July 31, 1928. 1,678,772

H. H. FROST

TELEPHONE PLUG

Filed Dec. 1, 1924

Fig. 1.

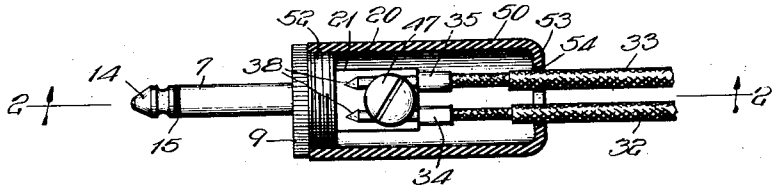


Fig. 2

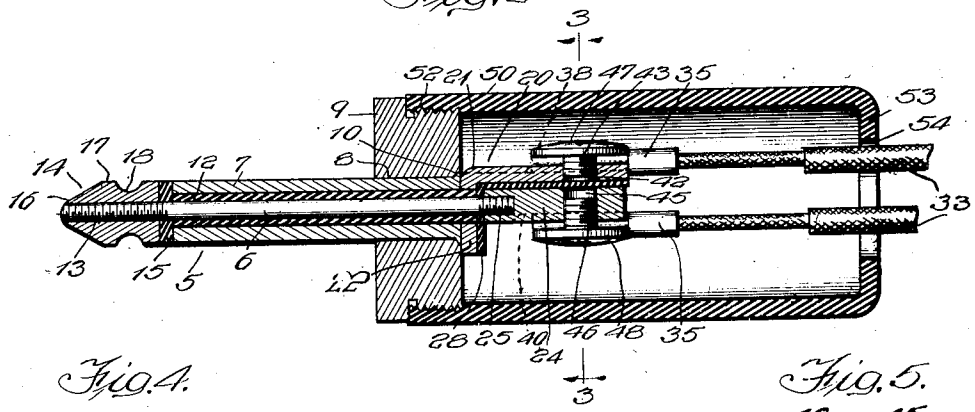


Fig. 4.

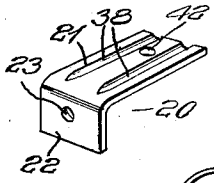


Fig. 5.

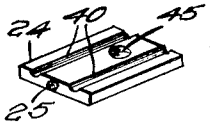
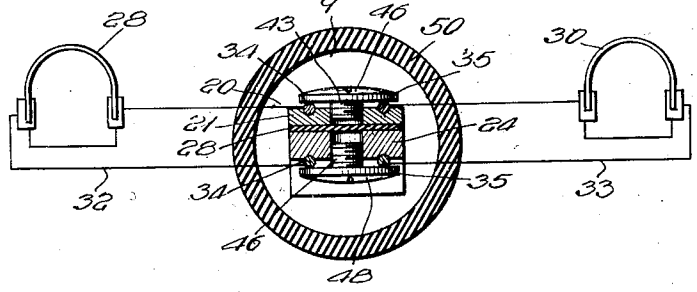


Fig. 3.



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UNITED STATES PATENT OFFICE.

HERBERT H. FROST, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CHICAGO TELEPHONE SUPPLY COMPANY, OF ELKHART, INDIANA, A CORPORATION OF DELAWARE.

TELEPHONE PLUG.

Application filed December 1, 1924. Serial No. 753,031.

My invention relates to telephony, more particularly to an improved plug for use with radio receiving instruments, and its object is the provision of a plug of generally improved and simplified construction which will permit a plurality of head phones or other apparatus to be connected to the receiving instrument.

According to my invention I provide a simple and inexpensive structure for permitting the insertion of a plurality of receiving circuits into the telephone circuit of a radio instrument, or the like. I decrease the number of binding screws necessary and provide for securing a firm connection and maximum contact between the tips or terminals of the phone or other circuits and the plug, one in which the tips will not be loosened or displaced in drawing up the binding means making the connection, and one that may be quickly and conveniently connected and disconnected. I also provide for decreasing the possibility of accidental disconnection upon slight displacement or loosening of the binding means and, in order to make the structure as simple and inexpensive as possible, I have arranged to use a minimum number of standard parts.

