July 3, 1962 J. NEAL 3,041,856

EAR ORNAMENT WITH THREE-POINT RESILIENT SUPPORT WITHIN THE TRAGUS, THE ANTI-TRAGUS AND THE ANTI-HELIX

Filed Nov. 2, 1960 2 Sheets-Sheet 1

Fig. 1

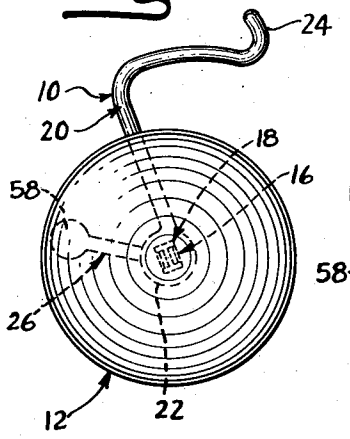


Fig. 2

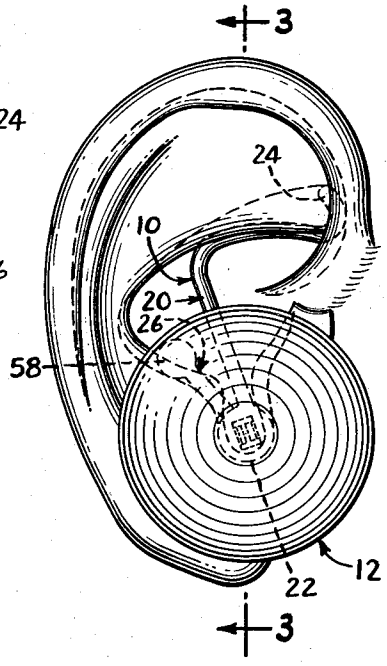


Fig. 3

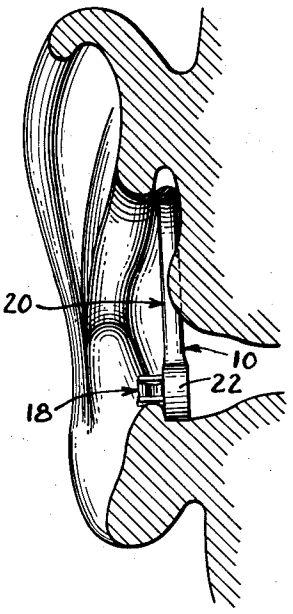


Fig. 4

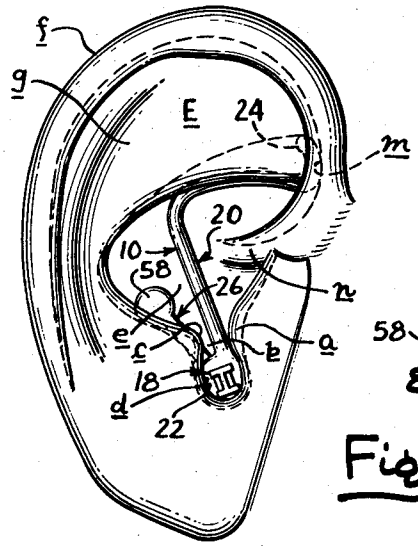


Fig. 5

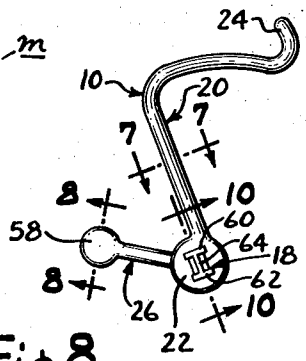


Fig. 6

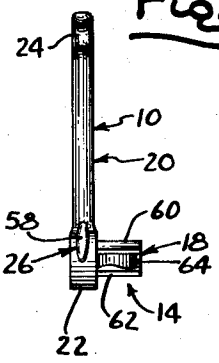


Fig. 8

