Oct. 19, 1954 C. D. MULLIN 2,692,305

HEARING AID UNIT

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FIG. 1

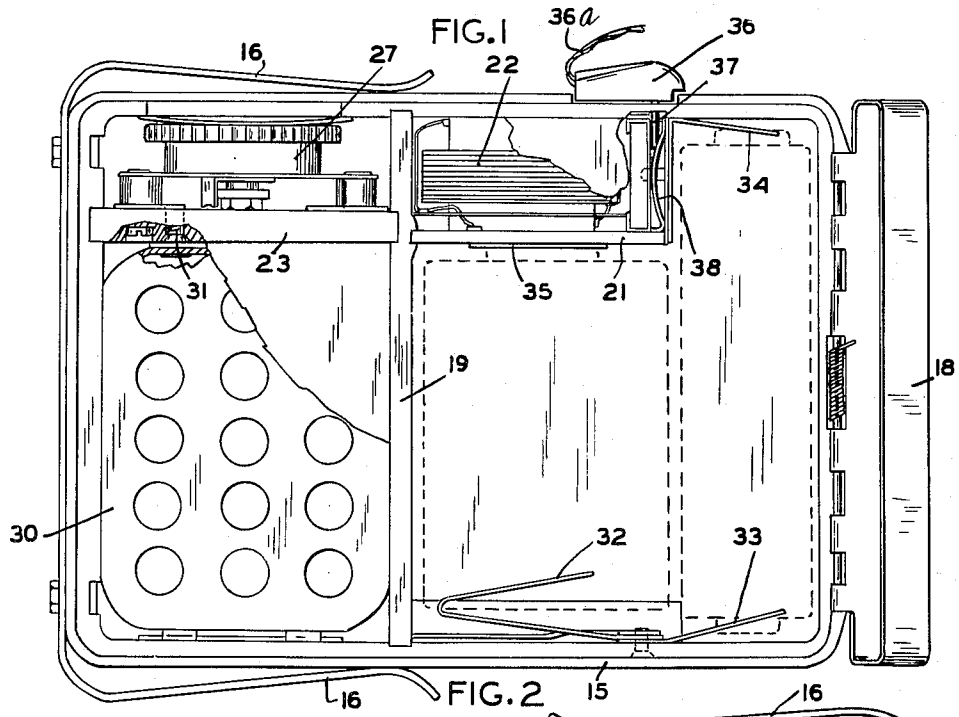
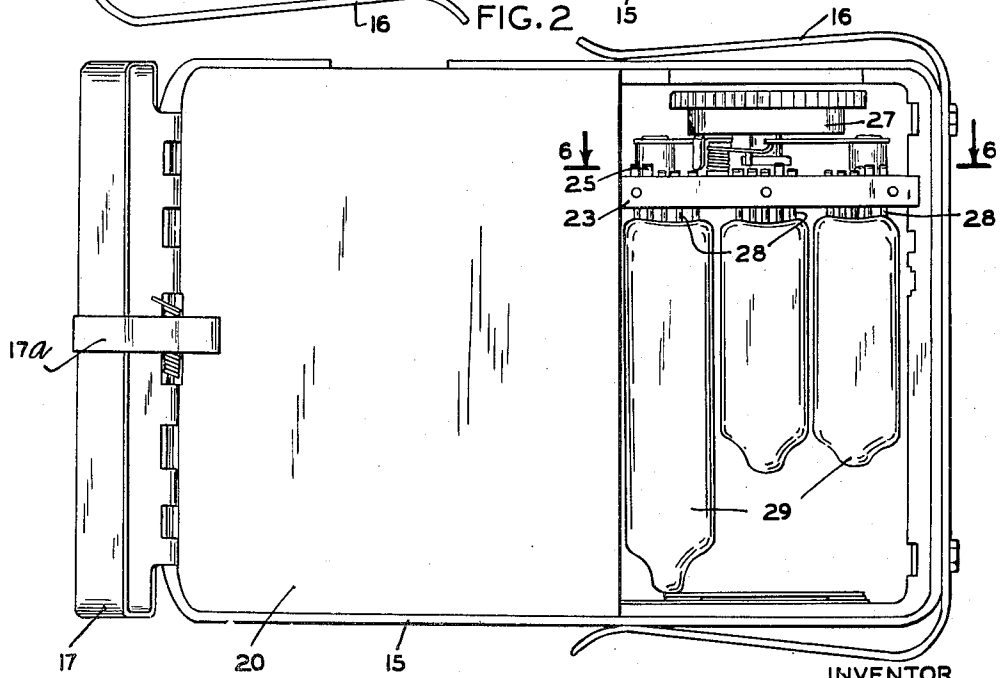


