Oct. 15, 1929. C. FISCHER 1,731,893

ELECTRIC CONNECTER

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Fig. 1.

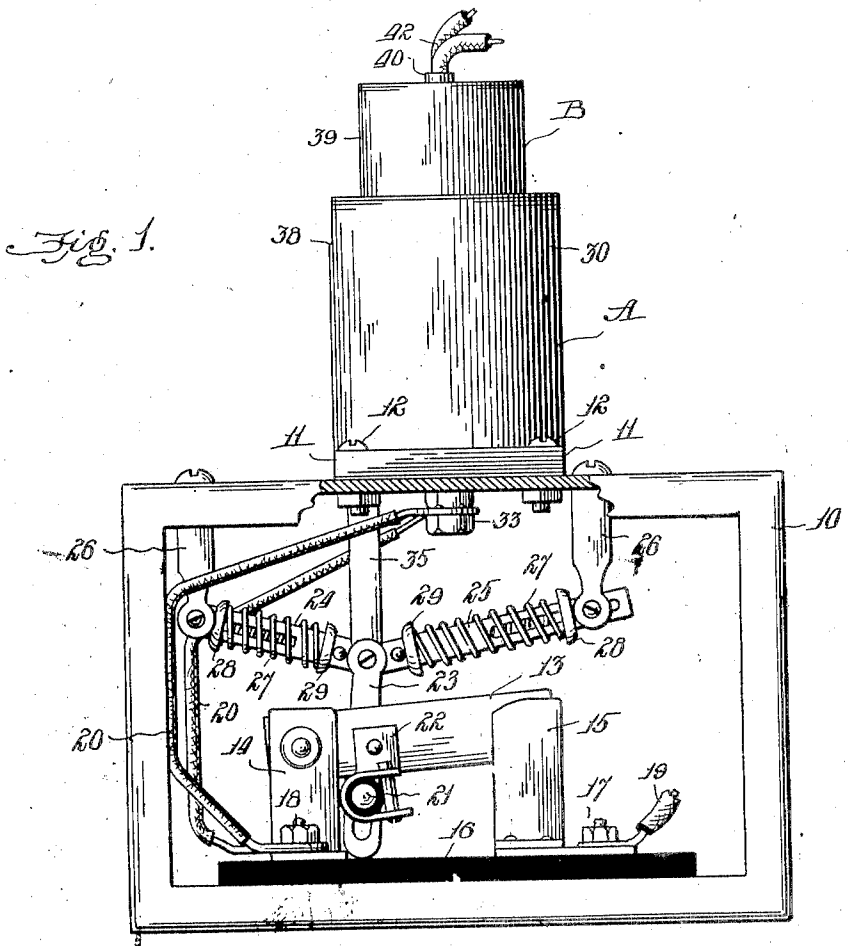
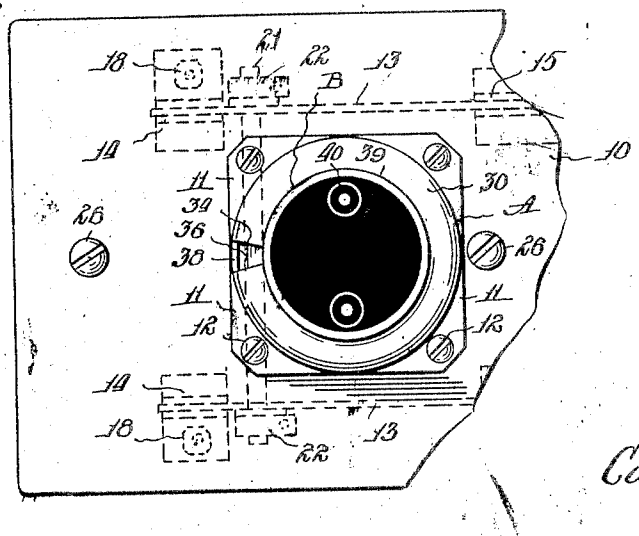


Fig. 2.



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Fig. 3.

