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R. C. MINER

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TELEPHONE RECEIVER

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FIG. 1

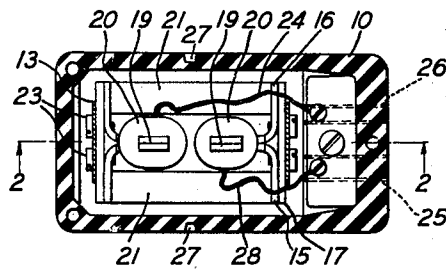
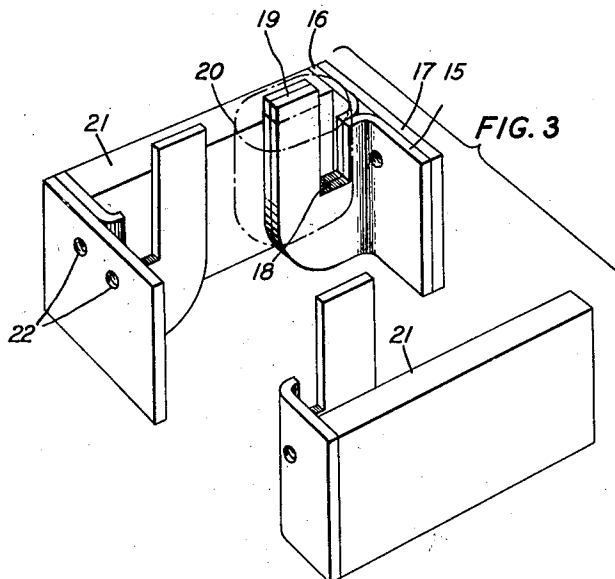
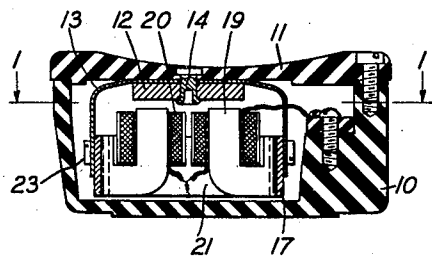


FIG. 2



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TELEPHONE RECEIVER

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3 Claims. (Cl. 179-107)

This invention relates to telephone receivers and particularly to that type of receiver known as a "bone conduction" receiver wherein vibrations produced thereby are transmitted to the auditory nerve through direct contact between the vibratile element of the receiver and a portion of the bony structure of the head of the user.

The object of this invention is to provide a bone conduction receiver which is light, small, efficient and rugged and yet inexpensive.

In its preferred form this invention comprises a casing to which is rigidly secured an armature and a resilient member, and a pair of electromagnets secured to the resilient member and held in close spaced relation to the armature thereby. The pole-pieces employed are fabricated of two L-shaped members and a plate welded or otherwise secured together to form a T, and the ends of the cross-bars of the T are connected by parallel bar permanent magnets. The coils of the electromagnets are mounted with their axes at right angles to the cross-bars and permanent magnets and the tails of the T's are accordingly notched and shaped to form the cores of the electromagnets. This construction of the electromagnets results in a very compact and efficient receiver.

For a better understanding of the invention reference is made to the accompanying drawing in which:

Fig. 1 is a plan view of the receiver with the cover removed to show the compact arrangement of the electromagnets;

Fig. 2 is an elevation of the receiver sectioned along line 2-2 of Fig. 1; and

Fig. 3 is an exploded view of the magnet structure used in the receiver.

Referring more particularly now to Figs. 1 and 2, 10 is a casing, preferably made of a phenol plastic composition, of which 11 forms a cover. The cover 11 also serves as the vibration conducting member of the receiver, and its surface therefore may be curved or otherwise formed to take the shape of a particular portion of the user's head, such, for example, as the mastoid process, to increase the area of the conducting surface in contact with the head and thereby increase the efficiency of the receiver. Shaping the contacting surface to the user's head also tends to reduce the unit pressure upon the head, which makes the receiver more comfortable to use. An armature 12 and a U-shaped spring member or yoke 13 are secured to cover 11 by means of a rivet 14. The electromagnets and polarizing

magnets used in the receiver are suspended from cover 11 by attachment to resilient member 13.

