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R. E. TRESISE ET AL

2,761,018

HEARING AID HAVING A MOLDED CHASSIS

Filed March 2, 1949

2 Sheets-Sheet 1

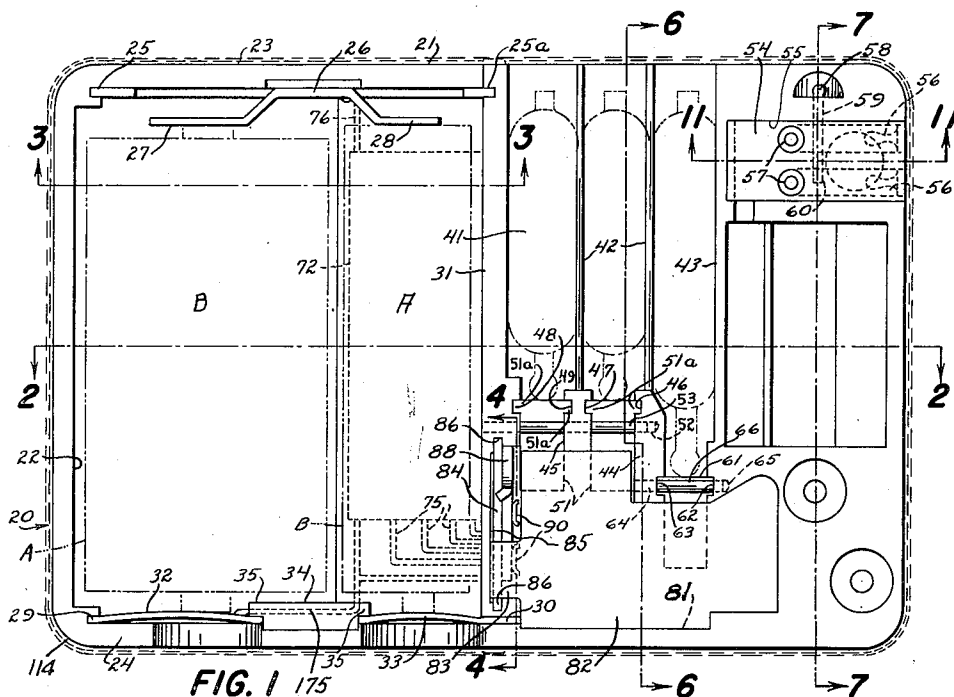


FIG. 1

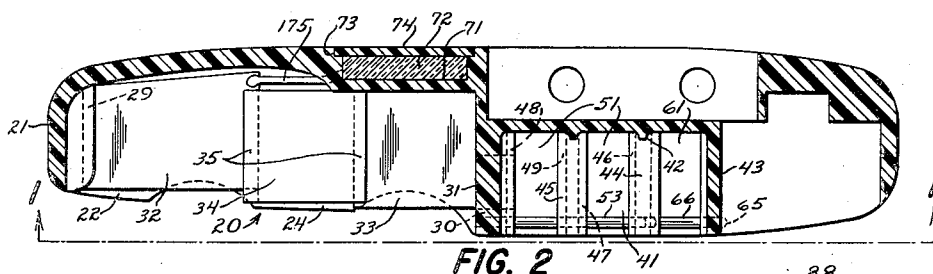


FIG. 2

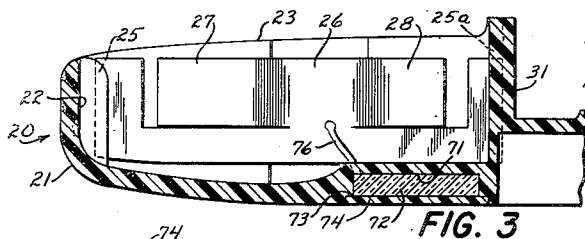


FIG. 3

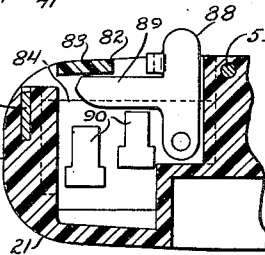


FIG. 4

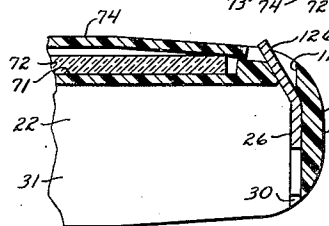


FIG. 5

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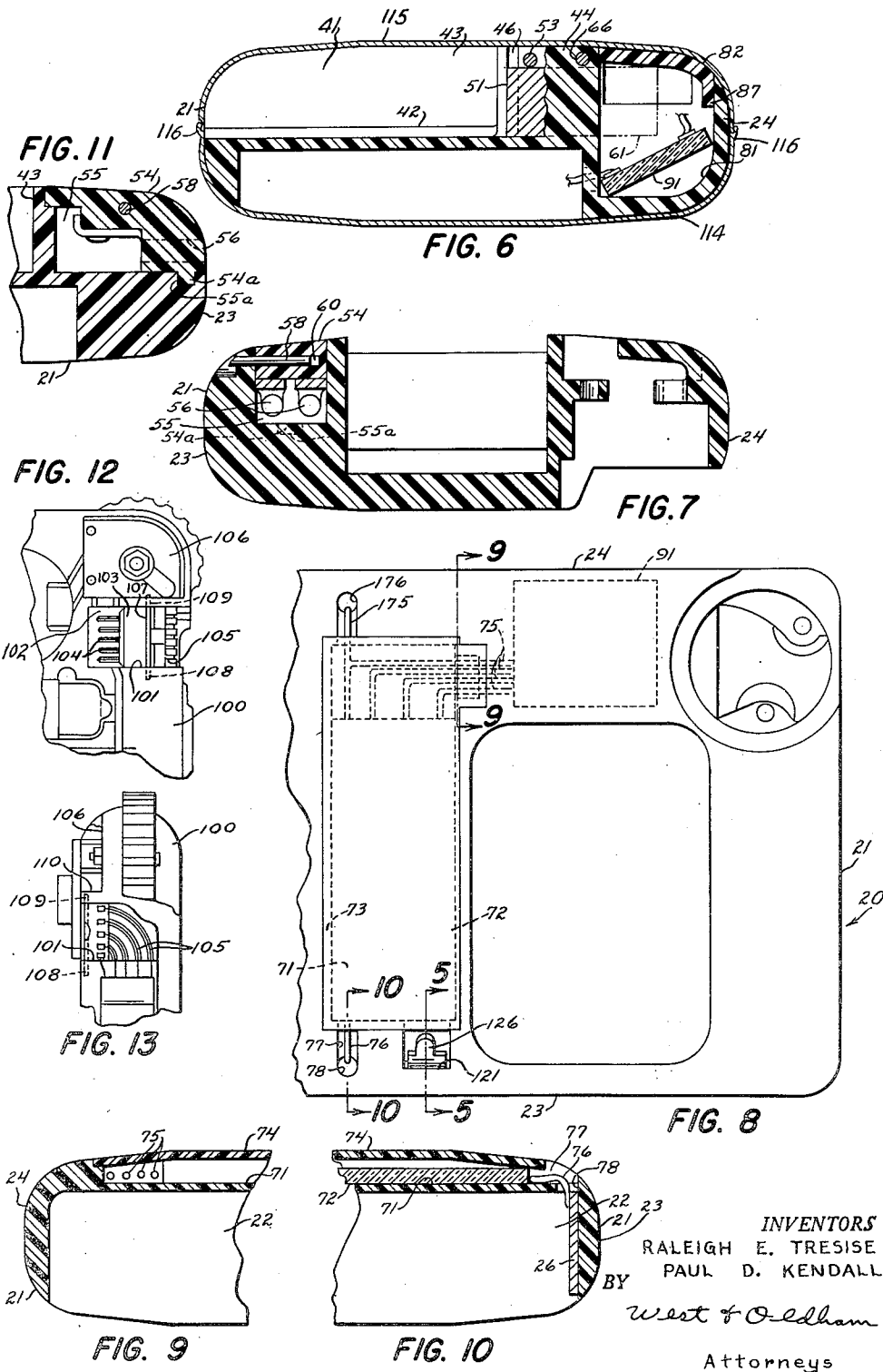
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2 Sheets-Sheet 2



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HEARING AID HAVING A MOLDED CHASSIS

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Application March 2, 1949, Serial No. 79,146

12 Claims. (Cl. 179—107)

This invention relates to hearing aids in general, and specifically relates to a hearing aid having a molded chassis wherein the chassis has a plurality of hearing aid element receiving recesses formed therein.

