April 20, 1926. 1,581,237

M. H. SPIELMAN

TELEPHONE RECEIVER

Filed Dec. 4, 1922 2 Sheets-Sheet 1

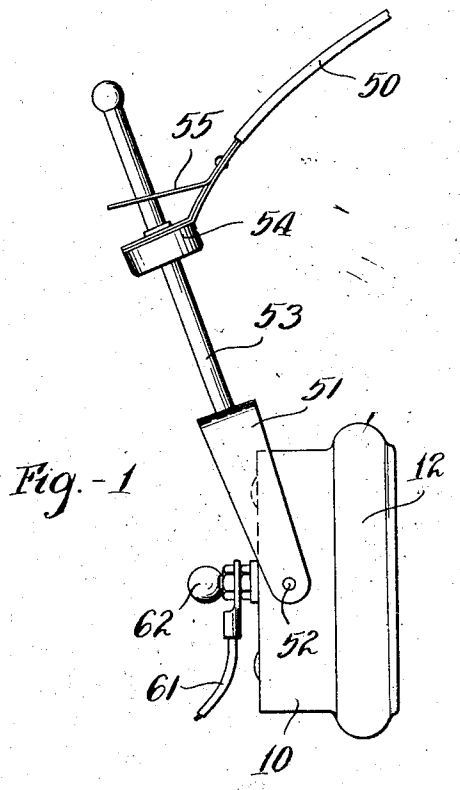

Fig.-1

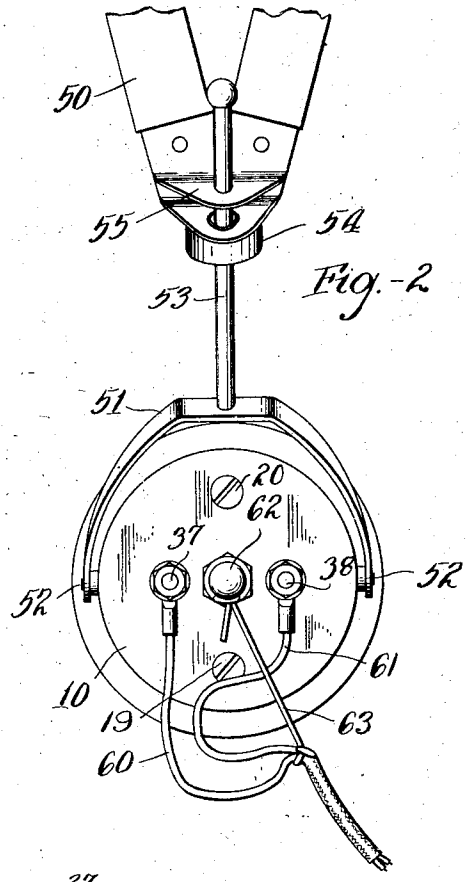

Fig.-2

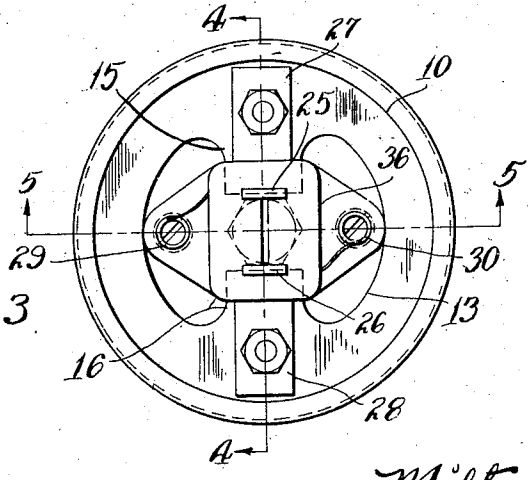

Fig.-3

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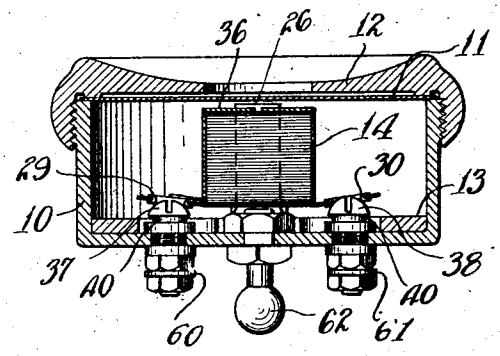