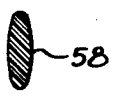


Fig. 7



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Fig. 9

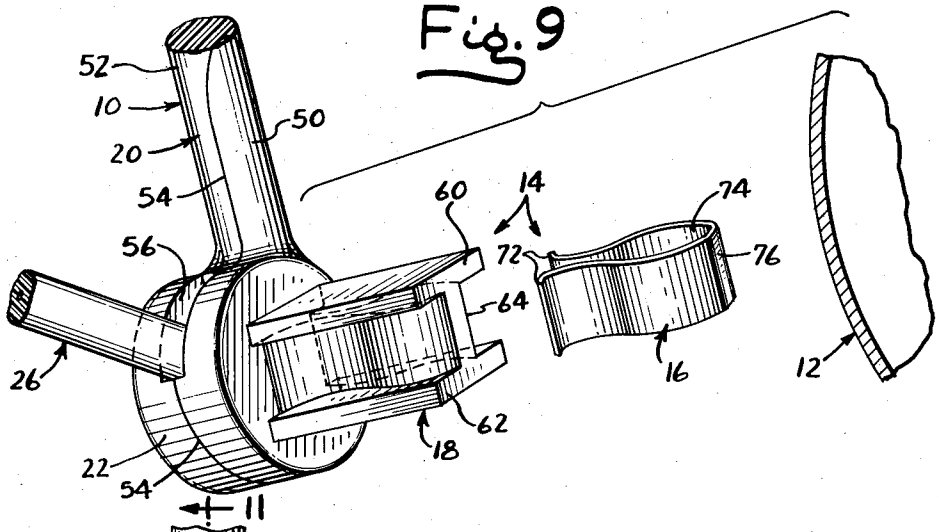


Fig. 10

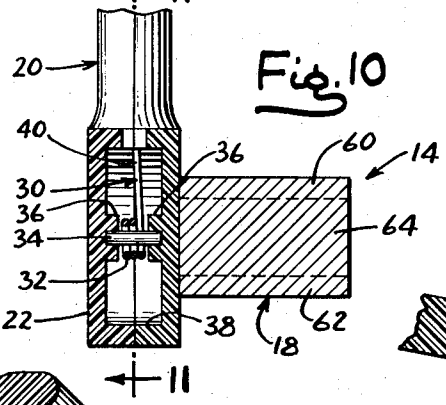


Fig. 11

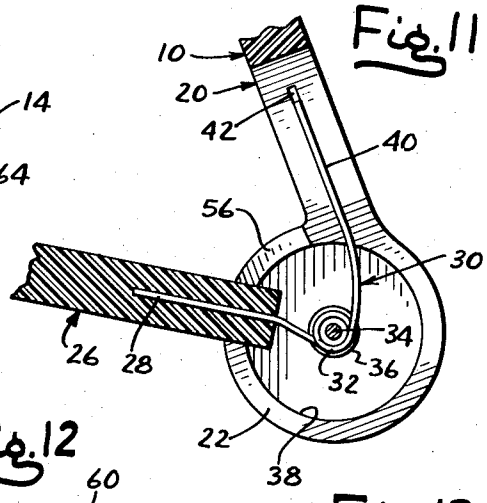


Fig. 12

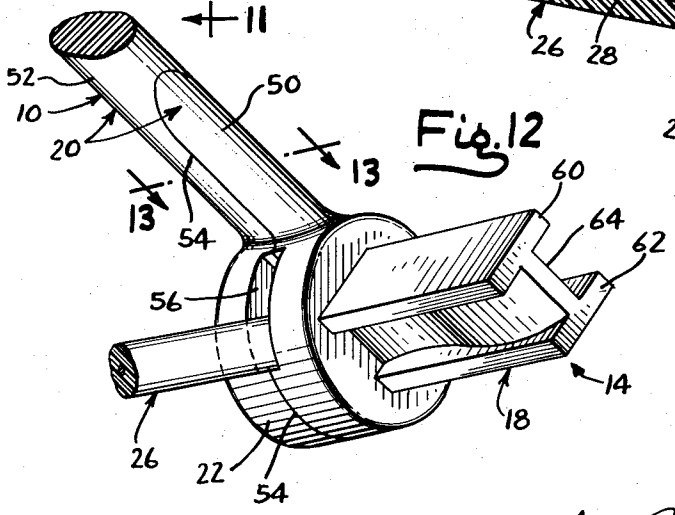


Fig. 13



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EAR ORNAMENT WITH THREE-POINT RESILIENT SUPPORT WITHIN THE TRAGUS, THE ANTI-TRAGUS AND THE ANTI-HELIX

