

Aug. 2, 1938.

N. A. KURMAN
TELEPHONE RECEIVER
Filed June 24, 1936

2,125,348



FIG. 1

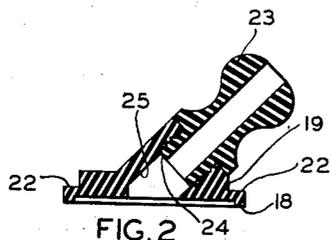


FIG. 2

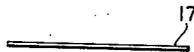


FIG. 3

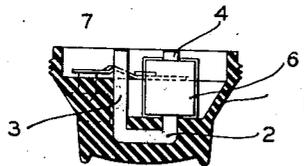


FIG. 4

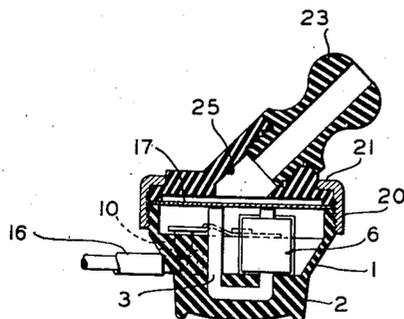


FIG. 5

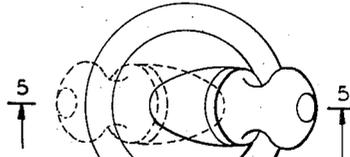


FIG. 6

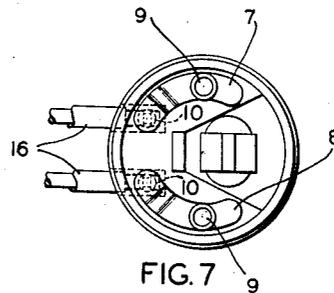


FIG. 7

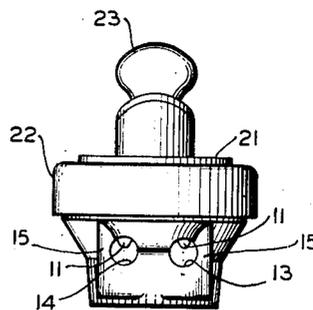


FIG. 8

INVENTOR
NATHAN A. KURMAN

BY *James H. Curtin*
ATTORNEY

UNITED STATES PATENT OFFICE

2,125,348

TELEPHONE RECEIVER

Nathan A. Kurman, Long Island City, N. Y., assignor to Kurman Electric Co., Inc., New York, N. Y., a corporation of New York

Application June 24, 1936, Serial No. 86,910

2 Claims. (Cl. 179—107)

This invention relates to a telephone receiver, and more particularly to an ear phone suitable for persons having imperfect hearing.

5 An object of this invention is to provide a highly efficient instrument, light in weight, and small in size.

Another object is the provision of a novel construction which materially reduces the cost of the instrument without decreasing its efficiency.

10 Still another object is the provision of a unit of this character which can be readily assembled in quantity production.

A further object is to provide an ear phone which is readily adjustable for use in either ear.

15 In the accompanying drawing, of which there is but one sheet, the invention is shown considerably enlarged, with Figures 1, 2, 3 and 4 arranged one below the other to show an "exploded" sectional view of the invention; Figure 1 being a clamping ring; Figure 2, the receiver cap; Figure 3, the diaphragm; and Figure 4, the receiver shell and contents.

20 Figure 5 is a section of the assembled ear phone, the section being taken through 5—5 of Figure 6.

Figure 6 is a top view of the invention.

Figure 7 is a top view of the receiver shell with the cap removed.

30 Figure 8 is an elevation of the assembled receiver.

Receiver shell 1, preferably molded of rubber, Bakelite or other suitable plastic compound has imbedded in its base a U-shaped polepiece 2. In order to strengthen the structure, and particularly, to prevent injury to the polepiece during and after construction of the device the present invention provides a novel arrangement for molding the polepiece into the receiver shell.

40 On referring to Figures 5 and 7, it will be seen that one arm 3 of the polepiece is supported on three sides for the greater part of its length by the material of which the shell is formed, while a recess, roughly V-shaped, extends from the inner face of arm 3 and includes arm 4, and is of such dimensions that there is just sufficient space in the recess to permit the arm 4 to be inserted the required distance into the form wound coil 6.

45 The terminals of the coils are soldered to spring clips 7 and 8 secured to the shell by pins 9 which are molded therein.

