70, with the free ends of these bands being hingedly connected with the respective casings 16a and 18a. For their adjustable connection with the spring part 70, the bands 72 and 74 are slidable in end straps 76 on the spring part 70, and are provided with elongated slots 78 through which extend the shanks 80 of flat heads 82, with the shanks 80 being at 84 riveted to the spring part 70 (FIGS. 9 to 11). The bands 72 and 74 are thus slidably adjustable on the spring part 70, and they are frictionally retained on this spring part in any adjusted position by the straps 76 and heads 82, as will be readily understood. Thus, on firmly gripping the sleeve part 58a of the flexible band ba with one hand, and with the other hand gripping either metal band 72

or 74 at its exposed length, the metal band may be forcefully adjusted on the spring part 70 either to extend or contract the spring band 34a, whichever is required for adjustment of the headset to a user's head of a given size. Of course, for such adjustment of the headset, both metal bands 72 and 74 will have to be equally adjusted on the spring part 70 for symmetrical disposition of the casings 16a, 18a on the on the headband 12a.

FIG. 12 shows the same headset 10a as FIG. 9, except that its spring band 34a has been extended for adjustment of the headset to a head of larger size, with the extension of the spring band 34a being accompanied by flattening or shortening of the loops 1a.

What is claimed is:

1. A headset, having a headband, a pair of casings having earphones therein, and insulated conductors connecting said earphones, with said headband being formed of two complementary parts, of which one part is a longitudinally curved spring of a given length with opposite ends, with opposite half-lengths of said spring being symmetrical, said casings being hingedly connected with said ends, respectively, of said spring, and the latter establishing the resilient flexibility of the headband, and the other part is a flexible conduit having opposite partial lengths extending to the respective ends of the conduit, and another partial length intermediate and continuous with said opposite partial lengths and shorter than the length of said spring, said conduit being with said intermediate partial length mounted on a symmetrical intermediate length of said spring, and said conduit ends extending into the respective casings and being anchored to the latter

therewithin, with said opposite partial conduit lengths being of equal longitudinal extents and forming outward loops between said spring and the respective casings, and said insulated conductors extending through said conduit and having sliding freedom therein.

2. A headset as in claim 1, in which said conduit has a sleeve formation coextensive with said intermediate conduit length, with said spring extending through said sleeve formation for mounting said conduit on said spring.

3. A headset as in claim 2, in which said spring is a spring band, and said conduit and sleeve formation thereon are formed by adjacent widths of a band of flexible material.

4. A headset as in claim 2, in which said spring consists of complementary lengths lengthwise adjustably connected with each other for extension or contraction of said spring.

5. A headset as in claim 3, in which said sleeve formation of said flexible band has a longitudinal through-passage of substantially rectangular cross-section for substantially fitted reception of said intermediate length of said spring band.

6. A headset as in claim 3, in which said conductors number two, and said conduit formation of said flexible band has two longitudinal through-passages for reception of the respective conductors with sliding freedom.

7. A headset as in claim 3, in which said flexible band is of rubber-like material.

8. A headset as in claim 3, in which said flexible band is molded of rubber-like material.

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