To acquaint those skilled in the art with the structure and manner of practicing my invention and with the advantages thereof, I shall now describe in connection with the accompanying drawings, a specific embodiment of the invention.

In the drawings:

Figure 1 is a longitudinal section centrally through the insulating sleeve of a plug embodying my invention, showing the strand tips, the contact post of the plug and its mounting, and the connections between the post and tips in elevation;

Fig. 2 is an enlarged longitudinal section on line 2—2 of Fig. 1;

Fig. 3 is a detail transverse section on line 3—3 of Fig. 2, showing diagrammatically the manner of connecting a pair of head phones to the plug;

Fig. 4 is an isometric view of the angular bracket; and

Fig. 5 is an isometric view of the other terminal bracket.

The plug post 5 of the device shown comprises a contact needle 6 and a surrounding needle sleeve 7, both of suitable conducting material, the sleeve being preferably formed of brass tubing and the needle being preferably of cold rolled steel, although of course this may be varied.

The inner end of sleeve 7 extends through an opening 8 axially through the body member 9 of the plug, said body member being also of suitable conducting material and preferably formed of a brass rod of suitable diameter, although this too may, of course, be varied. The sleeve 7 preferably has a pressed fit in opening 8 and is thereby secured rigidly and firmly therein, and in good contact with the body member 9, the inner end of opening 8 being preferably countersunk or chamfered at 10 and the inner end of sleeve 7 being preferably swedged or headed over into the annular recess, thus provided, and flush with the inner surface of body member 9, the swedging over of the inner end of the sleeve 7 acting with the pressed fit of the sleeve in the body member 9 to prevent outward displacement of the sleeve.

The needle 6 extends co-axially through sleeve 7 and is insulated therefrom by an intervening insulating sleeve 12 of hard rubber tubing or other suitable insulation, which sleeve 12 has a relatively tight fit about the needle 6 and within the sleeve 7, terminating at its outer end substantially flush with the outer end of sleeve 7 and projecting at its inner end therefrom. The outer end of the needle 6 is threaded at 13 and secured thereon is a plug tip 14. The outer end of needle 6 is finished off to conform to the nose of the tip and a touch of solder may be employed for preventing displacement of the tip. Interposed between and insulating the tip 14 from sleeve 7 is a fibre or other suitable insulating washer 15. The tip 14 has the usual tapered nose 16, annular hill 17 and valley 18 for co-operating with any suitable jack spring arrangement, as is well understood in the art.

At the inner end of the needle 6, which projects beyond the inner surface of plug body 9, is an angular terminal bracket 20 having a base 21 and a leg 22 extending at generally right angles thereto. The leg 22 has an opening 23 through which the needle 6 and surrounding sleeve of insulation 12

is adapted to extend and this leg 22 lies between the body 9 and a second terminal bracket 24. Bracket 24 has a threaded opening 25 for receiving the threaded inner end of needle 6, so that by screwing the inner end of the needle 6 into the opening 25, the bracket 24 is drawn up toward the body 9 and the leg 22 of the bracket 20 is drawn up tightly and into firm contact with body 9, and clamped firmly between said body and the bracket 24, while the tip 14 is drawn up tightly against the washer 15.

The brackets 20 and 24, while preferably of sheet brass, may be of any other suitable conducting material and they are insulated from each other by an angular bracket insulator 28 of sheet fibre, or other suitable insulating material. Thus the bracket 20 and sleeve 7 are connected electrically together and insulated from bracket 24 and needle 6 which are in turn electrically connected together, the sleeve 7 being co-operable with the usual sleeve or thimble contact and the tip 14 of the needle 6 being co-operable with any suitable jack spring arrangement, as well understood in the art.

In use, the phone or other circuits are connected across the brackets 20 and 24, and thereby across the sleeve and needle contacts of the plug. In Fig. 3 I have shown diagrammatically two head phones 28 and 30, each having a cord circuit 32 and 33, respectively, and each cord circuit having the usual pair of terminal tips 34, 34 and 35, 35.