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7 Claims. (Cl. 63—14)

The present invention relates to supports for ear ornaments, as well as to combination supports and ear ornaments. Specifically the invention is concerned with improvements in earring assemblies, utilizing the term "earring" in its commonly accepted sense of designating an entire class of ear ornaments.

Conventional earrings of the type which are attached to the lobe of the ear by means of clips or crew clamps are possessed of numerous limitations, principal among which is the lack of security of attachment. Careless application of such earrings to the ear is a common occurrence due to the fact that uncomfortable pressure on the lobe of the ear is necessary for secure attachment. As a result, the percentage of lost or damaged earrings is extremely high. When it is considered that earrings are invariably sold in matching pairs it is obvious that the loss of one earring destroys the wearability and worth of the other earring of the pair.

Numerous suggestions have been advanced to overcome the above-noted limitation that is attendant upon the construction and use of conventional earrings, one suggested form of earring comprising a base member which is inserted into the concha of the ear and from which the ornament proper is supported externally of the ear structure. Earrings of this type not only are insecure since they rely for their support upon outward pressure against the generally conical concha wall, but additionally they interfere with the transmission of sound waves to the inner ear structure through the auditory canal. Other suggested earrings find their support by using hooks which extend over the ear behind the helix in the manner of eyeglass frames, while still others have hook devices which hang in the intertragic notch and rest by gravity behind the tragus and the anti-tragus, some of them clampingly engaging the tragus and the anti-tragus. Earrings which hook over the helix are cumbersome, uncomfortable and lack the neatness associated with conventional earrings, while earrings which hang in the intertragic notch are susceptible to dislodgment by contact with an upwardly moving object, as for example the upward sweep of a comb or of the hand in arranging the hair.

The present invention is designed to effectively overcome these various limitations which are associated with conventional earrings of the lobe-clamping type and of the special type briefly outlined above and, accordingly, the invention contemplates the provision of a novel form of ear ornament support or base member having parts which fit within the external ear and which lend a three-point support for the base member as a whole, as well as for the ear ornament carried thereby. According to the present invention, the three points of support for the base member fit within the ear structure in such a manner that shifting of the support in any direction within a vertical plane is effectively precluded, while at the same time lateral shifting and consequent detachment of the base member from within the external ear structure is also prevented.

More specifically, it is among the principal objects of the present invention to provide a base member or ear ornament, all portions of which fit within the external ear structure, and having a first portion which lies

behind the tragus and the anti-tragus at the extreme bottom region of the concha, thus bridging the intertragic notch from the inside thereof; a second portion which lies deep in the crevice between the concha and the anti-tragus and remote from the intertragic notch; and a third portion remote from the two other portions and which extends into the crevice existing between the anti-helix and the concha near the top of the latter and which, in the case of certain human ears, may extend also into the crevice existing between the helix and the anti-helix. The base member is thus, to a large extent, concealed by the anatomical parts of the external ear behind which it lies, and those parts which are not completely concealed by portions of the external ear are in part concealed by the ornament proper and, otherwise, they are substantially hidden from view at most viewing angles.

Another and related object of the present invention is to provide a base member for an ear ornament which is of relatively small proportions so that it presents no excess visible material when viewed from normal angles; which is formed from a substantially transparent plastic material to further enhance its lack of conspicuousness when mounted in the ear; and which is sufficiently resilient and is so designed that it will seek to bottom itself, so to speak, within the ear crevices to which it is applied and thus remain concealed within ear structures which vary appreciably in size and contour.

Another object of the invention is to provide a base member for an ear ornament and which has associated therewith a spring loaded retaining part by means of which the base member is automatically adjustable to fit external ear structures which vary widely in their size and shape characteristics.