Fig.-5

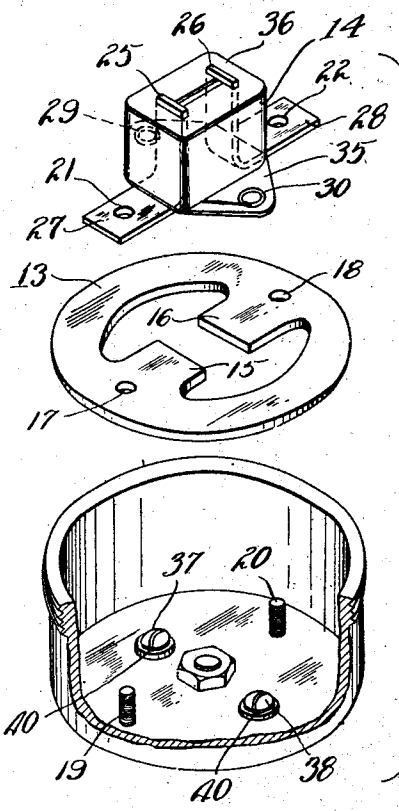
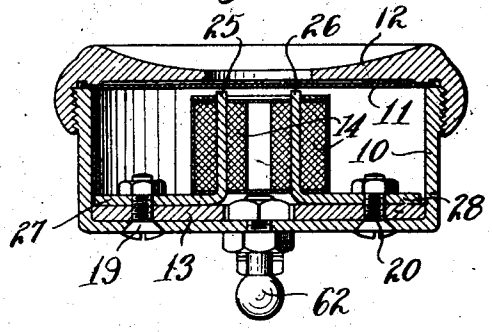


Fig.-6

Fig.-4



INVENTOR

Milton H. Spielman,

BY Bates & Macklin

ATTYS.

Patented Apr. 20, 1926. 1,581,237

UNITED STATES PATENT OFFICE.

MILTON H. SPIELMAN, OF CLEVELAND, OHIO, ASSIGNOR TO THE DOMESTIC ELECTRIC COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

TELEPHONE RECEIVER.

Application filed December 4, 1922. Serial No. 604,703.

To all whom it may concern:

Be it known that I, MILTON H. SPIELMAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Telephone Receivers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to telephone receivers, particularly to the watch case type such as are most frequently used in radio telephony.

In the manufacture of watch case receivers, considerable difficulty has heretofore been experienced in assembling the permanent magnet member and associated coils. One of the causes of these difficulties is the small space within which the parts must be assembled, and the degree of accuracy which must be used to provide and maintain an electrical circuit through the resistance coils. I have found that soldering leads from the coils to electrical connections extending through the casing, necessitates considerable time.

Accordingly one of the objects of my invention is to so construct the permanent magnet that it comprises a single easily positioned piece and likewise the electro-magnetic coils and cores comprise an assembled unit completed outside the casing and adapted to complete its magnetic and circuit connections by simply placing it in position, thus avoiding any soldering operation within the casing.

Other objects include the arrangement of a unitary coil structure whereby replacement thereof may be readily accomplished without necessitating replacement of a complete receiver. In addition, my invention provides for a permanent magnet construction which occupies a minimum space. The magnet construction contemplated, permits the receiver to be readily dismantled and the magnet to be replaced without affecting the electrical connections between the coils and the leads extending therefrom.

In carrying out my invention, I employ the usual casing, a diaphragm and ear piece with electrical connections leading from the exterior of the casing to the interior thereof. Within the casing, I provide an endless permanent magnet having opposed pole pieces and I provide coils having the cores thereof constituting extensions of the pole pieces and with means for removably securing the extension pieces to the magnet. The leads from the coils are mounted upon a flexible base, and are adapted to engage suitable contact members which extend through the casing.

The arrangement comprising my invention will be more fully set forth in connection with the following description, which pertains to the accompanying drawings, and the essential features will be summarized in the claims.