This invention relates to a hearing aid structure of the type disclosed in our co-pending application Serial No. 636,459 and is an improvement thereon being a continuation in part thereof in that the present molded chassis for receiving hearing aid elements has recesses therein for receiving all the elements of the hearing aid electrical circuit, together with the batteries providing the power supply therefor.

In a hearing aid, it is particularly desirable to provide a small, compact apparatus since normally such apparatus is carried by an individual and is generally received in a pocket or other portion of the clothing of the wearer. Hence any bulky apparatus is objectionable and a minimum size element is very desirable. Such a construction still must not sacrifice desired operating characteristics and it also should be capable of withstanding the fairly rough use to which hearing aids are subjected.

The general object of the present invention is to provide a novel, compact hearing aid apparatus wherein a special contoured chassis is provided and has recesses provided therein for receipt of and positioning of all elements of the electrical circuit of a hearing aid, including the power supply therefor.

A further object of the invention is to provide a molded chassis for a hearing aid wherein the chassis is adapted to reinforce a surrounding casing at substantially all points.

A further object of the present invention is to secure individual hearing aid elements in recesses provided therefor in a mounting chassis, which elements can easily be inserted into or removed from the special cavities provided therefor.

A further object of the invention is to provide a positive anchoring device between removable portions of a hearing aid electrical circuit and a chassis on which such elements are positioned.

A further object of the invention is to provide insulating covers for retaining hearing aid elements insulated from a carrying case in which the chassis is received.

Yet another object of the invention is to provide maximum protection, both physically and electrically, of the elements of the hearing aid circuit from a carrying case surrounding them.

Still another object of the present invention is to provide indexing means on a mounting chassis for association with a removable hearing aid component to be received in a recess in the chassis.

Another object of the invention is to provide a rigid carrying chassis for all of the components of a hearing aid so that fixed electrical contacts may be provided between the batteries of the hearing aid and the remainder of the electrical circuit of same.

Another object of the invention is to provide contact

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plates in a hearing aid which can easily be inserted into engagement with the chassis by a minimum of labor and with the contacts being inexpensively formed and assembled.

Another object of the invention is to provide a special unitary contact plate for a plurality of batteries in a hearing aid.

Other and more limited objects of the present invention are to provide a resilient grounding arm which is formed integrally with a contact plate of the hearing aid and is adapted to bear automatically upon a carrying case for the chassis of the invention; to provide a path for a connection for a lead extending from one contact plate in the battery positioning recess over to the remaining portion of the chassis; to position a hearing aid element in a complementary formed or sharpened recess in a chassis so that the element can easily be secured therein; and to provide a simple, inexpensive but positive means for assembling a hearing aid element in fixed position in a positioning chassis.

The foregoing and other objects and advantages of the invention will be made more apparent as the specification proceeds.

For a better understanding of the invention, reference should be had to the accompanying drawings, wherein:

Fig. 1 is a plan taken on line 1—1 of Fig. 2 of a hearing aid having a molded chassis and the bottom portion of a surrounding casing shown in dotted lines with only a portion of the hearing aid elements being shown positioned therein, which hearing aid embodies the principles of the present invention;

Fig. 2 is a longitudinal vertical section of the molded chassis taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary section of the molded chassis taken on line 3—3 of Fig. 1 to show the battery receiving recess and a special contact plate of the invention;

Fig. 4 is a fragmentary vertical section of the molded chassis taken on line 4—4 of Fig. 1, of a switch mounted in accordance with the invention;

Fig. 5 is a fragmentary vertical section taken on line 5—5 of Fig. 8, of a ground contactor;

Fig. 6 is a transverse vertical section taken on line 6—6 of Fig. 1 with the exception that the casing is shown sectionally in full line;

Fig. 7 is a transverse vertical section of the molded chassis taken on line 7—7 of Fig. 1 to show the positioning of an output connector block in the hearing aid;

Fig. 8 is a fragmentary bottom plan of a portion of the molded chassis and elements contained therein of the invention;

Fig. 9 is a fragmentary vertical section of the hearing aid taken on line 9—9 of Fig. 8 to show a portion of the leads extending from the printed circuit panel shown in Fig. 8;

Fig. 10 is a fragmentary transverse section taken on line 10—10 of Fig. 8 to show a contact wire leading from the printed circuit panel to a battery contact;

Fig. 11 is a fragmentary section of the outlet connector taken on line 11—11 of Fig. 1; and

Figs. 12 and 13 are a fragmentary plan and a side elevation, respectively, of a modification of the invention.

