United States Patent

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[54] **HEARING AID CONTROL MOUNTING**
2 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **179/107,** 248/27
[51] **Int. Cl.** **H04r 25/02**
[50] **Field of Search** 179/107; 200/168A, 168B, 168C; d26/13; 174/54, 55, 56, 138.5, 153G; 248/27

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ABSTRACT: A control mounting assembly for an ear insert hearing aid is described which consists of a mounting ring element receivable into the surface of the hearing aid having a switch receiving area defined therein wherein a portion of the mounting element will be provided with an upstanding protective ring circumscribing the switch knob to prevent persons from accidentally pulling the control knob from the switch while still permitting normal operation of the switch.

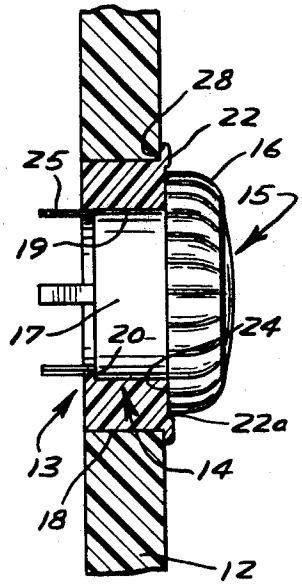


FIG. 1

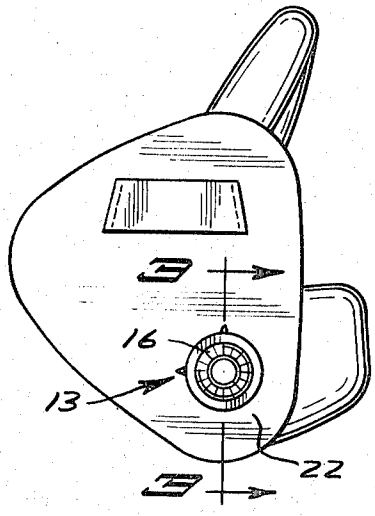


FIG. 2

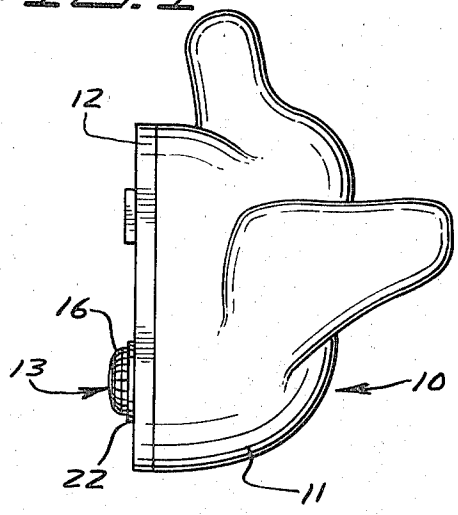


FIG. 3

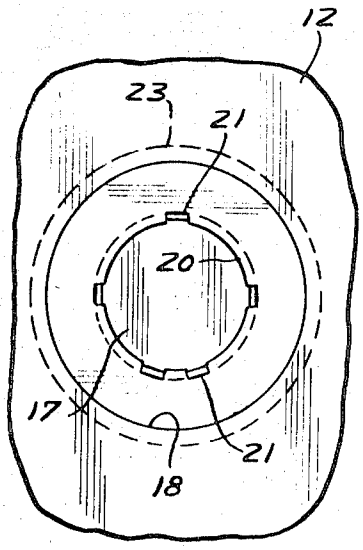


FIG. 4

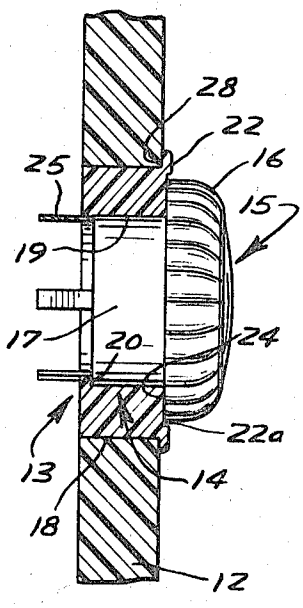
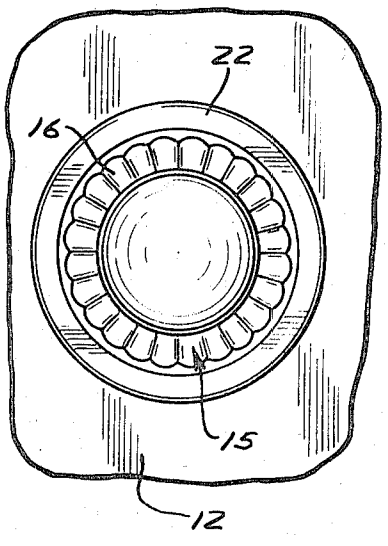


