

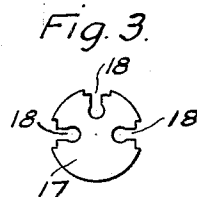
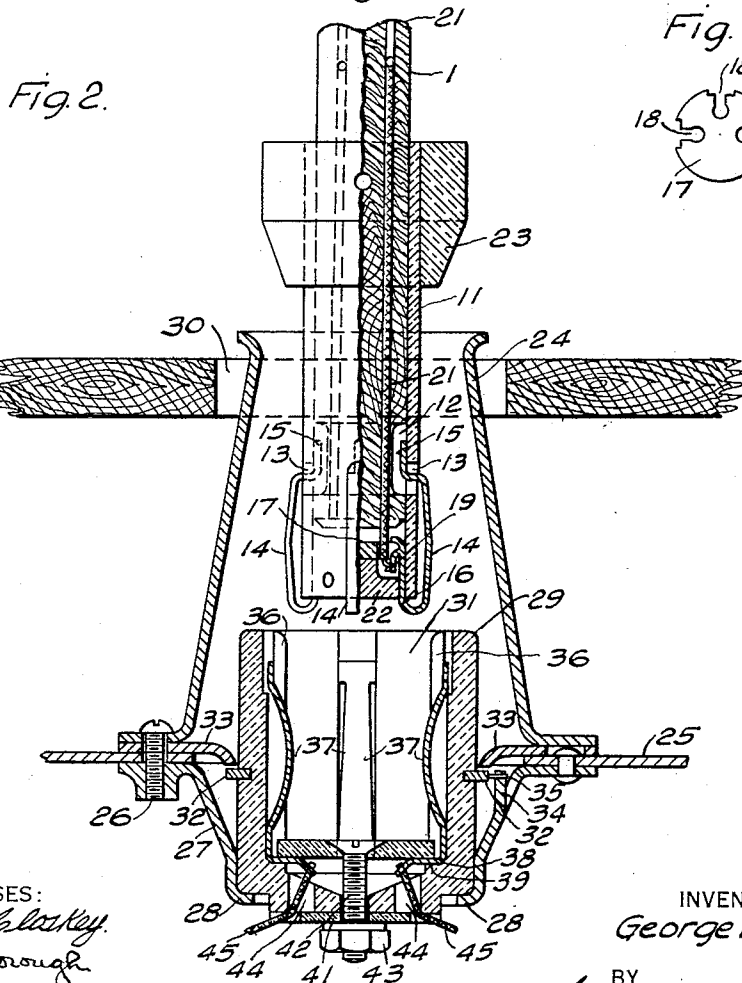
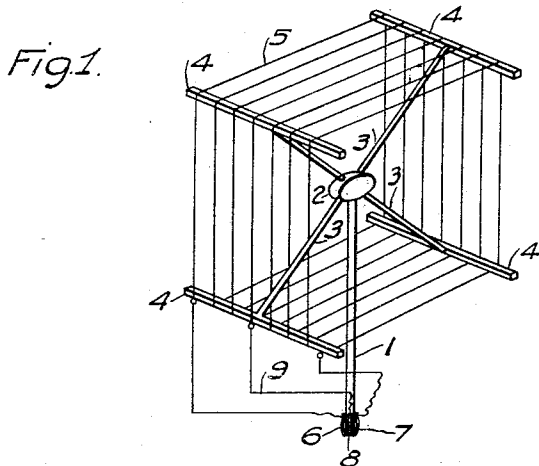
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CONNECTING DEVICE

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CONNECTING DEVICE

Application filed September 2, 1926. Serial No. 133,106.

My invention relates to connecting devices, and it has particular relation to devices for removably positioning a loop antenna or the like in operative relation to a radio receiving system housed in a suitable container.

One object of my invention is to provide a plug-and-jack arrangement for loop antennae that will be noiseless in operation.

Another object of my invention is to provide a plug-and-jack arrangement that cannot be correctly assembled for use.

Another object of my invention is to provide, in devices of the type described, a contact system that is not subject to deterioration.

Another object of my invention is to provide, in devices of the type described, a plurality of self-cleaning contacts.

Another object is to provide, in devices of the type described, separable plug-and-jack members that are capable of being easily and quickly assembled.