The novel construction of the magnets is best described with reference to Fig. 3. The cores of the electromagnets are comprised of two L-shaped members 15 and 16 and a plate 17 secured together, preferably by spot welding, to form a unit in the form of a T. Prior to welding, the L-shaped members are notched with a rectangular notch 18 to form a core 19 perpendicular to the face of the T, on which a coil 20 (shown in Fig. 3 by dotted lines) may be mounted. All three members of the core unit may thus be stamped out and formed on a punch press and united by spot welding, which construction is much less costly than a single piece construction would be since the latter, due to the peculiar shape of the unit, would necessitate several milling operations and would result in a waste of a large amount of material.

The cores are placed with the long axes of the cross-sections thereof in line instead of parallel to one another as is the common practice. This permits the width of the receiver to be considerably reduced and causes the cross-bars of the T-shaped units to assume a parallel position. The ends of the cross-bars are then connected to permanent bar magnets 21, preferably by soldering the ends thereto, to form a unified whole, resembling, when viewed as in Fig. 1, a rectangle within which the electromagnets are supported by extensions from the smaller sides of the rectangle. The magnet structure is thus exceedingly compact and yet contains a sufficient quantity of magnetic material properly to carry out the functions of the receiver.

The core units are drilled and tapped at 22 to receive machine screws 23 (Figs. 1 and 2) by which the magnet structure is secured to resilient yoke 13. The cores 19 and armature 12 are thus held in close spaced relation to one another without "freezing". Suitable flexible leads 28 and 24 connect coils 20 to sleeves 25 and 26 respectively whereby electrical contact may be established between the electromagnets and an external electrical circuit.

For best results the T-shaped units and armature 12 should be made of a material commonly known as "permalloy" and containing approximately 45% nickel, 0.60% cobalt, 0.05% carbon and the balance iron. The permanent magnets should be made of a cobalt steel the contents of which are approximately 36% cobalt, 7% tungsten, 3.50% chromium, 0.75% carbon and the balance iron.

- When the receiver is in operation, due to the inertia of the magnet structure and its resilient mounting within the casing, the entire casing is vibrated and the vibrations thus produced may readily be transmitted to various parts of the body merely by contact therewith. When used with the mastoid process, a headband may be employed to hold the receiver in place. For this purpose, the sides of the receiver are apertured as at 27 to receive the headband. If the receiver is to be used with other parts of the body, a handle, similar to a lorgnette handle (not shown), may be provided upon which to mount the receiver.
- 15 If desired the portion of the device to be held in contact with the mastoid eminence or other portion of the body of the user may be contoured to fit the individual user by molding processes well known to the surgical and dental professions.
- 20 It is understood that the above description is merely illustrative of the invention and that the scope of the invention accordingly should not be limited thereby but should be determined by the appended claims.
- 25 What is claimed is:
1. In a telephone receiver, an electromagnet comprising a coil and a magnetizable core there-

for, said core comprising two L-shaped members and a plate spot-welded together to form a T, the adjoining legs of the L-shaped members being notched to form a support for the coil which is perpendicular to the cross-bar and tail of the T. 5

2. In a telephone receiver, a pair of laminated pole-pieces, each pole-piece being comprised of the legs of a pair of L-shaped members, said pole-pieces being formed by notching said legs, and magnetizable bars connecting the free ends of the legs of the L-shaped members. 10

3. A bone conduction receiver comprising a rectangular casing, a U-shaped spring member secured to a side of the casing, an armature secured to the bottom of the U, electromagnets secured to the ends of the U and permanent magnets connecting the electromagnets, each of said electromagnets being comprised of two L-shaped members and a plate spot-welded together to form a T, the tail of the T being notched at the side to form a core the axis of which is at right angles to the tail and cross-bar of the T, and the cross-bars of the T's being connected by parallel permanent bar magnets to form a rectangular enclosure for the electromagnets. 15 20 25

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