The present invention, broadly speaking, relates to a hearing aid which includes a molded chassis having a plurality of specially contoured recesses formed therein for receipt and positioning all of the hearing aid elements, including the batteries, in fixed relation. The chassis is provided with at least one pair of opposed channels on one side of the battery receiving recess for sliding engagement with a spring metal contact plate adapted to contact and aid in positioning a battery in the chassis, with other special positioning means being provided in the chassis

for engagement with individual hearing aid elements received in the chassis for retaining such elements in a given position, and with cover means being provided for at least some recesses and the elements therein.

Reference is now made to the details of the structure shown in the accompanying drawings and in this instance there is shown a hearing aid element indicated generally by the numeral 20. This hearing aid element or apparatus includes a special substantially rectangular mounting chassis 21 which is formed from any moldable insulating material which may comprise one of the usual plastic materials, rubber, wood or the like and, specifically, might comprise a cellulose acetate butyrate material such as "Tenite." The chassis 21 is of appreciable depth, is usually rigid and strong, and is formed of a predetermined contour and has an externally shaped periphery substantially complementary to the inside contour or shape of the carrier case in which the chassis 21 is to be received for use. Normally the carrier case will be formed from a relatively thin material which will be reinforced by the chassis 21. The carrier case, as shown in Figs. 1 and 6, having a bottom section 114, and a top section 115 is in close fitting engagement with the chassis 21. The casing may be readily removed by providing an interlocking tongue and groove connection 116.

Another feature of the chassis 21 is that in forming or molding same a plurality of desired specially contoured recesses may be provided in which different hearing aid elements may be positioned. One recess 22 is of substantially rectangular contour and may be considered to be formed in the face surface of the chassis, and it is appreciably larger than any other recesses formed in the chassis 21. This recess 22 is the battery or power supply receiving recess for the hearing aid apparatus and is formed in the face of the chassis 21 adjacent one end thereof. The battery receiving recess 22 has a pair of opposed walls 23 and 24 partially defining same and the wall 23, as a special feature of the invention, has a pair of opposed channels, or recesses 25 and 25^a formed in spaced end portions thereof for receipt of a contact plate 26 therebetween by a telescopic or sliding engagement between the end portions of the contact plate 26 and the channels 25 and 25^a. It will be noted that the wall 23 provides an exposed or open surface between the channels 25 and 25^a, whereby a portion of the contact plate 26 may extend directly therebetween. However, the contact plate 26 also is provided with two inwardly extending offset contact sections 27 and 28. These contact sections 27 and 28 are resilient and serve to aid in positioning batteries in the recess 22, as will be hereinafter explained. The wall 24 defining the recess 22 also has a channel or recess 29 formed in one edge thereof. Adjacent the other margin of the portion of the wall 24 forming the recess 22, there is a slot 30 formed in the upper portion of a partition or wall 31 which defines the inner lateral margin of the recess 22. Usually to simplify the positioning of two separate contact plates 32 and 33 in the recess 22, a separate block or insert 34 may be secured to the wall 24 intermediate the margins of the recess 22. This insert 34 is provided with overhanging lateral edges 35 each of which provides, in effect, a channel or recess between the inner edge surface of the insert 34 and the adjacent portion of the margin or wall 24. Thus the contact plates 32 and 33 can be telescoped into engagement with the edges of the block 34 and channel 29 and slot 30.

Another feature of the present invention resides in the means used to secure a terminal or connector block to the chassis 21. Thus a recess 41 is provided in the chassis 21 intermediate the ends thereof and extending substantially transversely of the hearing aid. This recess 41 has a pair of ribs 42 formed in the bottom surface thereof for separating different vacuum tubes which are thereafter usually positioned in the recess 41. The recess 41 is bounded on one side by the wall 31 and on

