

Nov. 21, 1939.

J. C. BARNES

2,180,498

TELEPHONE COUPLING DEVICE

Filed Nov. 25, 1936

2 Sheets-Sheet 1

FIG. 1

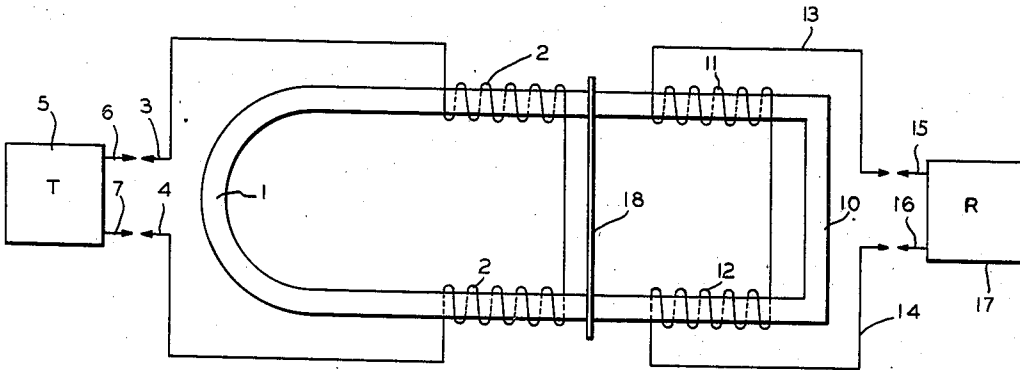


FIG. 2

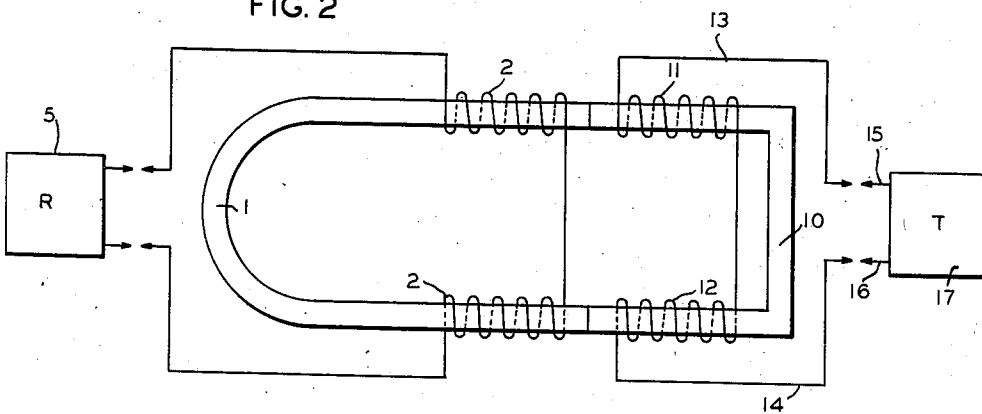
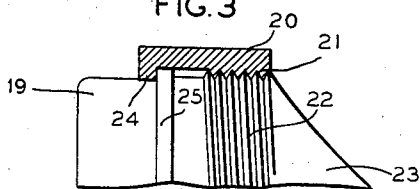


FIG. 3



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2 Sheets-Sheet 2

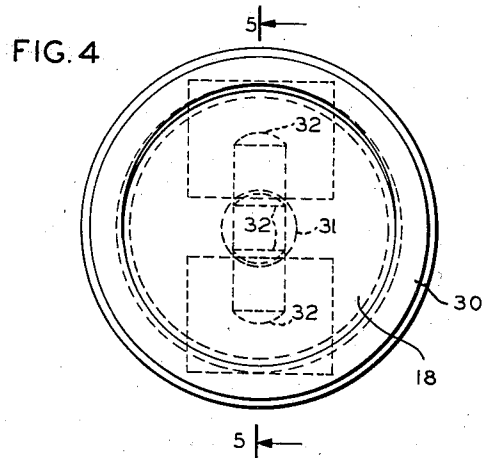
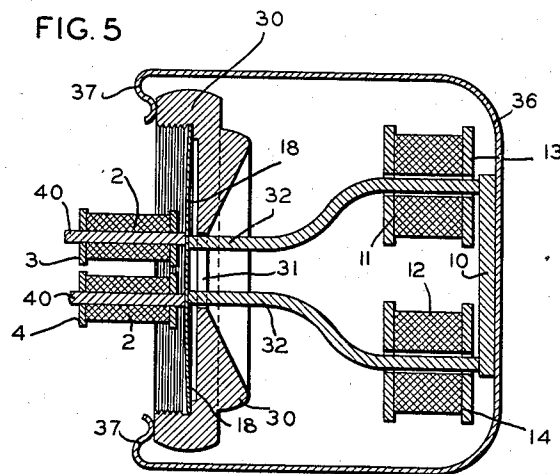
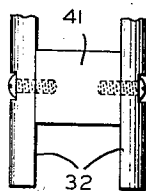


