Feb. 9, 1960 G. CAGEN 2,924,672

HEADSET

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Fig. 1.

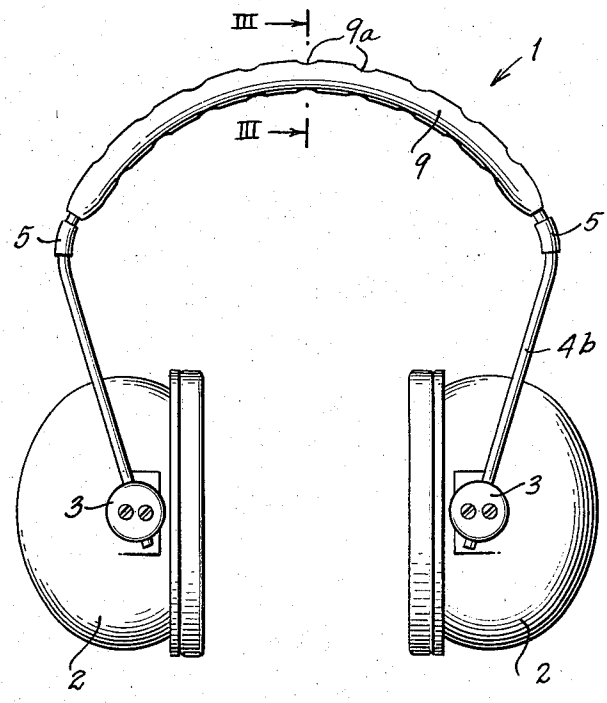


Fig. 2.

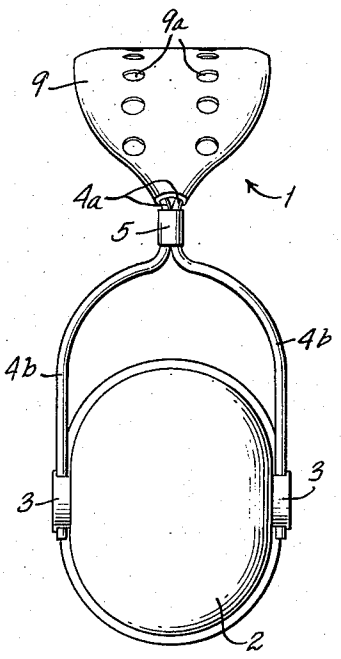


Fig. 4.

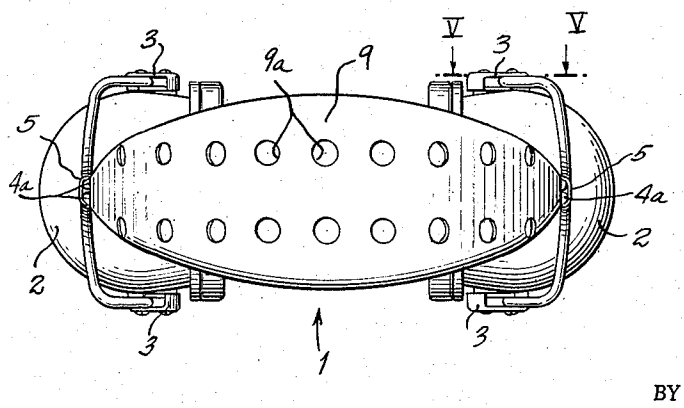
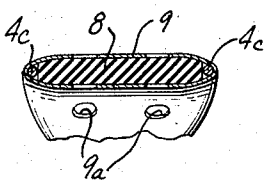


Fig. 3.



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Fig. 5.