50 The spring clips are curved to correspond to the contour of the inside of the shell, the adjacent ends of the respective springs being each provided with a pin or lug 10 having a rounded end 11 which extends downward into holes com-

municating with openings 13 and 14 extending through an externally built up section 15 forming jacks for cord tips 16 which are suitably grooved so as to be retained by the rounded ends 11 of lugs 10.

5 A diaphragm 17 is clamped between a peripheral ring 18 formed on the inner face of a cap 19, preferably of the same material as the shell, and the top of the receiver shell 1, by means of a metallic ring 20, provided with a 10 turned over portion or flange 21, which fits over shoulder 22, (Figure 2) formed on the upper surface of the cap.

Ring 20 is threaded on its inner surface so as to fit over corresponding threads on the outside 15 of the receiver shell.

A tube 23 having a knob formed at one end, and the other end 24, threaded, is screwed into channel 25 extending downward through the sloping top of cap 19 as shown in the drawing. 20

The knob is of such a size that it may be inserted into the auditory canal, the receiver shell being sufficiently small to rest well inside a normal outer ear.

25 The cap assembly may be rotated to any position in respect to the openings for the cord tips in the receiver shell by loosening the ring 20 which permits the cap to be turned as indicated by the dotted lines in Figure 6. This feature is important since it permits the receiver to 30 be worn in either ear with equal facility, and the user may set the cap so that the cord is looped over the ear or is left hanging downward, according to his fancy.

35 Polepieces 2 and the diaphragm are made of a magnetic material, preferably an iron-nickel alloy having a high permeability.

40 An extensive heat treatment is necessary to obtain the maximum permeability from such alloys. If after heat treatment, the metal is machined, shaped in a punch press, or otherwise subjected to strain, the permeability is materially reduced. It is not practical to heat treat parts which must fit with precision subsequent to machining since a certain amount of warping takes 45 place during the heating process.

50 In the present invention the polepieces may be formed to the desired dimensions and then heat treated. When the receiver shell is made, the ends of the polepieces are accurately positioned 50 in respect to the edge of the shell during the molding process, and any inaccuracies caused by the heat treatment is taken care of by the shell material which is formed around the yoke of the magnet while the molded material is in a plastic 55

condition. The method just described permits the use of a heat treated polepiece at its maximum magnet efficiency.

By using a U-shaped polepiece, the magnetic circuit is shortened with a corresponding increase in the magnetic flux. High efficiency in a reduced size is also possible with polepieces of this shape when a highly permeable alloy is used, since the polepieces may be made very close together, the coil being small in size, requiring only about one eighth of the number of ampere turns that would be necessary to produce a corresponding flux if a core of high quality iron were used. The efficiency is further increased by the use of a diaphragm of magnetic alloy having high permeability, thus making it possible to saturate the magnetic circuit at very small current values.

In manufacturing the present ear phone, as previously stated, the pole pieces and cord jacks are molded in the receiver shell. The coils are form wound. Coils are slipped over the polepieces and are held in position by friction. The conductors are then fastened by suitable means, preferably solder, to springs 7 and 8 and thereafter the cap and diaphragm are put in place and the ring 20 screwed on.

While but one illustrative embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction may be altered without departing from the spirit of this invention as defined by the following claims.

What is claimed is:

1. In a telephone receiver for partially deaf

persons, a receiver shell of molded material having a relatively thick portion and a U-shaped polepiece molded therein, the base and one arm of said polepiece being substantially imbedded in said material during the initial molding operation, the other arm of said polepiece being arranged in a cavity formed in said material, said cavity being of sufficient depth to permit a form wound coil to be placed on the last mentioned arm, spring terminal means for said coil secured to the thick portion of the shell, the thick portion of said shell having a pair of spaced vertical openings, and lugs on said spring terminal means extending into said openings, said thick portion of the shell having a second pair of openings in the side wall thereof, communicating with said first mentioned openings and adapted to receive the tips of a cord.

2. A telephone receiver for partially deaf persons, comprising a receiver shell, a threaded ring adapted to screw over the outside of said shell, a diaphragm arranged within said ring and resting on the upper surface of the receiver shell, said ring having its upper edges turned inwardly to form an annular flange, a receiver cap arranged within said ring between said diaphragm and said flange and having a peripheral flange frictionally engaging said annular flange, said cap being capable of rotation within said ring, a sloping tubular projection on said cap extending through said ring, and a tube detachably connected to said projection and having a knob at its free end adapted to be inserted into the auditory canal of a person.

NATHAN A. KURMAN.