Aug. 23, 1932. H. ROHRDANZ 1,873,042

SWIVEL ELECTRICAL CONNECTER

Filed July 3, 1930

Fig. 1.

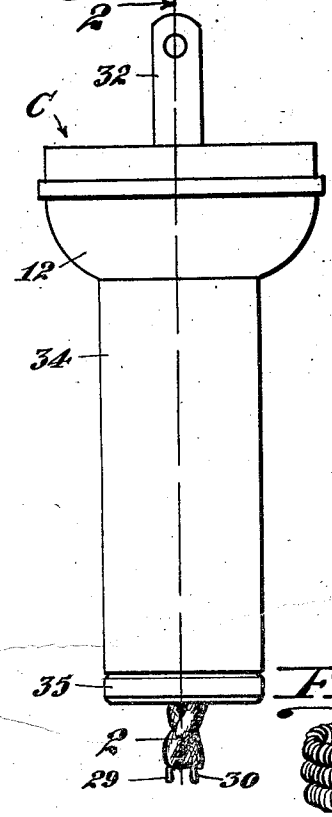


Fig. 3.

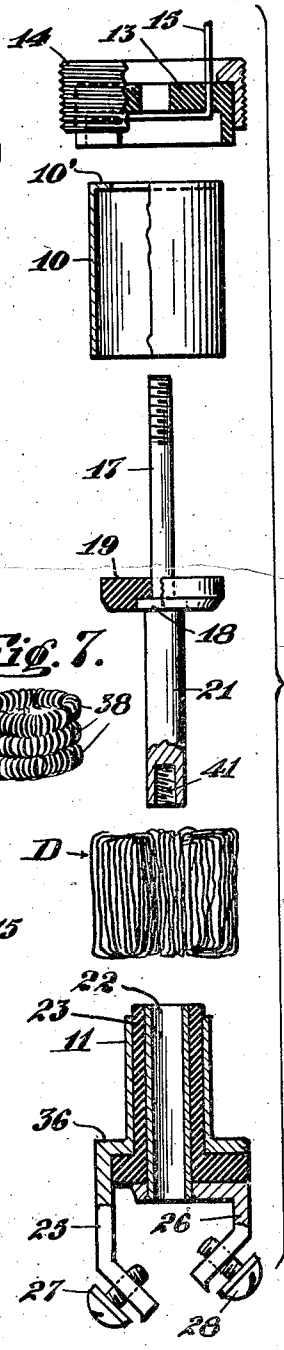


Fig. 2.

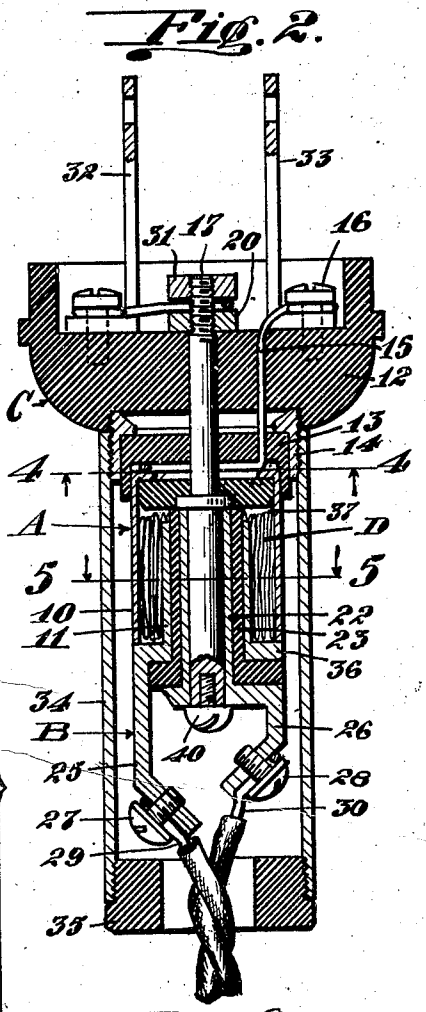


Fig. 7.

Fig. 4.

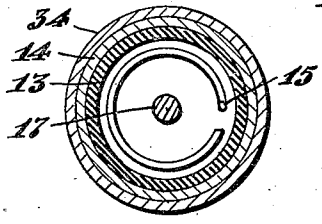


Fig. 5.

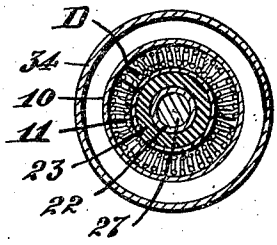
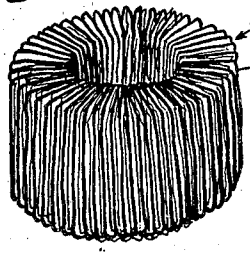


Fig. 6.



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UNITED STATES PATENT OFFICE

HAROLD ROHRDANZ, OF INGLEWOOD, CALIFORNIA

SWIVEL ELECTRICAL CONNECTER

Application filed July 3, 1930. Serial No. 465,462.