FIG. 2



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FIG. 3

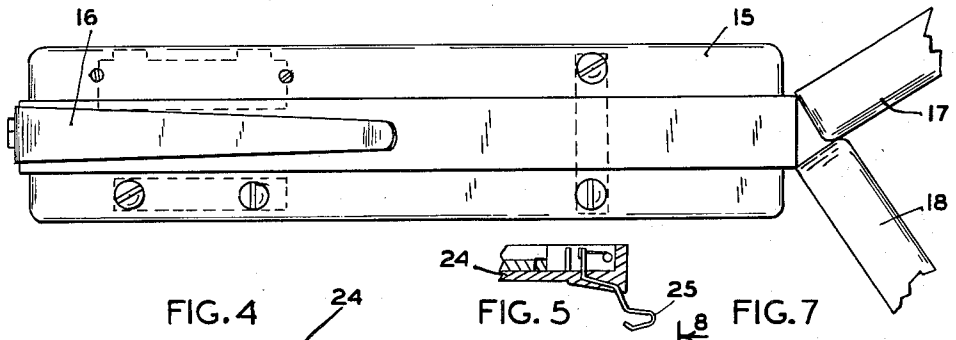


FIG. 4

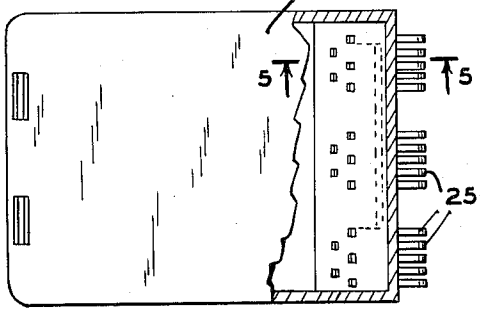


FIG. 5

FIG. 7

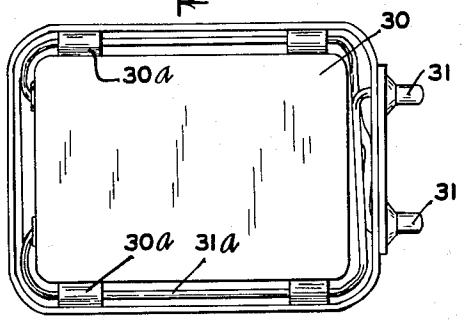


FIG. 6

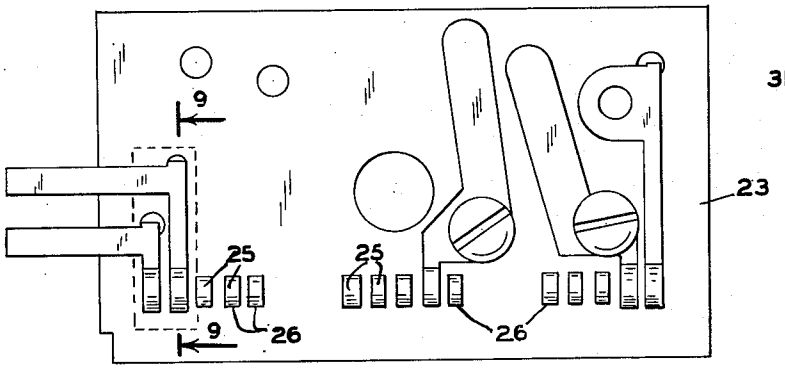
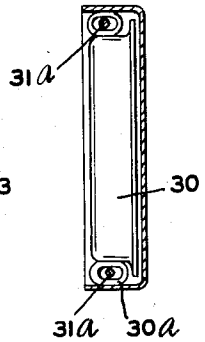