FIG. 6



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TELEPHONE COUPLING DEVICE

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Application November 25, 1936, Serial No. 112,686

3 Claims. (Cl. 179—2)

This invention relates to a telephone coupling device.

An object of the invention is to provide a simple and inexpensive apparatus for connecting picture transmission systems and the like to standard telephone equipment.

Another object of the invention is the provision of a light and inexpensive device of small size by which portable picture transmission apparatus or other apparatus operating at audio frequency may be quickly and conveniently coupled to a telephone circuit without the necessity of disturbing the telephone wiring or equipment.

Apparatus for a similar purpose has been proposed by which connection is made inductively, or otherwise, at the ringer box, but such equipment is more bulky than the present invention and consequently less suited for use for portable apparatus; and very often ringer boxes are located in inaccessible places making it inconvenient to attach such equipment.

It has been proposed also, to use a current generated by a vibrating diaphragm controlled from a telephone receiver, but this arrangement is not as compact as desired for portable equipment, and furthermore, a telephone controlled diaphragm introduces unnecessary distortion into a circuit.

The invention will now be described with the aid of the accompanying drawings of which

Figure 1 is a schematic diagram showing the magnet of a telephone receiver and the present invention with the receiver diaphragm between the respective magnets.

Figure 2 is a similar diagram except that the telephone diaphragm is omitted for maximum energy transfer.

Figure 3 illustrates one method of rotatably coupling the present invention to the shell of a telephone receiver.

Figures 4 and 5 show a modification of the invention which may be attached to a receiver without removing the receiver cap, Figure 5 being a section taken through 5—5 of Figure 4.

Figure 6 shows a brace for the polepieces made from a piece of Bakelite.

Referring now to the drawings: The reference character 1 indicates a conventional telephone receiver permanent magnet having windings 2 connected to outgoing circuits 3 and 4. The wiring details of the instrument and ringer box are omitted as unnecessary, but it will be understood that the receiver is connected to an outgoing line.

The square 5 indicates a picture transmission

apparatus or other frequency controlled equipment located at a distant point. In the present instance the letter T indicates a picture transmitter which is connected through lines 6 and 7 to lines 3 and 4.

The reference character 10 indicates a laminated core or other magnetic circuit whose ends are separated by the same distance as that of the polepieces of the receiver magnet 1. The core if laminated may be magnetized by a permanent magnet, or consist of laminations alone, or it may be a permanent magnet as in the case of certain types of telephone receivers.

Windings 11 and 12 on core 10 are connected to each other in series aiding, while the external terminals of the coils are connected respectively to lines 13 and 14 which in turn are connected to lines 15 and 16 extending from a picture receiving set, indicated diagrammatically by the square 17 and the letter R. In this embodiment the polepieces of core 10 and preferably those of magnet 1 rest against diaphragm 18 of the receiver.

Figure 2 shows a preferred embodiment of the invention differing only from that described above in that the polepieces of both magnets are in contact with each other. In this case, the terminal equipment is reversed from that of Figure 1 and 5 is the receiver and 17 the transmitter.

The assembly including core 10 and its coils are preferably mounted in a casing, somewhat similar to the well-known watch case type of ear phone indicated in Figure 3 by the reference character 19, which is the same size at the edge as a telephone receiver. A convenient method of coupling the apparatus to a receiver is by means of a ring 20 suitably threaded at 21 to screw over the cap threads 22 of a receiver 23, while the opposite end of ring 20 has an inside flange 24 which engages an annular ring 25 at the edge of casing 19, which when the ring is tightened on the receiver shell will hold the respective magnets together, or in a fixed position in respect to each other. Any well known means may be employed, if required, to adjust the core 10 in a longitudinal direction.