This invention relates to an electrical connecter and more particularly pertains to a means for effecting electrical connection between relatively revoluble parts; the invention also pertaining to swivel electrical connecters of the type set forth in the United States Patent Number 1,762,422 issued to me under date of June 10, 1930.

An object of the invention is to provide a swivel electrical connecter embodying simple and effective means for maintaining an electrical connection between interconnected, relatively, revoluble, telescoped parts and which is so formed as to maintain a closed electrical connection between the revoluble parts so as to avoid sparking due to the formation of gaps and thereby obviating the possibility of burning out of the connecter.

Another object is to provide a swivel electrical connecter which, while applicable to various uses, is especially adapted to effecting connection between electrical conductors leading from a source of electrical supply and conductors leading to an electrically operated appliance such as a lamp, motor, heater, flat iron, curling iron, and the like, and which may also be employed in telephone connections.

A further object is to provide a swivel connecter in which the parts are so formed, and arranged as to facilitate their assemblage and their removal and replacement.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed and illustrated by way of example in the accompanying drawing, in which:—

Fig. 1 is a view of the connecter as seen in side elevation.

Fig. 2 is a view in vertical section taken on the line 2—2 of Fig. 1.

Fig. 3 is a view illustrating various parts of the connecter in disassembled relation with the parts shown partly in section and partly in elevation.

Fig. 4 is a detail in horizontal section taken on the line 4—4 of Fig. 2 as seen in the direction indicated by the arrows.

Fig. 5 is a detail in cross section as seen on the line 5—5 of Fig. 2 as seen in the direction indicated by the arrows.

Fig. 6 is a perspective view of a contact element for effecting electrical connection between telescoped relatively revoluble conductors.

Fig. 7 is a perspective view illustrating a modified form of the contact element.

Referring to the drawing more specifically, A and B indicate generally relatively revoluble inter-connected members, the members A and B being here shown as embodying electrically conductive cylinders 10 and 11, respectively, which are disposed in telescoped arrangement with the cylinder 11 extending into the cylinder 10 in spaced concentric relation thereto. The cylinder 10 is carried on a support C which may be of any suitable construction adapted to effect electrical connection with one terminal of a source of electrical supply but which is here shown as embodying an insulated block 12 comprising a member of an electrical plug; the cylinder 10 being positioned in an insulating cap 13 carried by a metallic collar 14 having screw engagement with a recess in the insulated block 12.

An electrical conductor 15 leads from a binding post 16 on the block 12 through the latter and through the cap 13 and has the inner end portion thereof extended so as to be interposed between an inturned flange 10′ on the inner end of the cylinder 10 to effect electrical connection with the latter. The cylinder 10 and cap 13 are held in place on the insulated body 12 by means of an electrically conductive stem 17 which extends through the block 12 and is formed with a collar 18 arranged to bear on an insulating ring 19 disposed internally of the cylinder 10 and seating on the flange 10′; a nut 20 being screwed on the outer end of the stem 17 against the insulated block 12 between which end the collar 18, the ring 19, cylinder 10 and cap 13 are clamped in place in the collar 14, thereby rigidly affixing the

cylinder 10 relatively to the insulated block 12; and also clamping the flanged end of the cylinder 10 against the extended end portion of the conductor 15 which overlies the underside of the cap 13.

The stem 17 is formed with an end portion 21 which projects through the cylinder 11 and constitutes an arbor by which the members A and B are pivotally interconnected.

The member B includes a tube 22 which slidably encompasses the stem portion 21 in electrical contact therewith, and interposed between the tube 22 and cylinder 11 is an insulated sleeve 23; the tube 22, sleeve 23 and cylinder 11 being disposed in close frictional engagement to form a unit as shown in Fig. 3.

The sleeve 11 and tube 22 are formed with end extensions 25 and 26, fitted with binding screws 27 and 28, respectively, for effecting connection with a pair of electrical conductors 29 and 30 which lead to any suitable point.

The members A and B are held in their relatively revoluble relation against longitudinal movement by means of a screw 40 threaded into a socket 41 on the end of the portion 21 of the stem 17; the head of the screw overlapping the end of the tube 22 as shown in Fig. 2.

The outer end of the stem 17 is fitted with a nut 31 and constitutes a binding post which, with the binding screw 16, constitutes a pair of connecters which may be electrically connected to a pair of conductors of an electric circuit in any suitable manner, being here shown as connected to a pair of contacts 32 and 33 adapted to be engaged with the usual slip socket connecter.

The members A and B are enclosed in a shell 34 which has screw engagement with the collar 14 and is fitted with an insulated ring 35 at its outer end through which the conductors 29 and 30 lead.

The cylinder 10 slidably contacts an outwardly extending end flange 36 on the cylinder 11 and thus an enclosed chamber 37 is formed between the cylinders.

An important feature of the invention resides in a means for effecting electrical connection between the relatively revoluble cylinders which means consists of an electrically conductive, resilient cylinder D arranged in the chamber 37 and effecting slidable contact with the adjacent circumferential walls of the cylinders 10 and 11. The cylinder D is here shown as formed of an electrically conductive spring wire bent to form a series of coils which are collectively bent to form a cylinder. The cylinder D thus formed is irregular in contour, as the coils may assume various positions relatively to each other, but in its entirety is quite flexible and resilient. The coils are contracted on placing the cylinder D between the cylinders 10 and 11, and as the wire is resilient, the outer and inner portions of the cylinder D will bear under slight pressure against the adjacent surfaces of the cylinders 10 and 11 and thereby effect electrical connection therebetween.