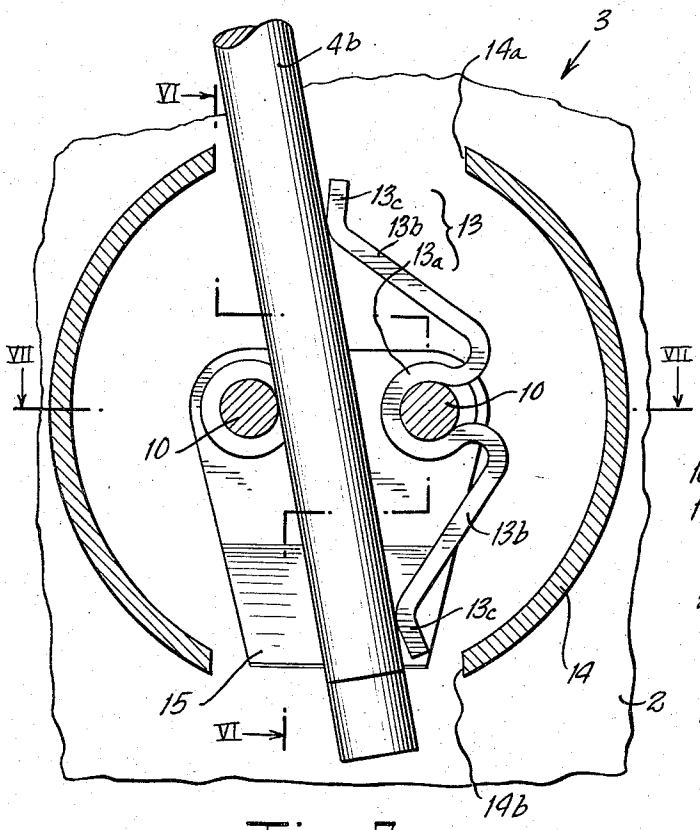


Fig. 6.

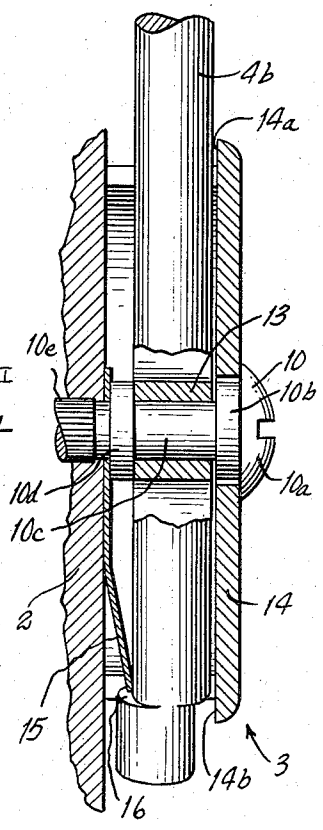
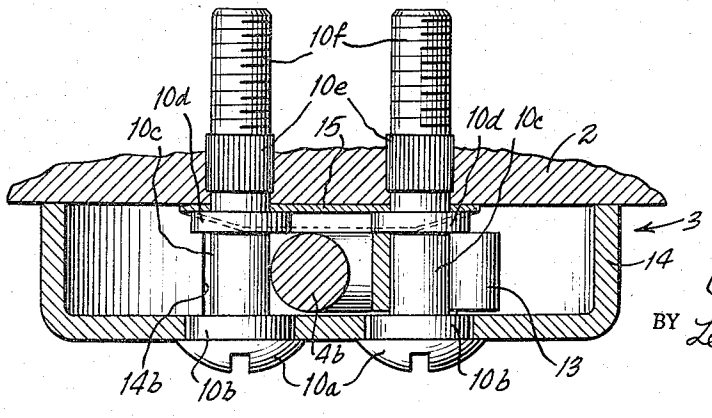


Fig. 7.



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2,924,672

HEADSET

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5 Claims. (Cl. 179—156)

This invention relates to improvements in earpiece supports and more particularly to improved means for pivotally and slidably mounting earpieces upon a supporting structure such as a yoke or headband. This invention relates also to improved yoke or headband structures for supporting earpieces upon the head and over the ears of the wearer.

An object of my invention is to provide an improved earpiece support.

Another object is to provide an improved means for mounting an earpiece upon a supporting structure.

Another object is to provide an improved support and mounting means of the type described by which an earpiece may be pivotally adjusted about a fore-and-aft horizontal axis and slidably adjusted up and down its support.

Another object is to provide an improved mounting means of the type described which is easily assembled and economically manufactured.