To permit connecting a plurality of head phones or other apparatus across the brackets 20 and 24, I provide a pair of substantially parallel spaced grooves 38 in the outer surface of the base 21 of bracket 20 and a pair of similar substantially parallel spaced grooves 40 in the outer surface of bracket 24. These grooves may be pressed, milled or otherwise formed in the respective brackets. Between the grooves 38, bracket 20 has a threaded aperture 42 for receiving a binding or plug screw 43 and between grooves 40, bracket 24 has a similar threaded aperture 45 for receiving a similar binding or plug screw 46. Each screw 45 and 46 has a relatively large head 47, 48, respectively, these heads overlying the grooves in the bracket with which the screw co-operates and the grooves 38, 38 and 40, 40 are adapted for receiving the terminal tips 34 and 35 of the circuits 32 and 33, so that when the tips are placed in said grooves and the screws are drawn up each screw head forms a common means for simultaneously engaging two tips, one on each side, and for binding said tips firmly in place and with maximum contact with their respective brackets.

The tips shown are of the usual circular cross section having enlarged socketed ends for receiving the ends of the conductors of the cord circuits and the grooves are of generally semi-circular formation. The seating of the tips in the depressions or grooves in the brackets prevents forcing of said tips laterally out of position or even from between the bracket and the head of the adjacent screw in drawing the screw up, such as might otherwise result where any irregularities occur or where the screw is tilted or threaded in at such an angle as would produce a wedging action between its head and the adjacent bracket on either side. Accidental transverse displacement of the tips upon slight loosening of the screws is also prevented, the tips remaining at least partially in the grooves upon slight loosening or outward displacement of the heads of the screws. The loosening must be sufficient to make the space between the under surface of the heads 47 or 48 and the adjacent surface of the brackets greater or at least equal to the diameter of the tips before complete lateral displacement of the tips can occur. Regardless of any irregularities that may occur between the screw and brackets and regardless of tilting or inclination of the screw, there cannot be any lateral displacing stress imposed by the drawing up of the screws. At the same time, slight loosening of the screws permits quick and convenient connecting and disconnecting of the tips by longitudinal withdrawal or insertion, accidental displacement in this direction being prevented by the firm binding engagement of the screws therewith.

An insulating sleeve 50 encloses the plug terminals and cord tips and connections therebetween and is threaded at one end as shown at 52 upon the reduced externally threaded portion of the body or head member 9. The opposite end of the sleeve 50 is partially closed by a radial flange 53 and this end has an axial opening 54 through which the conductors of the cord circuits 32 and 33 extend.

From the foregoing it will now be apparent that I have provided a simple and inexpensive structure for permitting the insertion of more than one receiving circuit into the telephone circuit of a radio instrument, or the like. A firm connection and maximum contact is secured and, at the same time, quick and convenient connecting and disconnecting is permitted. The possibility of accidental disconnection is decreased and the structure is simple and inexpensive and employs a minimum number of standard parts.

In connecting two head phone circuits to the plug, as shown, one tip 34 of one circuit is clamped with one tip 35 of the other circuit in the grooves 38 in the bracket 20 on opposite sides of the threaded aperture 42 and beneath the common head 47 of the screw 43. The other tip 34 of the circuit 32 is clamped with the other tip 35 of the cir-

cuit 33 in the grooves 40 in the bracket 24 on opposite sides of the threaded aperture 45 and beneath the common head 48 of the screw 46.

It is to be understood that other than head phone circuits may be connected in the manner set out and that I do not intend to be limited to the precise details shown or described.

I claim:

A plug comprising a plug body, a plug post extending through said body including a needle and a sleeve insulated from each other, a terminal bracket threaded upon the inner end of the needle and in electrical contact therewith, an angular bracket having a base and a leg clamped between the plug body and said first bracket, and an angular insulating bracket having a base and a leg, said base being clamped between the terminal brackets to insulate one from the other.

In witness whereof, I hereunto subscribe my name this 26 day of November, 1924.

HERBERT H. FROST.