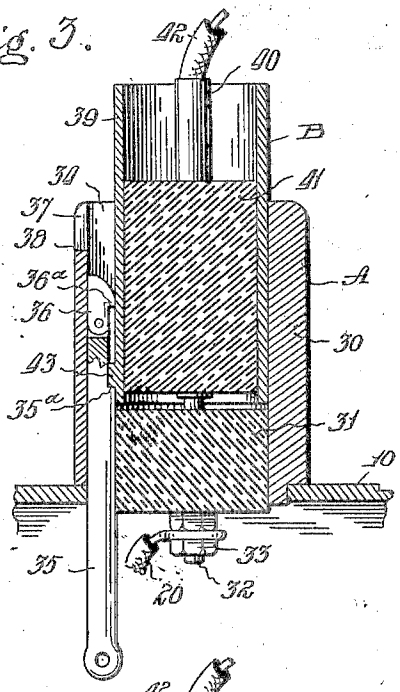


Fig. 5.

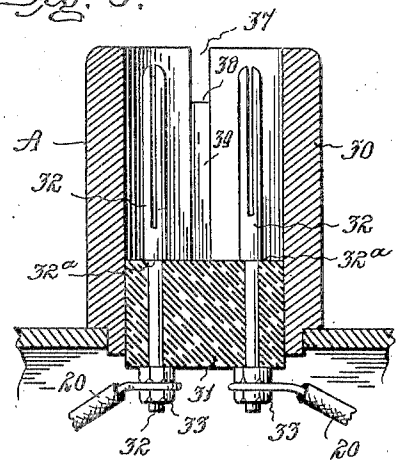


Fig. 6.

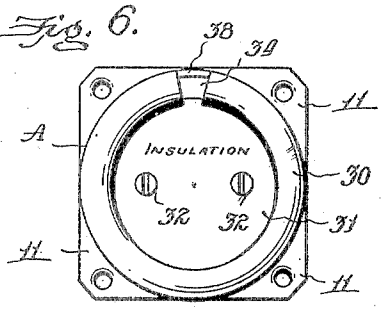


Fig. 4.

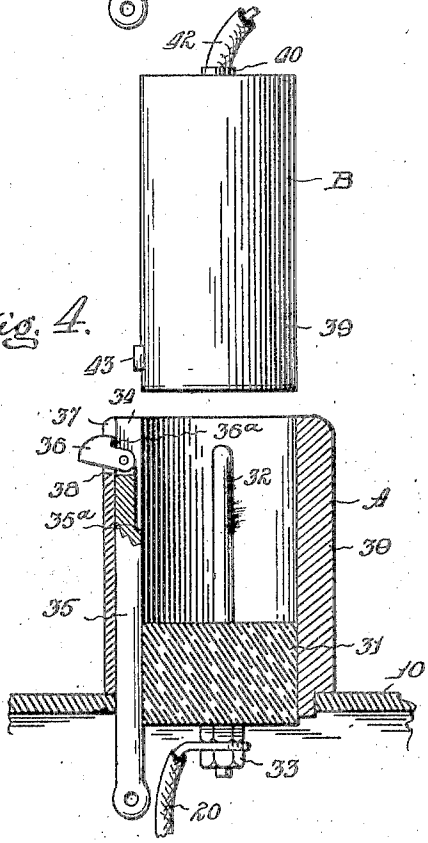


Fig. 7.

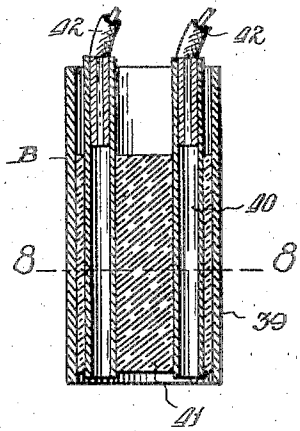
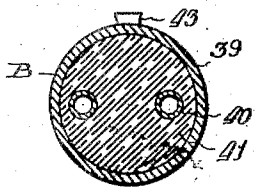


Fig. 8.



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Patented Oct. 15, 1929 1,731,893

UNITED STATES PATENT OFFICE

CARL FISCHER, OF WEST HOMESTEAD, PENNSYLVANIA

ELECTRIC CONNECTER

Application filed June 4, 1927. Serial No. 196,571.

My invention is an improvement in connecters for electric current conductors, and relates more especially to that particular type commonly known as a plug connection comprising plug and socket members fitting one within the other for the purpose of carrying the current through the connecter.