In the construction of radio receiving sets utilizing loop antennae as radiant energy receptors, it is necessary that means be provided for permitting rotation of the loop. It is also necessary that connecting devices be provided whereby the loop may be conductively, or capacitively, connected to the input circuit of the set. In the past, it has been customary to employ the well known telephone plug and jack for this purpose, the plug being mounted on the loop-supporting shaft and the jack being made an integral and permanent part of the set.

The plug-and-jack arrangement referred to, while sufficiently satisfactory from a mechanical standpoint, is not satisfactory electrically. The contacts unavoidably deteriorate in use, with the result that the set becomes noisy in operation.

By my invention, I have eliminated all moving contacts, providing instead a plurality of fixed contact members on the loop-supporting shaft and a plurality of complementary contacts on a rotatable socket. I prevent incorrect insertion of the loop-shaft by a non-symmetrical disposition of the contact members, utilizing the contact members themselves as guides for proper positioning

of the shaft in the socket. I further equip each of the socket contact members with a flexible lead, thus permitting a limited amount of rotation and provide a stop device to prevent undue strain from being applied to the flexible leads.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, both as to its organization and its method of operation, will best be understood by reference to the following description, taken in connection with the accompanying drawings, in which

Fig. 1 is a perspective view of a loop-antenna carried on a shaft equipped with contacts according to my invention; and

Fig. 2 is an elevation, partly in section, of a preferred form of my invention.

Fig. 3 is a plan view of element 17 of Fig. 2.

Referring particularly to Fig. 1, a shaft 1 is provided, at its upper end, with a hub 2 carrying four cross arms 3, each of which terminates in a conductor-supporting member 4. A conductor 5 is wound continuously around the supporting members 4, the beginning of the winding being conductively connected to a contact member 6 carried by the shaft 1, and the end of the winding being connected to another contact member 7. A third contact member 8 is provided on the shaft, from which a connection 9 is taken to the midpoint of the loop winding.

Referring particularly to Fig. 2, the shaft 1 is provided, at its lower end, with a sleeve 11 of insulating material, such as hard rubber, bakelite or the like. A continuous groove 12 is provided around the lower end of the shaft, the groove being so disposed as to register with a plurality of openings 13 cut into the insulator sleeve 11. A plurality of approximately U-shaped resilient contact members 14 are provided, the upper end 15 of each spring being passed through one of the openings 13 in the sleeve 11 from the outside thereof, and the other end 16 being bent around the sleeve 11 at right angles to the portion passing through the opening 13.

A washer 17, accurately cut to fit the in-

terior of the sleeve 11, is provided with a plurality of slots 18 to receive the bent-over ends of the contact members and serves to hold them in place. Each of the contact members 14 is provided with a struck-up tongue 19 which fits into the narrowed portion of the slot 18 and serves to prevent relative rotation of the contact member and the washer 17. A plurality of passage-ways are bored in the shaft through which the conductors may be passed, the contact members being so disposed that each one is immediately adjacent the lower end of the one of the passage-ways, in order that a conductor 21 may be passed through the passageway and the circular portion of the slot 18, and be soldered to the tongue 19. A plug 22 is provided to close the open end of the sleeve and may be affixed thereto by a pin.

A bearing collar 23 encircles the sleeve a short distance above the resilient contacts 14 and is of such a size as to permit the shaft to be inserted only a limited distance into a cylindrical or cone-shaped bearing element 24. The cone-shaped element is supported from a sub-panel 25 which may be an integral part of a receiving set, to which it is affixed by a plurality of bolts 26, the bolts also serving to support a depending cylindrical element 27 provided with an inturned flange 28 about its lower end. The upper portion of the cone-shaped element 24 may project through an opening 30 in the upper panel of a radio receiving set cabinet or may be so disposed as to be flush with the surface of the panel.

A socket element 29, generally cylindrical in shape and made of an insulating material, is provided with a large central opening 31 and is rotatably mounted on the inturned flange 28, the opening 31 thus being aligned with the opening in the upper bearing element 24.

A bearing collar 32 is carried by the rotatable socket 29, this collar cooperating with a circular element 33 held between the upper bearing element 24 and the lower supporting element 27 to prevent withdrawal of the socket.

A lug 34 is struck up from the lower bearing element 27, which lug cooperates with a pin 35, or a lug integral with the collar 32, to prevent rotation of the socket more than 360 degrees.