Yet another object of the invention is to provide a combined ear ornament and base member therefor wherein the ornament and member are readily separable, thus enabling the base member to serve as a common support for a series of interchangeable ornaments. By such an arrangement, the user once properly fitted with a pair of base supporting members may selectively choose ornaments to match various ensembles without necessitating the purchase of more than one initial pair of base members.

Another object of the invention, in an ear ornament assembly of the character briefly outlined above, is to provide a novel separable attachment means between the base support and the ornament proper including male and female counterpart devices and wherein the male fastening device is affixed to the base member and serves the additional function of providing a convenient manipulating handle whereby the base support may conveniently be applied to the external ear.

Another object of the invention in an ear ornament assembly is to provide a base ornament support which possesses a sufficient degree of stability when operatively applied to the external ear that it will support ornaments of considerably heavier construction than is possible in connection with earrings of the clip-on type.

Yet another object of the invention is to provide such an ear ornament assembly wherein the separable fastening device is so disposed on the base member that it projects through the intertragic notch and is substantially concealed therein from view.

A further object of the invention is to provide such an ear ornament assembly wherein the weight of the ornament and its base supporting member is widely distributed over the surface of the external ear so that no pull will be felt by the user on any part of the ear and so that no discomfort will be apparent to the user.

The provision of an ear ornament assembly which is extremely simple in its construction and which therefore

may be manufactured at a relatively low cost; one which is comprised of a minimum number of parts, particularly moving parts and which therefore is unlikely to get out of order; one which, despite its light weight and relatively small mass, is rugged and durable and which therefore is possessed of a long life; one in which the component parts thereof are readily susceptible to injection or other plastic molding operations; one which is attractive in its appearance and pleasing in its design, and one which otherwise is well adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

Other objects and advantages of the invention, not at this time enumerated, will become more readily apparent as the following description ensues.

In the accompanying two sheets of drawings forming a part of this specification several illustrative embodiments of the invention have been shown.

In these drawings:

FIG. 1 is a plan view of an ear ornament assembly constructed in accordance with the principles of the present invention;

FIG. 2 is a side elevational view of a right human ear showing the ornament assembly of FIG. 1 operatively applied thereto;

FIG. 3 is a sectional view taken substantially along the line **3**—**3** of FIG. 2;

FIG. 4 is a side elevational view, similar to FIG. 2, with the ear ornament proper removed and showing the manner in which the base member of the assembly is installed in the ear;

FIG. 5 is a plan view of the base member of FIG. 3;

FIG. 6 is a side elevational view of the structure shown in FIG. 4;

FIG. 7 is an enlarged sectional view taken substantially along the line **7**—**7** of FIG. 5;

FIG. 8 is an enlarged sectional view taken substantially along the line **8**—**8** of FIG. 5;

FIG. 9 is an exploded perspective view showing a separable fastening device employed in connection with the present invention;

FIG. 10 is an enlarged sectional view taken substantially along the line **10**—**10** of FIG. 5;

FIG. 11 is a sectional view taken substantially along the line **11**—**11** of FIG. 10;

FIG. 12 is an enlarged fragmentary perspective view of a portion of the structure shown in FIG. 5 and illustrating the mode of assembly of the three principal component parts of the base member; and

FIG. 13 is a sectional view taken substantially along the line **13**—**13** of FIG. 12.

Referring now to the drawings in detail and in particular to FIG. 3, as a preliminary introduction to the present invention, a right human external ear has been disclosed in this view and designated in its entirety at E. It is to be noted that the tragus *a* is a small lobe-like eminence which projects rearwardly over and is spaced slightly from the depression *b* which leads to the external auditory canal. The anti-tragus *c* is a similar small lobe-like eminence which opposes the tragus and which projects rearwardly and likewise is spaced slightly from the depression *b*. The tragus and anti-tragus are separated by so-called intertragic notch *d*. Both the tragus and the anti-tragus are formed of relatively firm cartilage and are thus fairly firm so that they constitute suitable spaced anchorage flanges within the lower region of the concha *e* behind which a portion of an ornament-supporting base member, such as the member designated at **10**, may be securely nested.