My invention contemplates an electric connection of this general type in which the plug operates in conjunction with the socket to control a make and break device or switch whereby in the present instance the connection is not completed for the passage of the current until the plug member is seated in the socket member, and likewise the circuit is broken by the connecter before the plug is withdrawn, thereby obviating any danger of shock to the operator by accidental contact or carrying of the current through the connecter prematurely.

A further object of my invention is to provide an electric connecter for carrying currents of any required capacity which will be not only entirely safe in the manipulation of the members thereof but also provide that the manipulation may be effected quickly and positively.

A further object of my invention is to provide an electric connecter of this character which will be gas and water proof.

Other objects and advantages of my invention, as well as its adaptability to various electric current make and break devices, will hereinafter appear, and what I claim as new and desire to protect by Letters-Patent is more particularly set forth in the appended claims.

In the accompanying drawings:

Figure 1 is an elevation illustrating the application of my improved electric connecter in connection with a conventional form of knife-switch.

Fig. 2 is a plan view thereof, a part of the switch-box being broken away.

Fig. 3 is a vertical sectional view through the connecter with the members thereof assembled for carrying the current.

Fig. 4 is an elevation with the members of the connecter separated, the socket member being shown in section.

Fig. 5 is a detail sectional view of the socket-member.

Fig. 6 is a plan view of the socket-member.

Fig. 7 is a detail sectional view of the plug-member, and

Fig. 8 is a transverse sectional view through the plug-member on the line 8—8 of Fig. 7.

In the drawings I have shown my improved electric connecter as adapted for the operation of an ordinary form of electric current make and break device or knife-switch in which the socket-member A to receive the companion plug-member B is mounted on the switch-box 10, for which purpose said socket-member is provided with short base-flanges 11 to receive the screws 12 for attaching the same to the top of the switch-box. The switch consists as usual of the pair of blades 13 pivoted at one end in standards 14 and closing at their outer ends between the contact-plates 15 arranged in pairs to receive the blades respectively, said standards and contact-plates being mounted on a plate 16 of insulation material and provided with binding-posts 17 and 18 to which the insulated wires 19 and 20 are connected for conducting the electric current to and from the switch. The blades are connected together for operation in unison by a cross-bar 21 secured thereto in the usual manner by clamps 22, riveted to the blades as shown in the drawings, and said cross-bar is engaged for operating the blades by a slotted link 23 connected to the meeting ends of spring-actuated rods 24 and 25 supported at their outer ends in brackets 26 depending from the top of the switch-box, each rod being actuated by a spring 27 interposed between opposite cup-shaped washers 28 and 29 bearing respectively against the supporting bracket and a projecting pin on the rod whereby these cooperating spring-actuated rods will serve to quickly open and close the switch when moved beyond their longitudinal plane in either direction. This is a conventional form of knife-switch and does not form an essential part of my invention, being illustrated to show one example of make and break device that may

be operated by the plug and socket members of my improved connecter.

In carrying out my invention the socket member of the connecter is in the form of a tubular casing 30 with a filling 31 of insulation material within the lower end thereof through which pass the contact members or terminals 32 projecting below the filling block to receive nuts 33 for connecting thereto the electric current conducters 20 extending from the switch or make and break device. The upper portion of the contact member or terminal 32 that extends into the cavity of the socket-member which receives the plug-member is split, as usual, to provide a closer contact with the cooperating plug-member hereinafter described, and for the purpose of securely connecting each contact-member or terminal to the insulation block said contact member is reduced for a portion of its lower length, where it extends through said block, to provide a shoulder 32^a bearing on the block and clamped thereagainst by the nuts 33. More particularly the casing is provided internally at one side with a wedge-shaped channel 34 in which slides an operating rod 35 for opening and closing the switch and therefore is connected to the link 23, said switch operating rod being actuated by the insertion of the plug-member into the socket-member and withdrawing it therefrom, for which purpose the upper end of said rod is provided with a pivoted catch 36. It will be noted that the upper end of the rod is cut away at its inner side for a short distance to provide a shoulder 35^a spaced from the bill 36^a of the catch, and that the upper end of the outer wall of the wedge-shaped channel is cut away to provide an opening 37 through which the catch may swing out (see Fig. 4) when the rod is in its uppermost position and closed or swung to a position on a line with the rod and wedge-shaped channel by striking the shoulder 38 at the lower end of said opening when the rod is depressed.