FIG. 8



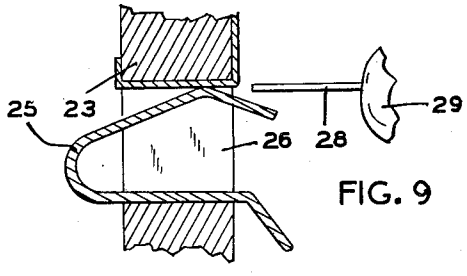


FIG. 9

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HEARING AID UNIT

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Application June 26, 1950, Serial No. 170,385

4 Claims. (Cl. 179—107)

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This invention relates generally to hearing aids and particularly to a hearing aid having substantially all the parts thereof easily removable to facilitate replacement thereof.

It is an object of the invention to provide a novel and improved hearing aid compactly constructed and having the components thereof removably mounted in a single casing to facilitate replacement of said components.

It is another object to provide a compact hearing aid unit having a removable microphone mounted therein and constructed to substantially eliminate transmission of case friction noises to the microphone.

It is still another object to provide an extremely compact hearing aid unit entirely enclosed within a relatively small casing and having the component parts thereof on sections removably mounted in said casing and having an interconnection section adapted to receive said sections and interconnect the same in proper operative relation.

These and other objects and advantages of the 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 front elevational view of the entire hearing aid unit with the cover in open position;

Fig. 2 is a rear elevational view thereof with the cover in open position;

Fig. 3 is a side elevational view of one side of the hearing aid showing fragmentary portions of the two covers in open position;

Fig. 4 is an elevational view partially broken away showing the circuit wiring panel;

Fig. 5 is a fragmentary sectional view taken substantially along the line 5—5 of Fig. 6;

Fig. 6 is a vertical sectional view taken substantially along the line 6—6 of Fig. 2 and showing one side of the connector panel in elevation;

Fig. 7 is a rear elevational view of my microphone unit;

Fig. 8 is a transverse sectional view taken substantially along the line 8—8 of Fig. 7; and

Fig. 9 is a fragmentary sectional view taken substantially along the line 9—9 of Fig. 6 and showing the prong of one of the amplifier tubes in position to be received by one of the spring contacts of the circuit panel.

As illustrated in the accompanying drawings, I provide a relatively compact hearing aid amplifying unit entirely mounted in a single relatively small casing which in the form shown is substantially rectangular in shape and is designated as an entirety by the numeral 15. The casing 15 has in the form shown a pair of spring retaining clip elements 16 mounted at the top thereof and a pair of covers 17 and 18 hinged at the bottom to respectively enclose the front and back thereof. A spring clip 17a is hingedly mounted on the top of one of said covers and is adapted to overlie the upper portion of the other cover to securely hold said covers in closed position. As best shown in Fig. 1 a transversely disposed dividing partition 19 is fixed across an intermediate portion of the casing and a battery compartment is formed between said partition and the bottom by the rear closure sheet 20 integrally formed with the casing and extending from the bottom thereof to partition 19 and completely enclosing the back of the battery compartment. A transformer compartment is formed at one corner of the battery compartment by a longitudinally disposed partition 21 extending a part of the distance across the battery compartment. A transformer 22 is mounted in said compartment.

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A connector panel best shown in Fig. 6 and designated as an entirety by the numeral 23 is interposed between the partition 19 and the top of the casing 15 in spaced relation to the side on which the transformer 22 is mounted. The partition and the top of the casing have in the form shown a pair of recesses respectively formed therein in opposed relation to receive said connector panel 23. A circuit wiring panel 24 has a plurality of spaced spring contact elements 25 extending outwardly on one end thereof and the spring contacts 25 are respectively received in a plurality of cooperating spaced apertures 26 to form with said apertures prong-receiving contacts.