Another object is to provide an improved yoke for supporting earpieces upon the head and over the ears of the wearer which is comfortable to wear and light in weight.

The foregoing and other objects of my invention are attained in the structure described herein by providing a headset comprising a yoke or headband adapted to extend over the head of the wearer from ear to ear and having end portions each adapted to support an earpiece over the ear of the wearer, and mounting devices on each end portion for supporting an earpiece.

The yoke or headband includes a frame constructed from a pair of generally parallel wire members adapted to extend over the wearer's head from one side to the other. The wire members are held closely together, as by clips, at localities which are adjacent the wearer's temples when the yoke is in place on his head. Outwardly from these localities, the wire members are spread apart to form a U-shaped end portion adjacent each of the wearer's ears, each U-shaped end portion including two vertical wire portions, one in front and one behind the wearer's ear. Between the closely held localities, i.e., over the crown of the wearer's head, the wires are also spread apart, but less widely than at the ends.

Between the portions of the wire members at the crown portion of the yoke is positioned an elongated pad of foam rubber conforming generally to the shape of the crown portion. This pad has an unstressed width substantially greater than the inside spacing between the wire members of the crown portion and the thickness of the pad is substantially greater than the diameter of the wire members. The pad is positioned between the wire members with its longitudinal edges abutting resiliently the inner surfaces of the wire members. It is further positioned so as to project upwardly and downwardly from the locality of its contact with the wire members, the downward projection being adapted thereby to support the frame upon the head of the wearer. A single piece cover is provided for the crown portion of the yoke. This cover

encircles and closely engages the wire members and the pad.

The earpieces may be of conventional construction, having a generally cylindrical or hemispherical housing. My improved mounting device comprises two connecting elements, located at diametrically opposite points on the earpiece housing. Each element includes a shell, held in place on the housing by two parallel screws, and having aligned openings above and below the space between the screws. The two vertical wires of one end portion of the yoke frame extend through the respective connecting elements, each wire extending through the two shell openings and the space between the screws.

Each connecting element includes a spring clip having a central U-shaped portion embracing one of the screws and widely spread free end portions extending backwardly beyond the bight of the U-shaped portion and yieldably and frictionally engaging the vertical wire, and tending to force it frictionally into engagement with the other screw. The shell openings have fore-and-aft dimensions considerably larger than the wire diameters, so as to allow pivotal movement of the earpieces through a substantial range of angles about a fore-and-aft horizontal axis.

The spring clip shifts on its screw as a pivot to accommodate this movement, maintaining its frictional and yieldable engagement with the wire throughout the range of angular positions of the earpiece.

Each of the connecting elements also includes a stop means adapted to limit the downward movement of the earpiece on the wire members and thus to prevent its disengagement from the yoke frame. The stop means consists of a leaf spring apertured at its upper end to receive the two screws and held in place between the spring clip and the earpiece housing. The lower end of the leaf spring extends downwardly and is preformed so that it projects outwardly from the surface of the earpiece. The outwardly projecting end is adapted to engage a shoulder formed in the end of the wire of the frame and so as to limit the downward movement of the earpiece.

The foregoing and other objects of my invention will become apparent from a consideration of the following description taken in conjunction with the drawings.

In the drawings:

Fig. 1 is a front elevational view of an earpiece support made in accordance with my invention, with attached earpieces;

Fig. 2 is a side elevational view of the device of Fig. 1;

Fig. 3 is a cross-sectional view of the headband taken on the line III—III of Fig. 1;

Fig. 4 is a plan view of the earpiece support of Figs. 1–3;

Fig. 5 is a sectional view, on an enlarged scale, taken on the line V—V of Fig. 4, and showing one of the connecting elements;

Fig. 6 is a cross-sectional view taken on the line VI—VI of Fig. 5; and

Fig. 7 is a cross-sectional view taken on the line VII—VII of Fig. 5.