The plug-member B of the electric connecter is in the form of a tube 39 adapted to snugly fit within the cavity in the upper end of the socket-member A, for insertion therein and withdrawal therefrom, and is provided with hollow contact members or terminals 40 to receive the terminals 32 in said socket-member and are embedded in a block 41 of insulation material extending from the bottom of the tube to near the upper end thereof, the insulated wires 42 for conducting the electric current from the plug-member being suitably secured in the upper ends of said hollow contact-members 40. In the present instance there is provided near the lower end of the tubular plug-member an outwardly projecting integral lug 43 shaped in cross-section to correspond with the wedge-shaped channel 34 in the socket-member or the inner portion thereof in which it slides or works, that is to say this lug works in the recess in the upper portion of the operating-rod 35 above the shoulder 35^a between said shoulder and bill 36^a of the catch carried by the operating rod, whereby it provides the means for operating the rod and make and break device or switch to which it is connected when the plug-member is pushed into the socket-member and withdrawn therefrom, it being understood that the connection of the link 23 to the cross-bar of the throw-switch herein shown is insulated to protect said operating-rod against current passing into the same, in other words the electric current is carried through the connecter or into any parts thereof only by way of the terminals 32 and 40 of the socket-member and plug-member respectively and these are thoroughly insulated from the other parts for the safe handling of the plug in the manipulation of the connecter.

The operation of connecting an electric current or currents by the improved form of connecter herein shown and described is similar to that of an ordinary plug and socket connection, but in the present instance when the plug-member is removed, sliding the rod 35 to its uppermost position, the terminals 32 of the socket-member are "dead" and remain so until said plug-member is pushed well into the socket or nearly fully seated therein—the length of the cut away portion of the upper end of the operating-rod determining the extent to which the plug is inserted before it begins to operate said rod—thus removing any danger of the operator receiving a shock in the manipulation of the connecter inasmuch as the switch is not thrown to closed position for transmitting the current through the connected terminals until the parts of the connecter are assembled. It will be obvious that on inserting the plug into the socket for operating the sliding rod 35, with the catch 36 of the latter swung out in the position it assumes on the withdrawal of the plug, the lug 43 on the plug passes down the channel 34 at the inner side of the reduced upper portion of the operating-rod until it strikes the shoulder 35^a and then pushes the rod downward for the operation of the switch, the one shown in the drawings being operated by the link 23 and spring-actuated levers connected to the rod, although of course any other form of switch or make and break device may be likewise operated by the operating-rod 35. This completes the connection and the current passes through the connecter by way of the joined terminals 32 and 40. When the connection is broken by the removal of the plug both terminals 32 and 40 become "dead" before the plug is moved to any appreciable extent in withdrawing the same, in this instance the lug 43 engaging the catch to operate the rod and swinging it

out through the opening 37 in the socket as the plug leaves the latter, and of course the projecting catch will serve also as an indicator of the position of the operating rod, the rod being maintained in uppermost position by the spring-actuated switch shown in the drawings or any other spring-actuated make and break device to which my improved electric connecter may be applied. In some instances it may be necessary to apply a spring for returning the rod to uppermost position directly to said rod, according to the make and break device preferred; in other words I desire it to be understood that my improved connecter may be used with any desired form of electric circuit make and break device, not only for transmitting currents of high capacity by a throw-switch of the type shown in the drawings but also low capacity currents, as lighting circuits, and consequently the shape of the socket-member A may be varied, as well as the size of the cooperating parts A and B, according to requirements with respect to their adaptability. Furthermore, the electric-switch or other form of circuit breaker may be designed for single pole or multiple and of course provided with overload protection either through the usual coil, relays, or fuses, in the latter instance the switch and fuses being mechanically interlocked, if preferred, to prevent replacement while the circuit is completed; such arrangements being in common use and obviously may be readily employed in association with my improved connecter which, as heretofore stated, may be also adapted for use in connection with a simple form of make and break device connecting low capacity currents such as supplied to residences for lighting, operating household appliances, &c.