the other side by a second partition wall 43. One end portion of the recess 41 extends to the side edge of the chassis 21 and is open at such end for receipt of the tubes to be secured therein. The inner end of the recess 41 has a plurality of abutments 44 and 45 terminating same, the outer surfaces of which lie in substantially the same horizontal plane as the outer surface of the wall 31. These abutments 44 and 45 each have a channel 46 and 47, respectively, formed in opposed edge portions thereof and extending the height thereof being open to the exposed face of the chassis 21. The adjacent portion of the wall 31 is thickened appreciably adjacent the abutments 44 and 45 and has a channel 48 formed therein similar to the channels 46 and 47. The abutment 45 also has a channel 49 formed therein and the channels 48 and 49 are formed so that they are in opposed relationship whereas the channels 46 and 47 are likewise in opposed relationship and are open from one margin of the chassis 21. Thus a properly shaped hearing aid element can be slid into engagement with either pair of channels desired so as to position such hearing aid element, such as a socket or terminal, or contactor block 51 between each pair of channels. The sockets 51 have lugs 51^a formed on opposite sides thereof for engagement with the channels 46 and 47, and 48 and 49.

An important feature of the present invention is that the wall 31, and the abutments 44 and 45 all have what may be considered to be a continuous hole 52 formed therein. This hole 52 extends completely through the wall 31 and the abutment 45 whereas it only extends partially into the abutment 44, as indicated in Fig. 1. Thus a pin 53 can be telescoped into engagement with the hole 52 from the side of the battery receiving recess 22. The pin 53 then normally will overlie the sockets 51 which are in engagement with the respective channels referred to hereinbefore to retain same therein.

As another important feature of the present invention, an output connector block 54 is in snug engagement with an elongate, shallow recess 55 formed in one end of the face surface of chassis 21, as best shown in Figs. 1 and 7, in which the battery receiving recess 22 and the vacuum tube recess 41 are formed. This connector block 54 is provided to engage with a pair of jacks or other members used to form a removable output connection with the hearing aid of the invention. Hence a pair of connector sockets 56 are provided in one end portion of the block 54 and they connect to a second pair of lead receiving sockets 57 which are formed in another portion of the connector block 54 and are adapted to have leads or connector means secured thereto from the remainder of the hearing aid apparatus. Another novel feature of the connector block 54 is that it is secured in place by a pin 58. This pin 58 is engaged with a hole 59 that is formed in the chassis 21 and with a hole 60 that is formed extending partially into the connector block 54 from the side thereof. When the connector block 54 is properly positioned, the holes 59 and 60 are in alignment and the outer end of the hole 59 is exposed since it extends from a lateral side margin of the chassis 21.

Fig. 11 of the drawings best shows that the block 54 has a little protuberance 54^a formed in the base portion thereof and that a complementary shaped socket or seat 55^a is formed in the base portion of the recess 55 for receipt of the boss 54^a to retain the connector block 54 in a fixed position with relation to the recess 55.

Yet a third socket or connector block 61 may be positioned at the inner end of the vacuum tube receiving recess 41. In this instance, a channel 62 is formed in a thickened portion of the wall 43 adjacent the abutment 44. This abutment 44 is slightly longer than the abutment 45 and in the rear portion thereof facing the channel 62, a channel 63 is formed in such abutment in opposed relation to the channel 62 whereby yet another socket or other desired member can be telescoped into engagement with such pair of channels 62 and 63. Again, a hole 64

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is formed in the abutment 44 and it is in alignment with a hole 65 that is formed into but does not extend through the wall 43. Thus another pin 66 may extend through the holes 64 and 65 to retain a socket 61 in place. It will be seen that the socket 61, like the other sockets used in the apparatus of the invention, usually is smaller in height than the recess 41 and associated elements whereby the sockets can be slipped down into engagement with the associated sets of channels below the pin receiving holes formed therein. Thus the pins are located externally of but usually in contact or engagement with the sockets, but, if desired could extend through a hole in same to secure them in the chassis.

While there have been shown herein sockets having lugs or rails formed on the sides thereof, in some instances it may not be necessary to use a definite sliding engagement between the chassis and the hearing aid element. Also, the channels may be formed on the hearing aid part and the rails or lugs on the chassis, or the element may be solely engaged with the chassis by the snug fit between a special receiving recess and a hearing aid element. In all events, a pin, when used to secure the hearing aid element in the chassis, may engage with spaced portions of the chassis and the elements either directly or indirectly, or with only the hearing aid element and the chassis alone so as to retain a hearing element in a desired recess. Of course, it is desirable to form the hearing aid element and the recess of complementary shape so that the element can be snugly positioned in a carrying and mounting chassis.