The various circuits of the amplifying system are connected through this connector panel. A potentiometer 27 is mounted on one side of the connector panel 23 and controls the volume of the sound transmitted to the ear of the user. This potentiometer also has an on-and-off switch actuated thereby in a similar manner to conventional radios. The circuit wiring panel 24 is inserted from the other side of the connector panel 23 and is disposed in substantially the center of the casing 15. The upper ends of the spring contacts 25 when inserted into the apertures 26 are disposed toward the rear of the casing and combine with the apertures to form sockets adapted to receive the prongs 28 of the vacuum tubes 29. These vacuum tubes are shown in Fig. 2 and are, of course, shaped to be received

within the casing and lie flat against the rear surface of the circuit wiring panel 24.

A microphone 30 has its contacts 31 inserted into suitable sockets formed in the connector panel 23 and lies flat against the front side of the circuit wiring panel 24. As best shown in Figs. 7 and 8, the microphone 30 is mounted in a protective casing and is cushioned therein to reduce mechanical transmission of sound through the casing by the resilient tubular mounting members 30*a* made as from a polyvinyl plastic. These relatively small tubular elements serve not only to cushion the microphone but also form a conduit through which the microphone lead wires are threaded. By providing this guiding passage for the lead wires 31*a* and the cushioning of the limited movement of the microphone unit, use of single strand lead wires 31*a* is permitted, since there is no need for the strength produced by multiple strand lead wires. Since any movement of the microphone element within its casing would produce shifting of the individual strands of a multiple strand lead wire relative to each other and therefore produces unwanted friction noise in the microphone, obviously then the use of a single strand wire is highly desirable. Power for the unit is, of course, supplied by the batteries shown in Fig. 1 by the dotted lines, and the sound received by the microphone 30 at the front of the unit is amplified to a controlled increased volume by the vacuum tubes 29 and is transmitted to the ear-piece through the connector 36 and interconnecting wires 36*a*. The wiring circuit panel 24 is, of course, removable from the casing without removing the connector panel as are the tubes 29, microphone 30, and the batteries. This easy removal to facilitate replacement makes my unit extremely easy to service, since all the parts therein which might give trouble may be removed, tested, and, if necessary, replaced with new parts within a matter of a few minutes.

It will be seen that I have provided an extremely compact hearing aid unit adapted to entirely enclose all the component parts of the amplifying system and to facilitate servicing of the unit by permitting substantially all these component parts to be easily and quickly removed from the casing for testing and for replacement with new parts. The construction of the microphone eliminates the static and interference due to sharp vibrations of the microphone unit.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departure from the scope of my invention, which, generally stated, consists in the matter shown, and described, and set forth in the appended claims.

What is claimed is:

1. A hearing aid unit comprising a casing, closure means for releasably closing the front and back of said casing to permit exposure of the inside thereof, dividing partitions fixed within said casing to form a compartment for receiving the batteries to supply the electric power for the amplifying system, spring contact elements and suitable connectors therewith for carrying electricity to the amplifying system, said partitions also forming an amplifying circuit compartment, a connector panel mounted across the amplifying circuit compartment, a circuit wiring panel removably mounted on said connector panel, a switch and volume control mounted on said connector panel and a microphone mounted on said connector panel, means on said connector panel for receiving a number of vacuum tubes for the amplifying system, and connectors on said connector panel for interconnecting the component elements of the amplifying system.

2. The structure set forth in claim 1, and said vacuum tube receiving means on said connector panel being removable and connected with said spring contact elements.

3. The structure set forth in claim 1, and said spring contact elements being doubled back upon themselves and being removably mounted in said connector panel to form a plurality of prong-receiving sockets for the vacuum tubes of the amplifying system.

4. The structure set forth in claim 1, and said tube receiving means being positioned on one side of said circuit wiring panel and said microphone being mounted on the other side thereof in said connector panel to facilitate accessibility to the tubes and contacts thereof.

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