A plurality of channels 36 are provided axially of the large opening 31 through the socket element 29, a resilient contact member 37 being disposed in each channel. The resilient elements 37 have lower bent portions 38 which rest upon a shoulder 39, and are maintained in position by a washer 41 through which passes a retaining bolt 42 provided with a nut 43. A plurality of small openings 44 are provided in the lower end of the socket element, through which pass

flexible leads that are soldered or otherwise affixed to the lower ends 38 of the resilient contact members.

The contact elements 14, as well as the channels 36, are disposed asymmetrically around the axis of the shaft and that of the socket, respectively.

When inserting the shaft into the rotatable socket, the non-symmetrical location of the channels and the cooperating contacts ensures that each contact is properly positioned, since the contacts carried by the shaft must be correctly aligned with the channels before electrical contact is made between the two sets of contact elements.

By reason of the fact that the members 14 and 37 are resilient, there is little likelihood of their deteriorating in use, and, since they must necessarily be engaged and disengaged by a rubbing motion, they are, at all times, self-cleaning.

The provision of the bearing element 24 obviates the necessity of equipping the top panel of a receiving-set cabinet with a ferrule to receive and support the bearing collar 23. When using such a ferrule, it is quite difficult to so align the ferrule opening and the opening in the shaft-receiving socket that the shaft will not have a tendency to bind.

My invention further obviates the necessity of providing a long, firmly mounted socket element in order to prevent the loop, which is rather unwieldly, as a rule, from wobbling around a vertical axis, when rotated. All of the weight of the loop is carried by the bearing collar, while the rotatable socket element 29 serves to prevent side-sway of the lower end of the shaft and, at the same time, completes the proper electrical connections.

I have, accordingly, provided an extremely efficient connecting device for use with loop-antennae and one that may be furnished as an integral part of a receiving set, irrespective of the type of cabinet with which it is intended that the set be used.

I claim as my invention:

1. In combination, a loop-supporting shaft having contact means connected to the loop, a rotatable socket member having contacts, a cabinet for housing said rotatable socket member, said cabinet having a top, a fixed socket member supported independently of, and in spaced relationship to said top and adapted for supporting said rotatable member, and guiding means on said shaft for centering the shaft in said fixed socket member in operative relation to the movable member.

2. In combination, a loop-supporting member comprising a shaft having contact devices adapted to be connected to a loop, a rotatable socket member having contact devices, a guiding member having an opening aligned with the opening in the rotatable member, and means on said shaft cooperating with said fixed member for supporting

said shaft within the opening of the fixed member in operative relation with the movable member.

3. In combination, a loop-supporting shaft
5 having a plurality of contact members, a rotatable socket having resilient contact members, a collar adapted to receive said shaft and position the contacts carried thereby in operative frictional relation with the socket
10 contacts, flexible leads connected to the socket contacts, and unitary means for preventing any strain on said flexible leads when the shaft and the socket are disengaged.

4. In combination, a substantially cylindrical element adapted to receive and support in direct contact therewith a loop-carrying shaft, a substantially cylindrical element depending from the shaft-receiving element, a shaft-receiving socket rotatably supported
20 by said second cylindrical element, a plurality of resilient contacts carried by said socket flexible leads connected to said contacts, and means for limiting the rotation of said socket.

5. In a socket adapted to receive a loop-supporting shaft, an insulating member having an opening axially thereof, a plurality of interior channels in the wall of said opening, an interior shoulder adjacent one end
30 of said opening, a contact member having a bowed portion and a knee-portion disposed in one of said channels, with the knee-portion resting on said shoulder, and means for retaining the knee-portion firmly in contact
35 with said shoulder.

6. In a socket adapted to receive a loop-supporting shaft, an insulating member having an opening therethrough, a plurality of channels in the interior wall of said opening, said channels being axial of the opening, a resilient contact member disposed in each
40 of said channels, means supporting said insulating member for rotation around the axis of said opening, flexible leads attached to said resilient contact members, and means limiting the rotation of said insulating member.
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7. In combination, a loop-supporting shaft provided with a plurality of contact members, a rotatable member having an opening
50 therethrough provided with guiding means and contact members in said socket located adjacent said guiding means, the contact members on the shaft being disposed on said shaft in a manner corresponding to said
55 guiding means in said socket, whereby they will permit insertion of the shaft into the opening only when said guiding means and said contact members are alined.

In testimony whereof, I have hereunto
60 subscribed my name this 30th day of August, 1926.

GEORGE L. BEERS.