There is shown in the drawings a headset or earpiece support comprising a yoke or headband generally indicated by the numeral 1, supporting earpieces 2 at its opposite ends. Each earpiece 2 is connected to the headband by means of two connecting elements 3. The earpieces 2 may be of conventional construction, and may, for example, be either earphones or sound attenuating cups, as illustrated.

Headband—Figs. 1–4

Headband 1 includes a frame constructed of a pair of enantiomorphically shaped elongated, stiffly resilient wire

members 4. Intermediate portions 4*a* of the wire members are held closely together by means of clamps 5. The portions 4*a* separate end portions 4*b* from crown portions 4*c* (Fig. 3). The crown portions 4*c* are curved so as to give to the crown portion of the frame, as seen in plan view, a generally elliptical configuration. Wire members 4 may be formed of any strong, light, stiffly resilient material. In the preferred form of my invention, however, they are formed of heat treated carbon steel having a diameter of .125 inch. While other diameters may be employed, the diameter selected provides the members with the strength necessary to perform their supporting function yet light enough to be comfortably worn by the wearer and malleable enough to be easily formed to the desired shape.

A pad 8 (Fig. 3) is provided between the crown portions 4*c* of the headband frame and conforms substantially to the shape of those crown portion. Pad 8 in the preferred embodiment of my invention is constructed from open-cell foam rubber. It is of course apparent that any light resilient material, as, for example, other forms of foam rubber and any of the various types of resilient rubber or plastic material, may be employed. However the material chosen for the construction of pad 8 should be highly resistant to perspiration, human skin and hair oils, sunshine, atmosphere, etc., to assure a long lasting and relatively sanitary headband. Pad 8 has an unstressed lateral dimension substantially greater than the distance between crown portions 4*c* of the wire frame members and a thickness substantially greater than the diameter of those members, so that when the pad is properly positioned, the longitudinal edges thereof abut resiliently the inside of the wire members and so that pad 8 projects upwardly and downwardly therefrom. This positioning is clearly illustrated at Fig. 3 of the drawings. As thus described, it may be seen that pad 8 maintains itself securely positioned between the members and conforms to the shape thereof. It will be further noted that when placed upon the head of the wearer, the downwardly projecting portion of the pad will resiliently support the headband structure upon the wearer's head.

A cover 9 encircles the crown portion of the headband and closely engages the wire members and the upper and lower surfaces of the pad. Cover 9 provides an outer washable covering as well as assuring the integral association of headband and pad and may be replaced when worn or soiled. Cover 9 may be formed of plastic, leather, or any suitable material which is resistant to moisture and stain due to dust, perspiration, oil, etc. In the preferred embodiment of my invention, I have constructed the cover of plastic Vinylite sheet material. The encircling cover is permanently secured to the wire frame and pad by heat sealing the longitudinal margins of the cover after once wrapping it about the wires and pad as above described. It is to be understood, however, that any convenient suitable means of attaching the outer cover may be employed. The cover may be provided with a plurality of openings 9*a* which allow for the passage of air therethrough. Such air may continue through the open cells of the foam rubber employed in my headband to provide through ventilation, affording to the portion of the wearer's head in contact with the headband a continuous supply of fresh air. As thus constructed, it will be noted that the headband is extremely light in weight, being constructed simply of two thin elongated wire members, a pair of metal clamps, a foam rubber pad, and an enveloping cover. It will also be apparent that the headband frame is simple to construct and economical to manufacture since the supporting crown section and depending earpiece supporting end sections are integrally constructed and formed simply by attaching a pair of preformed wire members as above described.

The end portions 4*b* of the wire frame members 4 spread apart from the portions 4*a* and then extend vertically downward, as best seen in Fig. 2, to provide a frame end portion spanning the wearer's ear when the headset is in place and adapted to support an earpiece by means of a pair of the connecting elements 3.

The configuration described above has been found to afford maximum support, stability and comfort of the headgear upon the head of the wearer with a minimum of local stress and discomfort. Specifically the elliptical shape of the crown portion tends to distribute the weight of the entire assembled structure over a considerable area at the top of the wearer's head.

