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 designing 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 from the ear behind with conventional earrings, while earrings 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 of conventional earrings, while earrings which hang in the intertragic notch are susceptible to dislodgement 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 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 direction in any 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 removed 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 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.

Yet 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.

Another object of the invention in an ear ornament assembly, is to provide a base member which is 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 supports may selectively choose ornaments to match various ensembles without requiring 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 and 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 combination 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 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 together with a portion of the concha of the ear;

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 smaller 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 intertragus notch d. Both the tragus and anti-tragus are formed of relatively firm cartilage and are therefore 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 nestled.

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 interheliex notch, such term being coined merely for descriptive terminology herein since there is no medical authority for it.

Returning now to the intertragus notch d, the depth of the pocket a 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 intertragus 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 intertragus 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 intertragus notch and caused to become coupled with the male portion, the ornament overlies portions of both the tragus a and the anti-tragus c, 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 intertragus notch d and the herein termed interheliex 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 FIGS. 11 and 12) and it is designed to encase certain spring-elastic and resilient, or similar, elements, 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 inter-helix notch \(m\).

The medial region of the strut 20 between the two notches \(d\) and \(m\) may be 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 rib \(n\) which passes partially across the concha \(e\). The strut 20 is not constrictive within the ear inasmuch as it is formed of a transparent 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 nestled 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 an 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 configured 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 two sections are joined 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 node. 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 inter-helix notches \(d\) and \(m\) respectively, the lever arm nodules 26 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 protrubance 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 T-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 75 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, 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 auditory meatus may 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 anti-tragus, 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 inserted behind the inter-helix notch \(m\). The male part 18 of the separable connector 14 will then project through the intertragic notch 12 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 antrihelix 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 being received in 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 inter-helix 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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