In the drawings, Fig. 1 is an end view of a receiver embodying my invention and showing the provision for attachment of a head strap; Fig. 2 is a rear view of the receiver shown in Fig. 1; Fig. 3 is a plan view of the receiver having the ear piece and diaphragm removed; Figs. 4 and 5 are sections on the lines 4—4 and 5—5 respectively, in Fig. 3; and Fig. 6 is a perspective view showing the relative position for assembling of the various parts, as set forth in my invention.

Designating the parts shown in the drawings by the use of reference characters, 10 indicates a casing having a diaphragm 11, and an ear piece 12 associated therewith. Within the casing, I provide an endless permanent magnet, indicated at 13, and a coil 14 positioned thereabove. The particular construction of the magnet and coil, together with the manner of connection to the casing, embody particular features of my invention as will now be described.

The permanent magnet is shown as comprising an annular member having opposed pole pieces 15 and 16 extending inwardly and formed integral with the ring-like body of the magnet. This magnet may be a metallic stamping, which is hardened in the usual manner and fitting closely in the side wall of the casing, lying flat against the bottom or rear wall thereof. Suitable openings 17 and 18 extend through the magnet for receiving clamping screws 19 and 20.

The coil and pole piece extensions comprise a single unitary structure which is readily adapted for attachment mechanically and electrically within the casing. Each extension member constitutes the core of a coil, and is adapted to be attached to the magnet by the same securing members employed for retaining the magnet within

the casing. To this end, I have shown each core as comprising an L-shaped member, one arm of which, as at 25 and 26, extends through the coils and other arms, as at 27 and 28, engage the magnet, as illustrated in Fig. 4.

The terminals from the coil lead outwardly and are electrically connected to contact members in the nature of eyelets 29 and 30 which are shown as flanged to embrace a flexible base 35 extending transversely of the pieces 27 and 28. This base is formed of insulating material, such as fibre, and is adapted to fit over the upwardly extending arms of the pole extensions. A suitable non-magnetic spacing member 36 extends over the ends of the arms 25 and 26 closely embracing the same and maintains the coils permanently in position.

The magnetic core and arms are each preferably made of soft magnet core iron and as the flat portions 27 and 28 may fit closely upon the pole pieces of the permanent magnet, magnetic flux is established through these elements, which flux may be varied in the usual way by the action of the electromagnetic coils to vibrate the diaphragm 11. The small wire terminals of the coils may be conveniently electrically connected to the eyelets 29 and 30 by simply soldering them, or clamping the wire beneath the edge thereof, forming a permanent electrical connection which need not thereafter be disturbed; these eyelets later forming connection by simply pressing against binding posts which will be described.

When the coil and extension pieces are assembled, as shown in Fig. 6, openings 21 and 22 in the core arms are in registration with the openings 17 and 18 in the permanent magnet. Accordingly, the eyelets 29 and 30 are in position to engage contact members 37 and 38 which are shown as binding screws extending through the casing on a line transversely of the attaching screws 19 and 20. Suitable washers 40 may be placed beneath the heads of the contact members 37 and 38 to cause an upward pressure to be exerted against the under surface of the eyelets, whereby the inherent resiliency in the base maintains an electrical circuit through the coil. In this way, the coil may be readily assembled outside the casing and then connected electrically with the connections leading into the casing, when the extension pieces are attached to the fastening members 19 and 20.

I have shown my invention as adapted for use in radio telephony wherein two receivers may be mounted on a head strap 50. The manner of mounting is embodied in a bracket 51 which straddles the casing and is pivoted on suitable trunnions 52 associated with the exterior of the casing. A spindle 53 may be rigidly secured to the intermediate portion of the bracket and is adapted to carry the ends of the head strap. To secure adjustment, I have shown the end of the strap as having an apertured member 54 which engages the spindle and is loosely mounted thereon. A spring 55 also having an opening therein which fits over the spindle, is rigidly attached to the strap in such manner as to extend at an angle therefrom, as indicated in Fig. 1. The inherent resiliency of the spring, and the inclination from the strap is such that the spindle is gripped with sufficient force to retain the strap in any desired position. To adjust the receiver, the spring and member 54 are pressed together, whereupon the spindle may be moved in either direction relatively to the strap. when the desired adjustment is obtained, the spring is released, whereupon the spindle is gripped in a new position.