Still referring to FIG. 3 in the upper regions of the external ear E, the relatively flexible helix *f* bounds the upper margin of the ear, faces forwardly, and overlies the anti-helix *g*. The latter, in turn, overlies the upper margin of the concha *e*. The anti-helix *g* is formed of hard

cartilage and this portion of the ear, being slightly spaced from the concha, defines a recess or pocket within which another portion of the ornament-supporting base member **10** is nested. The forward upper region of the anti-helix *g* in a large percentage of human ears passes under the extreme forward region of the helix *f* and, in combination with the latter, establishes a notch such as has been designated at *m* and which will hereinafter be referred to as the interhelix notch, such term being coined merely for descriptive terminology herein since there is no medical authority for it.

Returning now to the intertragic notch *d*, the depth of the pocket *n* which exists behind the anti-tragus *c* is of appreciable magnitude and this pocket is more remote from the auditory canal than is the pocket which lies behind the tragus *a*. This pocket is thus suitable for the nesting of a third portion of the ornament-supporting base member **10**.

With the base member **10** thus nested within three fairly widely spaced pockets within the external ear structure, a three point suspension is provided for the base member as a whole, and for any ornament which may be applied to the base member. Furthermore, since the three pockets or recesses generally oppose one another or, in other words, face toward a common central region, these pockets serve to maintain the base member against shifting in any direction in a vertical plane as well as against rotation in a vertical plane.

A complete ear ornament assembly has been illustrated in FIG. 1 and, briefly, it is comprised of two principal parts including the previously mentioned base member **10** and an ornament proper **12**. The base member **10** and ornament **12** are separable, the assembly and separation thereof being made possible by a separable male-female connector assembly **14** (see also FIG. 9) which will be described in detail presently.

The ornament **12** illustrated herein is exemplary of a typical ornamental design and it may assume numerous forms and contours. Whatever form the ornament **12** may assume, it is essential that the same be smooth on the inside thereof and that it have sufficient width to extend an appreciable distance over both the tragus *a* and the anti-tragus *c* so as to conceal the intertragic notch *d*. The ornament **12** carries the female portion **16** of the separable connector assembly **14** while the base member **10** carries the male portion **18** thereof. The base member **10** is so disposed within the external ear that the male portion of the separable connector assembly **14** is in register with the intertragic notch from the inside of the ear, and the ornament **12** carries the female portion of the assembly **14** at a location where when it is projected through the intertragic notch and caused to become coupled with the male portion, the ornament overlies portions of both the tragus and the anti-tragus, the extent of such overlying being, of course, dependent upon the specific size of the ornament.

Referring now to FIGS. 4 to 8 inclusive, and in particular to FIGS. 4 and 5, the base member **10** is comprised of two principal parts, including a curved part **20** which hereinafter will be referred to as a strut inasmuch as it extends across the outer ear inside the overall cup-shaped ear cavity from the lower region to the upper region thereof. Specifically, it extends between the intertragic notch *d* and the herein termed interhelix notch *m*. The lower end of the strut **20** is in the form of a small flattened nodule **22** of hollow and somewhat flattened and therefore disk-like design (see also FIGS. 11 and 12) and it is designed to encase certain spring-biasing mechanism, the nature of which will be made clear presently. The nodule **22** fits snugly within the relatively deep pocket (FIG. 2) which lies within and behind the anti-tragus and the tragus.

The upper end **24** of the strut **20** is generally of hook shape design and it is likewise somewhat flattened. In some ears it will extend into the crevice existing between

the helix *f* and the concha *e*; in others it will extend into the crevice between the anti-helix *g* and the concha. In most ears it will underlie both the helix and the anti-helix and thus fit in the pocket behind the interhelix notch *m*.