Another feature of the invention is that the contact plate 26 has a little ear 126 extending therefrom as shown in Figs. 5 and 8. This ear 126 extends through a small hole 121 formed in the chassis 21 and protrudes therefrom. The ear 126 is of a resilient construction and is used for contact with the carrying case for the hearing aid apparatus. The ear 126 then will form a ground connection for both of the batteries received in the recess 22.

Another salient feature of the present invention resides in a recess 71, Fig. 2, which is formed in the back of the chassis 21. This recess 71 is of a relatively rectangular shape and is of quite shallow construction. The recess 71 lies behind the battery receiving recess 22 which is relatively deep. The recess 71 receives a flat hearing aid element component such as a printed circuit panel 72 therein. It should be noted that the recess 71 has a shoulder portion 73 formed in the walls thereof and extending substantially therearound. Thus after the panel 72 is positioned in the recess 71, it is possible to place an insulator or cover panel sheet 74, made from any suitable material, over the recess 71. This panel 74 is adapted to be supported on the shoulder 73 and may be permanently secured thereto, if desired, by cementing or otherwise securing the cover member in position. The panel 72 normally has a plurality of leads 75 extending from one end thereof whereas a lead 76 extends from the other end thereof, as shown in Fig. 8 and through a channel recess 77 and hole 78 to an edge of the battery recess 22 where it connects to the contact plate 26. A special lead 175 may extend from the other end of the panel 72 through a recess and hole 176 to extend below the block 34 and connect to the contact 32. It should be noted that the cover 74 smoothly blends in with the periphery of the chassis 21 and protects the printed circuit panel from shorting against the casing or being otherwise disturbed. The leads 76 and 175 are below the periphery of the chassis and hence protected from contact with any carrier case used.

In another portion of the apparatus, a recess 81, best shown in Fig. 6, is provided for receipt of a portion of a connector circuit including another printed circuit panel 91. This recess 81 is relatively deep and it has a plurality of leads received therein, primarily from the sockets 51 and 61. A cover 82 is provided for blending into the periphery of the chassis 21 and forming a protective cover

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for the recess 81 and the electrical means received therein. The cover 82 may be supported on the chassis in any desired manner. In this instance, a little extension lug 83 is formed on one side of the cover 82 and it may bear upon either wall 31 or, usually, an elongate tone control switch 84 which is positioned in the wall in a recessed portion thereof. This recessed portion 85 of the wall 31 is provided with a pair of spaced but opposed channels 86 which are adapted to engage with end portions of the switch 84 whereby such switch can be slid into snug telescoped engagement with the recess 85 and be retained in such position. An arcuate inner edge portion 87 is also provided on the cover 82 and it protrudes down inwardly with relation to a lateral margin of the chassis 21. The cover 82 also is supported at its inner edge by bearing on the sockets 51 and 61. The edges of the walls forming the recess 81 may have supporting shoulders formed thereon, if desired, or suitable elements may be used to retain the cover 82 secured to adjacent portions of the chassis 21.

Fig. 4 best shows that the switch 84 may include a pivotally movable contact arm 88 which has an extension 89 formed thereon for engagement with contacts 90 provided on base portions of the switch 84. A portion of the contact arm 88 protrudes above the periphery of the chassis 21 to permit the position of the switch to be readily controlled from a point exterior to the chassis.

In the drawing, there are shown a plurality of other recesses formed in the chassis 21 and the particular shape and spacing or size of such recesses and the elements (not shown) received therein are not parts of the present invention. The chassis 21 has apertures or slots or recesses provided therein where it is desired to pass conductors from one recessed portion thereof to another so that the conductors are retained within the contour or periphery of the chassis.