Connecting elements—Figs. 5–7

Each of the connecting elements 3 includes two parallel pins, shown as screws **10**, which are attached to and project outwardly from the housing of earpiece 2. Each screw 10 is preferably constructed of plated brass and is provided with a head **10***a*, a pair of integrally formed shoulders **10***b* and **10***d*, a smooth shank **10***c* between the shoulders, a knurled portion **10***e* and a threaded end **10***f*.

A spring clip **13** is pivotally mounted upon the right hand one of the screws **10**, as they appear in Figs. 5 and 7. The clip **13** is made of resilient material, preferably Phosphor bronze. Clip **13** may, however, be constructed of any material characterized by a high spring rate as, for example, any of the high carbon content steel alloys. In the preferred form of my invention, clip **13** is formed to have a narrow central U-shaped portion **13***a* and a pair of relatively long free end portions or wings **13***b*, each formed as an integral extension of one of the arms of the central U-shaped portion and ending in a foot portion **13***c*. Each of the ends **13***b* extends reversely from the central U-shaped portion in a direction substantially opposite to the direction taken by the legs of the central U-shaped portion. Clip **13** is constructed so that in its unstressed position the central portion **13***a* has a diameter slightly less than the diameter of the shank **10***c* of the screw **10**. Clip **14** is mounted upon screw **10** by deflecting the arms of the central portion outwardly from its unstressed position permitting engagement of the supporting bar by the clip arms. The clip **13** is maintained upon screw **10** by the inwardly directed force of the stressed arms of the central portion **13***a*. The narrow throat opening between the arms of the central portion assures a relatively secure connection between the clip **13** and screw **10** to maintain them together under substantially all normal and usual uses to which the earpiece would be expected to be put. The frictional connection between the clip **13** and screw **10** is sufficiently weak to permit the clip to move pivotally about the bar upon the application of slight force, but nevertheless sufficiently strong to hold the clip in any angular position in which it may be set.

The spacing between the shanks **10***c* of the screws **10** is somewhat greater than the diameter of the end portions **4***b* of the wire frame members, as best seen in Figs. 5 and 7. The wings **13***b* of the spring clip **13**, when unstressed, take up positions such that the wings must be bent somewhat to the right, as viewed in Fig. 5, in order for the wire end portion **4***b* to be inserted past the wings **13***b* and between the screws **10**. When the wings **13***b* are so deflected from their unstressed positions, they are effective to bias the wire end **4***b* to the left, holding it firmly and frictionally in engagement with the left-hand screw **10**, as shown in Fig. 5.

The earpiece **2** may be moved longitudinally along the wire ends **4***b*, with the feet **13***c* sliding along the wire, and the wire sliding along the left-hand screw **10**, to accommodate that movement.

When the earpiece **2** is moved angularly with respect to the wire **4***b*, then the spring clip **13** pivots around the right-hand screw **10**, for example, the upper wing **13***b* may move to the right as viewed in Fig. 5, and the lower wing **13***b* to the left. The frictional engagement between the wire **4***b* and the left-hand screw **10** is maintained throughout the pivotal movement. Similarly, any angular

position established by the frictional engagement with the clip 13 and the right-hand screw 10 is maintained throughout any longitudinal movement of the earpiece along the wire end portions 4*b*.

A shell 14 of generally cylindrical configuration encloses the screws 10 and the spring clip 13. The shell 14 has apertures 14*a*, 14*b*, at its top and bottom, through which the wire end 4*b* passes. The lateral dimensions of the apertures 14*a* and 14*b* determine the limits of the angular movement of the earpiece 2 with respect to the wires 4*b*.

A leaf spring 15 is provided at its upper end with holes to receive the screws 10. Leaf spring 15 projects downwardly from the screws 10 and is preformed so that its lower end projects outwardly and engages the adjacent side of the wires 4*b*. The tip of the wire 4*b* is provided with a shoulder 16, offset from the principal portion of the wire inwardly toward the earpiece 2, so that if an attempt is made to slide the earpiece off the wire 4*b*, the leaf spring 15 engages the shoulder 16, as shown in Fig. 6, and prevents further movement.