The medial region of the strut **20** between the two notches *d* and *m* is more or less oval in transverse cross section as shown in FIG. 7. When positioned in the ear, the curved strut **22** is bowed rearwardly so as to pass around the rearwardly extending raised rib *n* which passes partially across the concha *e*. The strut **20** is not conspicuous within the ear inasmuch as it is formed of a transparent plastic material such as Lucite or the like and, if desired, it may be faintly tinted a flesh color. With the upper and lower ends of the strut **20** nested within respective pockets at widely spaced regions across the ear, and with the bowed medial region thereof resting against the concha *e*, the strut is prevented from turning about a vertical axis in one direction. It is prevented from turning about such axis in the other direction by means of a spring biased lever arm **26**.

The lever arm **26** is formed of a plastic material similar to that of the strut **20** and it is molded about the distal end of one leg **28** of a V-spring **30** (FIGS. 10 and 11) having one or more loops **32** constituting the bight portion thereof. The loops **32** extend around a central shaft **34** which is seated within opposed bosses **36** provided internally of a cylindrical chamber **38** formed in the hollow nodule **22**. The other leg **40** of the V-spring **30** is confined within an elongated channel **42** provided internally in the proximate end region of the bowed strut **20**. As a manufacturing or molding expediency, the strut **20** may be formed in two sections as shown in FIG. 12, one section **50** being in the form of a cap member and the other section **52** constituting the remainder of the strut **20**. The seam line where the two sections are adhered together by a suitable adhesive or solvent is shown at **54**. Both sections are relieved to provide a slot **56** through which the leg **28** of the V-spring **30** as well as the proximate region of the spring biased lever arm **26** project radially outwardly as best seen in FIG. 12.

As shown in FIG. 5, the lever arm **26** is substantially straight and the distal end region **58** thereof is in the form of a flattened nodule. When the strut **20** is properly disposed within the ear structure as previously described with its ends in the vicinity of the notches intertragic and interhelix notches *d* and *m* respectively, the lever arm nodule **58** fits behind the anti-helix *c* in the crevice which exists between the anti-helix and the lower region of the concha *e*.

Referring now to FIGS. 9 and 12 wherein the details of the separable connector assembly **14** are best illustrated, this assembly constitutes an important feature of the present invention in that the male part **18** thereof constitutes a convenient protuberance by means of which the base member **10**, as a whole, may be manipulated when installing the same within the external ear. The male member **18** is in the form of an elongated post of I-shaped configuration in transverse cross section and it includes spaced flanges **60** and **62** connected together by a medial web **64**. The web diminishes in thickness toward one end of the member and the narrow end of the web, as well as the adjacent ends of the flanges **60** and **62**, are secured to a face of the hollow nodule **22** in any suitable manner as for example by an adhesive.

The female counterpart **16** of the assembly **14** is in the form of a wide spring clip **70** which is generally of U-shape in longitudinal cross section and has outwardly flared free edges **72**. The cross sectional shape of the member **16** is conformable to the longitudinal cross sectional shape of the web portion **64** of the male part **18** of the connector assembly **14**. The part **16** is adapted to be forced over the web **64** and be centered between the flanges **60** and **62** when the two parts are assembled.

The bight portion **74** of the female part **16** is adapted to have an ornament such as the exemplary ornament **12** permanently attached thereto and accordingly the bight portion may be flattened as at **76** to facilitate soldering of the ornament thereto in case the clip **16** and male part **18** are formed of metal, or to facilitate the adhesive bonding of the ornament in case the clip and male part are formed of a plastic material. It is contemplated that in marketing the ear ornament of the present invention a purchaser will be supplied with a pair of the base members **10**, one constructed to fit the right external ear and the other constructed to fit the left external ear, and that a large variety of the ornaments **12** be made available in pairs for selective attachment to the base members by means of the separable connector assembly **14** described above.

In the application of the base member **10** to the external ear, the male part **18** of the connector assembly **14** may be employed as a manipulating handle since it projects laterally outwardly from the nodule **22** a sufficient distance to enable it to be grasped between the thumb and forefinger. Since it is non-cylindrical in its contour, the necessary degree of torque may be applied to the base member as a whole to properly orient it while inserting it into the overall ear cavity. Present day ear ornaments or hearing aid devices which employ base members that fit into the external ear cavity and which have detachable ornaments or hearing aid chassis applied thereto usually employ snap fasteners which are circular in transverse cross section and in which the female part of the fastener is carried by the base member so that it is necessary when applying the base member to the ear to grasp the body of the base member. This results in awkwardness in many instances. Particularly where the finger nails of the user are unduly long, there is the danger of scratching or gouging the external ear.