Figures 4 and 5 show another modification of the invention which may be attached to the receiver of a telephone without removing the receiver cap or otherwise disturbing the apparatus. This modification makes it possible for persons lacking the mechanical skill to unscrew and replace a telephone receiver cap to connect an audio frequency device to a telephone system.

This modification is particularly useful in connection with telephone news broadcasts now furnished to pool-rooms, clubs and the like of sporting events, in which the line signals are received via telephone and amplified and reproduced through suitable loud speaking apparatus.

In Figures 4 and 5 a conventional telephone receiver cap 30 is shown having a circular central opening 31, into which snugly fits polepieces 32, of a magnet 10 having windings 11 and 12 similar to those previously described.

The outer part of the polepieces in this embodiment, are preferably curved to fit the circular opening 31 in the center of the receiver cap as shown in Figure 4.

The magnet 10 is preferably mounted in a shell 36 provided with one or more pairs of spring clips 37 which engage the underside of the receiver cap, rotatably securing the shell 36 thereto; the clips, shell and polepieces being of such dimensions that with the device in place, polepieces 32 buckle diaphragm 18 of the receiver slightly, pressing it against polepieces 40 of the receiver and preventing the diaphragm from vibrating.

When this embodiment of the invention is clipped to a receiver shell, it is not necessary to remove the receiver cap and diaphragm to locate the polepieces, as all that is required, once the device is in place is to rotate it in respect to the receiver shell until the desired signal level is reached. The respective poles are coaxial with the maximum signal transfer.

Operation

The device operates as follows:

Assuming that the apparatus indicated at 17 is for transmitting pictures according to well known practice, then the signal current to be transmitted sets up a magnetomotive force in core 10. In the case of Figures 1, 4, and 5, the magnet circuit is partially through diaphragm 18 and the permanent magnet 1 of the receiver.

The flux produced by the signal voltage will divide between the two magnetic circuits. The part passing through the telephone receiver polepieces induces a voltage in the receiver coils 2 which will go out to lines 3 and 4 to the distant receiving apparatus 5. Likewise, if the receiving and transmitting apparatus were transposed, the incoming signal current would induce a current in windings 11 and 12, which in this case would

be connected to receiving apparatus as indicated in Figure 1.

For maximum transfer of energy, the polepieces of magnet 1 and core 10 should be coaxial. Figure 2 shows the most efficient arrangement as the polepieces are in contact and there is no division of the magnetic circuit through a diaphragm. If desired, the signal level may be controlled by rotating the magnets 1 and 10 in respect to each other, as previously stated.

What is claimed is:

1. In a device of the character described, an electric circuit and a telephone system including receivers; means to connect said circuit to said telephone system, which includes a pair of magnets connected to said circuit, polepieces for magnets shaped to fit the opening in a receiver cap, and means for securing the first mentioned means to a telephone receiver so that said polepieces extend through the opening in said receiver cap and engage the diaphragm of said receiver.

2. In a device of the character described, an electric circuit and a telephone system, including telephone receivers; means to connect said circuit to said telephone system which includes a pair of magnets connected to said circuit, polepieces for said magnets shaped to fit the opening in a receiver cap, and means for securing the first mentioned means to a telephone receiver so that said polepieces extend through the opening in said receiver cap and engage the diaphragm of said receiver pressing it against the receiver polepieces and thereby preventing the diaphragm from vibrating.

3. In a device of the character described, an electric circuit and a telephone system including telephone receivers; means to connect said circuit to said telephone system which includes a pair of magnets connected to said circuit, polepieces for said magnets shaped to fit the opening in a receiver cap, and means for rotatably securing the first mentioned means to a telephone receiver so that said polepieces extend through the opening in said receiver cap and engage the diaphragm of said receiver pressing it against the receiver polepieces and thereby preventing the diaphragm from vibrating, means for adjusting the signal current which comprises rotating said magnets in respect to each other.

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