The connecting element may be assembled by first inserting the screws 10 through the housing 14, thereafter assembling the clip 13 on one of the screws 10. The leaf spring 15 is then placed over the screws 10 and the threaded ends of the screws are inserted into the shell of the earpiece 2, being fastened in place by conventional nuts (not shown). After two of the connecting elements 3 are mounted on an earpiece, it may be assembled on the yoke or headband 1 by threading the ends 4*b* of the headband frame wires through the apertures 14*a* and past the spring clips 13 of the respective connecting elements 3.

While I have shown and described a preferred embodiment of my invention, other modifications thereof will readily occur to those skilled in the art and I therefore intend my invention to be limited only by the appended claims.

I claim:

1. A headset comprising a yoke structure adapted to extend over a wearer's head, said yoke structure including a pair of elongated, stiffly resilient enantiomorphic frame members, having spaced parallel crown portions adapted to extend across the top of the wearer's head when the yoke is in place thereon, spaced parallel end portions adapted for positioning adjacent at least one of the wearer's ears, and abutting portions at the ends of said crown portions, clamp means fastening said abutting portions together, an earpiece adapted to fit over an ear of the wearer and including, a housing, two connecting elements at diametrically opposite localities of said housing, each pivotally and slidably attaching said earpiece to one of said end portions, each said connecting element comprising a pair of pins projecting outwardly from the earpiece and defining a space between them to receive said one end portion, an elongated spring clip having an intermediate locality thereof frictionally and resiliently mounted for pivotal movement on one of said pins and having free ends adapted to engage said end portion yieldably and frictionally on either side of said one pin and to bias said end portion yieldably into frictional engagement with the other of said pins, said clip being effective to hold said earpiece frictionally in any of a plurality of positions along said end portion, said clip also being effective by virtue of its frictional pivotal mounting to hold said earpiece frictionally in any of a plurality of angular positions about an axis transverse to said end portion.

2. A headset comprising a yoke adapted to extend over a wearer's head and having at least one end portion positioned adjacent the ear of the wearer when the yoke is in place on the wearer's head, at least one earpiece adapted to fit over an ear of the wearer, means pivotally and slidably attaching said earpiece to said one end portion, said attaching means comprising a pair of parallel pins projecting outwardly from the earpiece and defining a space between them to receive said end portion, an elongated spring clip having an intermediate locality thereof frictionally and resiliently mounted for pivotal movement on one of said pins and having free ends adapted to engage said end portion of the yoke yieldably and frictionally on either side of said one pin and to bias said end portion yieldably into frictional engagement with the other of said pins, said clip being effective to hold said earpiece frictionally in any of a plurality of positions along said end portion, said clip also being effective to hold by virtue of its frictional pivotal mounting to hold said earpiece frictionally in any of a plurality of angular positions about an axis transverse to said end portion.

3. A connecting element for supporting a device on an elongated rod for linear and angular adjustment of the position of the device with respect to the rod, comprising a pair of parallel pins projecting outwardly from the device and defining a space between them to receive said rod, an elongated spring clip having an intermediate locality thereof frictionally and resiliently mounted for pivotal movement on one of said pins and having free ends adapted to engage said rod yieldably and frictionally on either side of said one pin and to bias said rod yieldably into frictional engagement with the other of said pins, said clip being effective to hold said device frictionally in any of a plurality of positions along said rod, said clip also being effective to hold by virtue of its frictional pivotal mounting to hold said device frictionally in any of a plurality of angular positions about an axis transverse to said rod.

4. A connecting element as defined in claim 3, including a stiff leaf spring fixed at one end on said device and having its free end slidably engaging the rod, and a shoulder on said rod engageable by said free end of the leaf spring and effective so to limit movement of the device along the rod.

5. A connecting element as defined in claim 3, including a shell mounted on said device and enclosing said pins and said spring clip, said shell having opposed apertures aligned with the space between the pins to permit passage of said rod, said apertures having dimensions substantially larger than said rod, engagement of the rod with the shell at the edges of the apertures serving to limit the angular movement of the device on the rod.

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