FIG. 5



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HEARING AID CONTROL MOUNTING

This invention relates to apparatus for mounting the main control element of a hearing aid within a surface plate of the unit such that the control may be removed for proper servicing thereof but providing structure which will prevent the inadvertent removal or breakage of the control knob by the user. The device basically consists of a mounting ring element receivable into a surface of the hearing aid having a switch receiving area defined therein wherein a portion of the mounting element will be provided with an upstanding protective ring circumscribing the switch knob to prevent persons from accidentally pulling the control knob from the switch while still permitting proper operation of the switch.

During the last several years the refinement of hearing aids has resulted in what is now known as the "in-the-ear" aid which consists of a complete energizeable package insertable into the canal and outer ear which requires no external wiring and the like. These units are basically completely enclosed and contain their own battery source of power. Naturally with any device aid in hearing it is necessary to control the amplification of the device and certainly to conserve on the energy of the battery source it is desireable to provide an an on-off mechanism for deenergization of the aid when not in use. On the "in-the-ear" aids this control is usually a single control element having an external control knob for operation by the user and the normal method of providing these control switches in the aids is to directly glue or otherwise adhere the switch to an aperture in the aid. This switch locating is usually accomplished with the aid of adhesives and should service be required it is often necessary to completely destroy the aid in order to service an inoperative switch.

Another difficulty with "glued in" switches is their protrusion from the surface of the aid. This protrusion is undesirable as very often the user will grasp the knob and being able to place his fingernails thereunder often tears the knob from the switch, thereby requiring replacement of the entire switch.

It is therefore an object of applicant's invention to provide a mounting structure for control switches on hearing aids and the like wherein the use of adhesives is eliminated while retaining the switch in proper position on the aid and allowing proper removal thereof only when required for servicing and the like.

It is a further object of applicant's invention to provide a protective device for the control knob of a hearing aid control switch which will prevent the user from grasping the entire knob but permitting the user to properly turn the switch and operate the hearing aid device.

It is still a further object of applicant's device to provide a structure which will permit ease of mounting and removal of control switches for hearing aids and the like.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a side elevation of an "in-the-ear" hearing aid embodying the concepts of applicant's invention;

FIG. 2 is an elevation of the device viewed from the exposed side when mounted in the ear;

FIG. 3 is a vertical section take taken substantially along line 3–3 of FIG. 2 illustrating the switch mounting portion of the hearing aid;

FIG. 4 is a top plan view of the switch mounting portion of the device; and

FIG. 5 is a bottom plan of the mounting device.

In accordance with the accompanying drawings, the hearing aid generally designated 10 illustrating an "in-the-ear" construction is generally well known in the art and includes a frontal portion 11 thereof receivable into the outer ear canal and defining a cavity therein which contains the electrocircuitry required for the operation of the aid. A rear closure plate 12 is provided to close the cavity and this plate 12 is often directly adhered to a rearmost surface of the cavity 11 such that the unit is basically sealed.

As illustrated the control section generally designated 13 is arranged on and within the plate 12 having a mounting ring structure 14 and a control switch designated generally 15 with a control knob 16 thereof extending outward from the plate 12 and the actually switch body 17 arranged within the ring 14. In this manner the control knob 16 is accessible to the user but as illustrated in FIG. 3 the control knob 16 is recessed within the control knob mounting ring 14 to basically prevent anyone from grasping the control knob 16 or inserting something therebehind to pry the same from the switch 15. This prying could be the result of a person grasping the knob and having his fingernails reach therebehind and the recession of the knob 16 within ring 14 will prevent this.