It will be apparent that modifications in the details of construction of my improved connecter may be resorted to without materially altering the purpose of my invention to provide a plug and socket connecter in which the terminals are "dead" until the connection is practically made with the plug seated within the socket; for example, the operating-rod 35 could be modified to have the catch-member 36 an integral part thereof, but in this instance said integral catch would project beyond the outer end of the socket-member (the rod being made longer for the purpose) so that the projection on the plug-member could be moved into engagement therewith by a lateral movement of said plug-member before it is inserted in the socket-member; or the same result could be obtained by enlarging the upper end of the cavity in the socket-member to permit of this lateral movement of the plug-member before it engages the reduced lower portion of said cavity, the length of the terminals 32 being such as to permit of this operation, all within the spirit and scope of my claims.

I claim:

1. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, a spring-actuated rod slidable in a channel in one side of the socket-member and connected to the circuit breaker for operating the same, said rod having a recess at the inner side of the upper portion thereof having a shoulder at the lower end of said recess, and a catch pivoted on the upper end of the rod and movable in and out of alignment with the aforementioned shoulder; together with a projection on the plug-member working in said recess to engage the shoulder at the lower end of the recess and catch at the upper end thereof for moving the rod when the plug-member is inserted in the socket-member.

2. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, a rod slidable in the socket-member and connected to the circuit breaker for operating the same and having a recess in one side forming a shoulder at the lower end of said recess and a catch pivoted on the upper end of the rod and movable laterally to bring the bill of the catch in and out of alignment with the aforesaid shoulder; together with a projection on the plug-member working in the recess to engage the shoulder and catch for operating the rod as the members of the connecter are connected and disconnected.

3. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, a projection on the plug-member, a slidable rod in the socket-member connected to the circuit breaker and having a shoulder with which the projection on the plug-member engages to operate the rod in one direction on the insertion of the plug-member in the socket-member, and a pivoted member on the outer end of the rod above the aforementioned shoulder and movable in and out of alignment therewith and with which the projection on the plug-member engages to move the rod in the other direction on the removal of the plug-member from the socket-member.

4. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, a projection on the plug-member, a circuit breaker operating rod slidable in a recess in the socket-member and having a shoulder with which the projection on the plug-member engages for moving said rod in one direction, and a catch on the upper end of the rod above said shoulder and movable into and out of engagement with the projection on the plug-member, said projection engaging the catch to move the rod in the other direction.

5. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, a projection on the plug-member, a circuit breaker operating rod slidable in a recess in the socket-member and having a shoulder with which the projection on the plug-member engages for moving the rod in one direction, and a catch pivoted at the upper end of the rod to swing into and out of engagement with the projection for movement of the rod in the other direction.

6. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, a projection on the plug-member, a circuit breaker operating rod slidable in a recess in the socket-member and having a reduced upper portion forming a recess in one side with a shoulder at the lower end thereof, and a catch pivoted at the upper end of the reduced portion of the rod to swing into and out of alinement with the recess, the projection on the plug-member working in the recess to alternately engage the shoulder and catch as the members of the connecter are connected and disconnected.

7. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, the socket-member having a vertical wedge-shape recess in one side thereof, a circuit breaker operating rod wedge-shape in cross-section and slidable in the aforesaid recess and having a reduced upper portion forming a recess at the inner side of the rod with a shoulder at the lower end of the recess, and a catch pivoted to the upper end of the reduced portion of the rod to swing into and out of alinement with the recess in the rod in the uppermost position of the rod; together with a projection on the plug-member working in the recess in the rod to alternately engage the shoulder and catch as the members of the connecter are connected and disconnected.

8. In combination with a circuit breaker of a connecter comprising a socket-member and a plug-member having cooperating terminals, the socket-member having a vertical wedge-shape recess in one side thereof with an opening through the side of the socket-member at the upper end of said recess, a circuit breaker operating rod wedge-shape in cross-section for slidable movement in the aforesaid recess in the socket-member and having a reduced upper portion forming a recess at the inner side of the rod with a shoulder at the lower end of the recess, and a catch pivoted to the upper end of the reduced portion of the rod and having a bill projecting into alinement with the recess in said rod, said catch being movable into the opening through the side of the socket-member in the uppermost position of the rod; together with a projection on the plug-member working in the recess in the rod to alternately engage the aforesaid shoulder and catch on said rod.

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