Yet another method of mounting hearing aid elements or apparatus in a recess in the chassis used in the invention is shown in Figs. 12 and 13 of the drawings. In this instance a molded chassis 100 is provided with a specially contoured recess 101, which would usually have a flat base surface 102. The recess 101 is specially contoured and is shaped complementary to the bottom surface of a hearing aid element such as a socket 103. This socket 103 has a plurality of leads 104 extending into one side thereof which leads may extend from a vacuum tube, and a plurality of leads 105 extend from the other side thereof so that the socket member 103 can be used to connect any desired set or sets of conductors forming part of the hearing aid apparatus of the invention. Usually the side walls of the recess 101 are substantially vertically directed with relation to the longitudinal axis of the chassis 100 whereas when the corresponding side portions of the socket 102 are similarly contoured to provide a snug engagement between the recess and socket. The end portion of the chassis 100 may also position a control switch 106. As indicated in Fig. 13, this switch 106 is located below the vertical position of at least the upper portion of the socket 103, so that a pin 107 can be engaged with aligned holes 108 and 109 formed in the upper portions of the chassis 100 defining the recess 101. Usually the hole 109 extends completely through a wall 110 in that portion of the chassis 100 whereas the hole 108 only extends into the body portion of the chassis adjacent the other side of the recess 101. Hence the pin 107 can be threaded or telescoped into engagement with the holes 109 and 108 from the edge or corner portion of the chassis 100 after the socket 103 is slid into position in the recess 101. If desired, complementary shaped bosses and recesses could be formed on the surface of the recess 101 and the lower portion of the socket 103 to retain same against any movement longitudinally of the recess 101 since the other positioning of the socket 103 in the recess prevents actual disengagement of the socket from the recess.

The drawings also clearly show in Figs. 1 and 2 that batteries A and B may be positioned intermediate the contacts 32 and 33 and the offset portions 27 and 28 of the contact 26. Hence a resilient but effective support is provided for the batteries A and B and the same are easily inserted in or removed from engagement with such mounting and contact means.

It will be realized that the insert block 34 referred to hereinbefore may in some instances be formed integrally with the chassis, if desired. In some instances the undercut referred to hereinbefore in the base of the block 34 may be omitted, if it is not required in the chassis. The printed panel members 72 and 91 referred to hereinbefore usually include exposed contact means or wires whereby it is desirable to insulate same from the remainder of the apparatus. Of course, the cover panels used in the apparatus can in some instances be cemented in place merely by having cement positioned between two adjacent abutted edge surfaces one being on the cover panel whereas the other surface would be formed integrally with the chassis itself. Of course, spaced lugs or shoulder portions may be used in place of the continuous shoulder 73 disclosed herein.

By virtue of mounting all of the elements of a hearing aid on the chassis 21, the chassis will form a completely operative structure without the addition of any other elements thereto hence the hearing aid would work without a cover or carrying case provided therefor as long as a ground or connector wire would be provided between several different leads of the apparatus which at present are connected through the casing in which the chassis and elements are to be inserted. It should be noted that, in general, all of the components of the hearing aid are received completely within the periphery of same to prevent contact with the carrier case so that the operating elements are insulated from the carrier case which provides a ground element for the apparatus.

This present invention is a continuation in part of our joint co-pending application Serial No. 732,718.

Reference also is directed to our other joint co-pending application Serial No. 762,278 which shows a typical casing construction used to encompass the chassis of the invention.

By positioning the power supply batteries and all the remaining elements of the hearing aid in specially shaped recesses formed in the chassis of the invention, one is able to effect a positive location of the relative hearing aid elements and the connections between the batteries and other hearing aid elements are made by fixed conductors. Furthermore, the particular type of contacts used with the chassis of the invention facilitate positioning the batteries on the chassis and a ready connection means is provided for taking current from the batteries.

Any of the indicated means may be used in locating hearing aid apparatus in a specially shaped recess adapted to receive same and then a pin can be used with either the hearing aid apparatus itself and with the mounting chassis, or with just the chassis, as desired so as to lock or retain the hearing aid element in a given position. Usually the retaining pins are retained in a given position by a suitable cement. However, when required, both the locking pins used in the invention and the respective covers can be disengaged from the remainder of the chassis to permit repair or replacement of the hearing aid elements of the apparatus.

Having thus described our invention, what we claim is:

1. In a hearing aid, a molded chassis having a plurality of recesses therein for receiving and carrying hearing aid elements therein, said chassis being formed to provide a battery receiving recess in one portion thereof open from one face of said chassis and including a pair of opposed sides, said battery receiving recess being relatively large and one side formed with one pair of spaced but opposed channels and with two pairs of spaced but opposite channels on the opposite side thereof, and spring contact plates

disposed in slidable engagement with said channels in said battery receiving recess and positioned therein by said channels, a carrying case having thin walls for close engagement with said chassis, said chassis being adapted to be inserted as a unit into said carrying case.