In the form shown the mounting ring 14 includes a generally cylindrical body portion 18 defining a cylindrical longitudinally extending cavity 19 therein. The length of this cavity 19 is controlled by an inwardly projecting ring 20 at the lowermost end of the housing 18 and within this ring 20 a plurality of spaced radially outwardly extending slots 21 are provided. The total longitudinal length of the mounting member 14 is designed to coincide with the thickness of the plate 12 and at the uppermost end of housing 18 an outwardly extending ring 22 is provided having a lower shoulder 23 to abut with the upper surface of the plate 12. This outward extending ring 22 is of slightly greater inner diameter than the 22*a* diameter of the longitudinal passage 19 of the housing 18 such that the knob portion 16 of the switch 15 which is slightly larger than the switch body portion 17 is free to rotate within the confines of the inner circumference 22*a* of the ring 22. The length of the cavity 19 is also controlled such that the switch portion 17 will bottom against the inwardly extending ring 20 with the knob portion 16 thereof arranged in slightly longitudinally spaced relation from an uppermost shoulder 24 of ring 14 which shoulder 24 extends to the inner circumference 22*a* of the ring 22. With this arrangement the control knob portion 16 of the switch 15 is free to rotate through its various positions without binding or rubbing on any of the portions of the mounting ring 14. While such rotation is permitted it is also illustrated that the height of the ring 22 is such that it is spaced slightly above the bottom surface of the control knob 16 such that it is not normally possible to insert anything behind the control knob 16 unless removal is absolutely desireable.

The dimensions between the circumference of the control ring 14 and the switch 15 are such that an interference fit is provided and for this purpose the ring may most desirably be formed of a resilient material. In this manner a dual interference fit is provided which will hold the ring 14 within the plate 12 and will hold the switch body 17 within the internal cavity 19 of the switch mounting ring 14. This, of course, is necessary to prevent the switch from falling from the aid and to hold the switch body 17 against rotation when the knob 16 is turned.

Normally the switch provided with the "in-the-ear" aids include a plurality of contacts 25 extending from the bottom thereof. The aforementioned slots 21 provided at the bottom most portion of the housing 18 extending radially outwardly into the ring 20 are designed to specifically receive these contacts and allow them to be connected to the proper portions of the electrical circuit within the aid. In the form shown five of such slots are provided but it should be obvious that any number of slots to match the number of contacts on the switch would be provided.

As should be obvious this particular type of construction permits an ease of assembly for mounting control switches in hearing aids as compared to previous methods wherein a flat bottom hold was bored partially through the plate 12 and a number of cuts were made in the remaining portion of the plate 12 to pass the switch contacts therethrough. In this old assembly procedure then it was necessary to govern the depth of the passage through the plate 12 and even with close control, the knob portion 16 of the switch often times extended outwardly from the plate 12 to an undesirable height. Further, in this type of construction soldering of the contacts is sim-

plified as all soldering may be done away from the plate 12 with assembly completed after soldering as compared with the old method wherein the switch had to be inserted into the plate 12 properly glued therein and soldering done thereafter.

It should be obvious that applicant has provided a new and unique hearing aid control mounting method and structure which permits simplicity of assembly of the control portions for hearing aids while insuring that the control knob of the control portion is properly depressed within the structure to prevent its being torn from the structure while still permitting ease of operation for the user.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportion of parts without departing from the scope of the invention, which generally stated consists in the matter set forth in the appended claims.

I claim:

1. An improved hearing aid control mounting assembly for mounting a control device within the surface panel housing the hearing aid electrical components with a rotary control knob mounted outside said housing, said hearing aid control mounting assembly comprising:

a longitudinally extending generally accurate resilient member having an outer portion fit mounted in an aperture in said surface panel;

said resilient member having a length substantially equal to the thickness of said surface panel;

a control device receiving passage defined longitudinally through said member to receive and retain said control device therein;

an inwardly projecting ring at one end of said member extending within said passage to provide an abutment to said control device;

an annular outwardly extending should shoulder at the other end of said member having an outer diameter greater than the diameter of said passage so as to abut said surface panel adjacent said aperture; and

a control knob receiving portion within said shoulder for receiving said rotary control knob, said portion including,

an annular cavity within said shoulder, and

an annular rim projecting from the base of said cavity and extending outwardly adjacent said rotary control knob to provide a protective ring around the perimeter of said control knob to discourage undesired prying of said control knob from said control device.

2. An improved hearing aid control mounting assembly as claimed in claim 1, wherein said control receiving passage includes means for providing an interference fit between said member and said control device mounted within said passage.