To assemble the receiver in accordance with my invention, the magnet is placed within the casing with the openings 17 and 18 extending over the attaching screws 19 and 20, and then the coil is positioned within the casing with the openings 21 and 22 in the extensions in registration with the openings in the magnet. This brings the extension pieces into engagement with the pole pieces. When the attaching members 19 and 20 are tightened, the eyelets 29 and 30 with which the leads from the coils are electrically connected, are brought into engagement with the contact members 37 and 38, which extend through the casing at points equidistant from the screws 19 and 20. Then the electrical connection is completed by attaching wires 60 and 61 outside the casing. A knob 62 extending through the center of the casing, serves as a post for attaching a tape 63 to relieve the tension between the wires and the connections therefor on the exterior of the casing. In the event the receiver is used as a head phone, then the brackets 51 carrying the trunnions 52 may be snapped into position upon the casing. The receivers are then adjusted as heretofore described.

By constructing a receiver in accordance with my invention, a greater number of ampere turns is obtainable, by reason of the fact that the one-piece magnet lies flat within the casing and therefore requires comparatively little space. The construction of the magnet and the associated coils, permits these parts to be readily assembled and replaced without necessitating the making of electrical connections within the casing.

I claim:—

1. In a device of the class described, the combination with a casing, of a one-piece magnet positioned within the casing, said magnet having opposed pole projections, coils having the cores thereof shaped to rest on the pole pieces and to provide extensions

thereof, means whereby the coils may be removably secured as a unit to the magnet, and contact means carried by the casing remote from the core connections for effecting an electrical circuit through the coils upon contact of the cores with said magnet.

2. In a device of the class described, the combination with a casing, of a magnet carried thereby, coils associated with the magnet, means for removably securing the coils within the casing, electrical conductors extending through the casing, remote from the magnet connections to the casing and means for automatically effecting electrical contact between the leads from the coil and said conductors when the coils are positioned within said casing, and the cores thereof are brought into engagement with said magnet.

3. In a device of the class described, the combination with a casing, of a magnet carried thereby, a coil having the cores thereof extending along and resting on said magnet, electrical connections extending through the casing, and flexible means carried by the coil and supporting coil terminal contacts for effecting electrical contact between the coils and connections.

4. In a device of the class described, the combination with a casing having a permanent magnet therein, of coils having cores which extend in opposite directions to rest on said magnet, means extending transversely of the core extensions and carrying the leads from the coils, and electrical connections extending through the casing remote from the magnet and adapted to engage said means for completing an electrical circuit through the coil, said engagement being effected upon contact of the core extensions with said magnet.

5. In a device of the class described, the combination with a casing having a permanent magnet therein, of a coil carried thereby, a flexible member supported by the coil and carrying the leads therefrom, electrical connections extending through the casing remote from the magnet and adapted to engage said leads for completing an electrical circuit through the coil, said engagement being effected upon contact of the coil with said magnet.

6. In a device of the class described, the combination with a casing, of a one-piece magnet carried thereby, said magnet having inwardly extending pole pieces thereon, coils associated therewith, the cores of said coils extending laterally in opposite directions, and are adapted to rest upon said pole pieces, a flexible base of insulating material projecting laterally from the coil and transversely of said core extensions, said base carrying the leads from said coils, electrical contact pieces associated with the casing, and means whereby contact of the core extensions and magnet effects an interengagement of the leads from the coil with said contact pieces.

7. In a device of the class described, the combination with a casing, of an annular magnet having inwardly extending pole projections integral therewith, electrical conductors extending through the casing, and remote from the magnet connections, a coil, the cores of which comprise feet resting on the pole pieces, and a base for the coil, said base carrying contact members which are adapted to engage the conductors for completing an electrical circuit through the conductors and coil when the cores of the coil are attached to the magnet.

8. In a device of the class described, the combination with a casing, of an annular magnet having inwardly extending pole pieces positioned diametrically opposite each other, L-shaped members, each having one arm thereof resting on a pole piece, coils associated with the other arm of each member, electrical conductors passing through the bottom of the casing, means for attaching the members to the magnets, and means whereby such attachment effects electrical contact between said conductors and the leads from said coils.

In testimony whereof, I hereunto affix my signature.

MILTON H. SPIELMAN.