When using the male part **18** of the connector **14** as a manipulative handle as described above, the lever arm **26** may first be inserted into the crevice behind the antitragus, after which the spring **30** may be placed under tension to enable the strut **20** to be swung closer to the arm **26** and the distal hook **24** to be unserted behind the interhelix notch *m*. The male part **18** of the separable connector **14** will then project through the intertragic notch *d* ready for application thereto of the clip or female part **16** and its attached ornament **12**.

The pressure exerted by the spring **30** is not great and it is just sufficient to maintain the nodule **58** at the distal end of the lever arm **26** in position within the crevice behind the anti-tragus and to maintain the hook **24** at the upper end of the strut **20** within the crevice which lies behind the antihelix notch. The base member is thus automatically adjustable to fit a wide variety of ear sizes and shapes so that it is not required that it be manufactured in more than three or four different sizes to fit the entire range of human ear dimensions. With the three portions of the base member, namely the nodule **22**, the nodule **58** and the hook **24** disposed behind respective tissue or cartilage portions of the ear which overlie the concha *e*, the base member is securely held within the external ear against dislodgement outwardly or against shifting in any direction in a vertical plane, as well as against turning movement about a vertical axis.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit of the invention. Therefore, only insofar as the invention has particularly been pointed out in the accompanying claims is the same to be limited.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. A composite ear ornament including a base member including an elongated narrow strut part dimensioned so as to be capable of having one end thereof received within the pocket of the external ear which lies

behind and below the intertragic notch near the bottom of the concha, and of having the other end thereof received within the crevice which lies behind the anti-helix near the top of the concha, said elongated strut part being bowed or curved in a direction wherein the medial region thereof lies substantially flat against the medial region of the concha and avoids contact with the raised rib at the juncture between the helix and the tragus, said one end of the strut part being of hollow construction providing an internal chamber having a cylindrical wall, there being a slot in said wall, said slot being elongated circumferentially of said wall and lying at that side of said one end facing away from the direction of said curve, a shaft extending across said chamber, a lever part pivotally secured at its proximate end to said shaft and projecting radially outwardly through said slot and of such length that its distal end is adapted to fit within the crevice which lies behind the anti-tragus, means yieldingly biasing said lever and strut angularly apart so that upon application of pressure to the strut and lever parts tending to decrease their angularity relative to each other, the base member as a whole may be contracted immediately prior to application of the base part to the external ear, an ornament proper adapted to overlie the intertragic notch, and means adapted to extend through said intertragic notch for securing said ornament proper to said one end of the strut part.

2. A composite ear ornament as set forth in claim 1 and wherein said biasing means comprises a V-spring having one leg fixedly secured to the lever part and the other leg fixedly secured to the strut part.

3. A composite ear ornament as set forth in claim 1 and wherein said biasing means comprises a V-spring

having one leg fixedly secured to the lever part and the other leg secured to the strut part, and its bight portion encircling said shaft.

4. A composite ear ornament as set forth in claim 1 and wherein said other end of the strut part is turned laterally to provide a curved hook of sufficient extent that the distal end of the hook may underlie the anti-helix while the base of the hook may underlie the helix with the hook lying behind the interhelix notch.

5. A composite ear ornament as set forth in claim 1 and wherein said one end of the strut part and the distal end of the lever part are formed with enlargements designed to fit the respective pocket and crevice within which said ends are adapted to lie.

6. A composite ear ornament as set forth in claim 1 and wherein said securing means comprises a separable connector, a separable connector including a male post member secured to said other end of the strut part and adapted to project through the intertragic notch, and a cooperating female socket member secured to the ornament proper.

7. A composite ear ornament as set forth in claim 6 and wherein said male post member is of non-circular transverse cross section throughout.

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