2. A molded chassis for a hearing aid having a plurality of recesses therein for receiving and carrying hearing aid elements therein, said chassis being formed to provide a recess in one portion thereof one wall of said recess being formed to provide a pair of spaced parallel and opposed channels for slidable receipt of the end portions of a spring metal contact therein, two batteries positioned in said last named recess and a common contact plate for said batteries the end portions being engaged with said channels and having two longitudinally spaced contact sections provided thereon each of which individually engages one of said batteries, a thin carrying case for close engagement with said chassis, said contact plate having a portion extending therefrom the margins of the chassis to provide spring electrical contact with said case.

3. A molded chassis for a hearing aid having a plurality of recesses formed therein for receiving and carrying hearing aid elements therein, a hearing aid element having a body portion formed to provide a hole therein positioned in one of said recesses, said chassis being formed to provide a hole both ends of which are exposed in the portion thereof adjacent said recess, and a pin engaged with the hole in said chassis and extending therefrom to engage the hole in said hearing aid element to retain same in its position in said chassis.

4. In a hearing aid, a molded insulated chassis body formed to provide a recess therein for receipt of a connector block, a connector block disposed in said recess, said chassis and block each being formed to provide holes in alignment with each other extending thereto from an exposed portion of said chassis, and a pin in said aligned holes to retain said block in position.

5. A molded chassis for a hearing aid formed with a recess in one portion thereof said recess having a pair of spaced parallel and opposed channels formed therein open at one edge of the recess, and a terminal block smaller than said recess and having a pair of protruding lugs formed on opposite sides of same, said lugs being in slidable engagement with said channels to position said block in said chassis below the outer margin of the recess, and a pin extending across the recess and engaged with said chassis to retain said block in said recess.

6. A molded chassis body for a hearing aid formed to provide a plurality of recesses therein for receiving and carrying hearing aid elements, said chassis being formed to provide a recess in one portion thereof with a pair of spaced parallel and opposed channels, a hearing aid element having a pair of protruding lugs formed on opposite sides of same, said lugs being in slidable engagement with said channels and held thereby to position said element in said chassis, said chassis body being formed with aligned holes therein on both sides of said element receiving recess, and a pin engaged with the holes in said chassis and extending across said recess to retain said element in its position in the channels in said chassis.

7. In a hearing aid, a molded insulating chassis body formed to provide a hearing aid element receiving recess therein, a hearing aid element snugly received in said recess and being shaped substantially complementary thereto, and a pin engaged in said chassis and extending across said recess to retain said element in position.

8. In a hearing aid, a molded insulating chassis having a recess formed therein with a pair of spaced but opposed walls at least partly defining the same, said walls being formed with opposed channels therein open to the outer surface of the chassis and extending in the direction of the depth of the recess, a hearing aid component received in said recess and engaged with said channels, said chassis being formed to provide a hole therein one end of which extends through the portion defining said

recess, and a pin received in the hole in said chassis and engaged with said component to retain same in said recess.

9. In a hearing aid, a molded insulating chassis formed to provide a recess formed therein with a pair of spaced but opposed walls at least partly defining the same, a hearing aid component disposed in said recess, said chassis body being formed to provide a hole therein one end of which extends through a portion thereof defining said recess, and a pin received in the hole in said chassis and engaged with said component to retain same in said recess.

10. In a hearing aid, a molded insulating chassis having a face and having a plurality of hearing air element receiving recesses formed therein one of which is adapted to position a pair of batteries therein and is formed in the face of the chassis, and includes a wall portion, an insert block secured to the wall of said recess but being spaced from the bottom thereof and having overhanging side portions, said wall being formed to provide a channel type contact receiving slot in spaced portions thereof one on each side of said block, and a contact plate in sliding engagement with one of said slots and with an overhanging side portion of said block.

11. A hearing aid as in claim 5 wherein one member of said chassis and said block has a protuberance formed thereon and the other of said members has a recess formed thereon for receipt of the protuberance when the said block is correctly positioned in said recess.

12. A hearing aid comprising a chassis of molded plastic material formed with recesses therein for the reception of hearing aid elements, said chassis being in substantially the form of the completed hearing aid, and a

readily removable cover of thin protective material surrounding and enclosing said chassis in substantial engagement therewith and protecting the chassis against physical damage, said chassis being formed and providing a substantial close fitting contact with the cover and engaging said cover to provide a substantial support for the cover against deformation of the cover.

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