The cylinder D may be formed of either a single length of wire, or of a multiplicity of lengths of wire and the coils forming same may be disposed in various arrangements; it being found in practice that the coils may become considerably entangled and the convolutions thereof may extend at various angles relatively to each other so as to form a somewhat mixed mass of wire strands, but by reason of the wire body being placed under compression when in position in the connecter, with various portions of the wire in overlapped contacting relation and with portions thereof contacting the cylinders 10 and 11, a very satisfactory electrical connection is afforded between said cylinders. In fact the essence of the present invention resides in interposing between the relatively revoluble cylinders a mass of electrically conductive wire strands intermingled with each other and contracted together under tension between the cylinders so that a number of lengths of the strands of wires adjacent the surfaces of the cylinders will bear closely thereagainst with the lengths of at least a portion of the strands extending in the general direction of the lengths of the cylinders so that on rotation thereof these strands will be wiped transversely. This insures an effective and enduring electrical connection between the wire strands and the cylinders.

In Fig. 6 of the drawing, the member D is shown as formed of a coil of wire, the convolutions 37′ of which are elongated and are collectively arranged to form an annulus which is adapted to be positioned around the cylinder 11 and to be crowded into the cylinder 10 on assembling the cylinders in their telescoped relation. The member D, which constitutes a wiper contact member, may be formed as illustrated in Fig. 7; that is, of a plurality of annular members 38 formed of spirally wound lengths of wire bent to form rings which are assembled in superposed relation and are adapted to be positioned between the cylinders 10 and 11 with the outer portions of the rings contacting the cylinder 10 and with the inner portions thereof contacting cylinder 11, thereby affording an electric connection between said cylinders.

The operation of the invention is apparent from the foregoing, it being obvious that on connecting the terminal of the connecter to the lines of an electric circuit, the electric current will flow through the conductor 15, cylinder 10 to the conductor 29, or vice versa; the current flowing from the cylinder 10

through the wires constituting the member D to the cylinder 11, or vice versa; and current flowing from the conductor 30 through the tube 22 and stem 17, or vice versa, according to the direction of flow of the electric current through the lines from the electric circuit to which the connecter is applied.

I claim:

1. In a swivel electrical connecter, a pair of spaced telescoping relatively revoluble electrically conductive cylindrical members, and a resilient mass of electrically conductive strands interposed between and contacting said cylinders to afford electrical connection therebetween.

2. In a swivel electrical connecter, a pair of spaced telescoping relatively revoluble electrically conductive members, an annular arrangement of coiled electrically conductive non-insulated wire arranged in the space between said members affording an electrical connection therebetween; at least a portion of the lengths of said wire extending longitudinally of said members and contacting therewith.

3. In a swivel electrical connecter, a pair of spaced telescoping relatively revoluble electrically conductive members, and a mass of loosely coiled electrically conductive non-insulated wire interposed between said members and frictionally bearing thereagainst to afford an electrical connection between said members.

4. In a swivel electrical connecter, a pair of spaced concentrically arranged electrically conductive members, means for supporting said members for relative rotation, and a substantially cylindrical mass of loosely coiled spring wire interposed between said members in wiping contact therewith to effect electrical connection therebetween.

5. In a swivel electrical connecter, an insulated support, an electrically conductive stem carried by said support, an electrically conductive cylinder encircling said stem and insulated therefrom, an electrical conductor having an end portion interposed between said support and an end of said cylinder, means embodying said stem for clamping said cylinder against said conductor and for securing said cylinder in fixed relation to said support, a swivel revolubly supported by said stem including a pair of electrically conductive members insulated from each other, one of which is arranged in electrical contact with said stem, and means for affording a wiping electrical connection between the other of said members and said cylinder.

6. In a swivel electric connecter, an electrically conductive stem, an insulated support therefor, means for effecting electrical connection between said stem and one terminal of a source of electrical supply, an electrically conductive cylinder encircling said stem in spaced relation thereto and insulated therefrom, means for effecting electrical connection between said cylinder and another terminal of the source of electrical supply, a second electrically conductive cylinder interposed between said first named cylinder and said stem and insulated from the latter, means revolubly supporting last named cylinder on said stem including an electrically conductive tube encompassing the stem and an insulated sleeve interposed between said tube and its encompassing cylinder, a pair of electrical conductors connected to said tube and last named cylinder, and a mass of loose wire coils of an electrically conductive material interposed between said cylinders and yieldably bearing thereagainst to afford electrical connection therebetween.

7. In a swivel electrical connecter, a pair of spaced telescoping relatively revoluble electrically conductive cylindrical members, and a mass of electrically conductive non-insulated wire strands intermingled with each other and contracted together under tension between said members and bearing thereagainst to effect electrical connection therebetween.

HAROLD ROHRDANZ.