

July 4, 1933.

W. L. BETTS ET AL

1,917,009

ELECTRICAL CONNECTER

Filed March 17, 1931

FIG. 1.

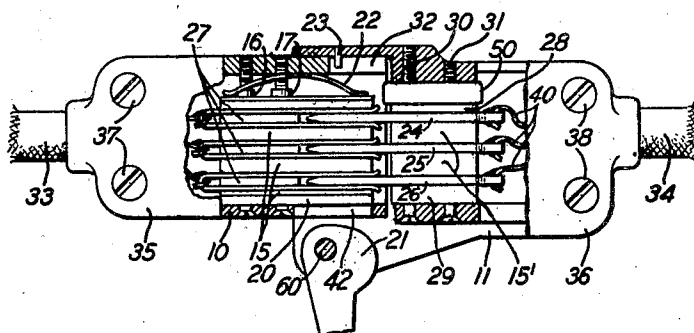


FIG. 2.

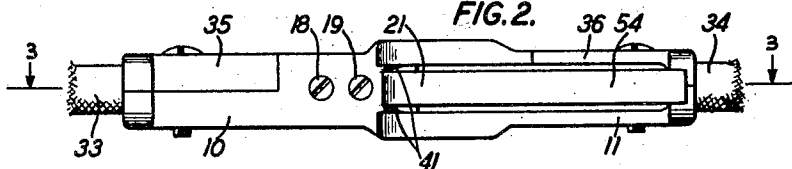


FIG. 3.

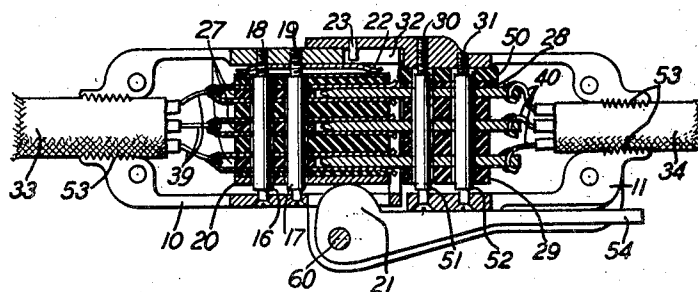


FIG. 4.

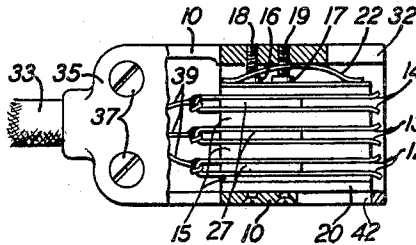
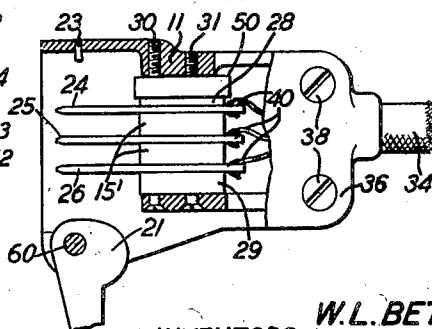


FIG. 5.



INVENTORS
W. L. BETTS
E. SORENY
BY
J. Mac Donald
ATTORNEY

UNITED STATES PATENT OFFICE

WALTER L. BETTS, OF BROOKLYN, AND ERNEST SORENY, OF NEW YORK, N. Y., AS-
SIGNORS TO BELL TELEPHONE LABORATORIES, INCORPORATED, OF NEW YORK, N. Y.,
A CORPORATION OF NEW YORK

ELECTRICAL CONNECTER

Application filed March 17, 1931. Serial No. 523,220.

This invention relates to electric switches and more particularly to a plug and jack especially for use in speech transmitting circuits of low impedance in which the speech currents are exceedingly feeble. It is essential that such circuits be very free from noise disturbances. The ordinary plugs and jacks at present available are more noisy than could be tolerated because of contact potentials generated between the contacting elements and therefore the plug and jack of the present invention was devised to provide a device which would be free from this objection.

In accordance with this invention in addition to the contact pressure provided by the resiliency of the jack springs themselves, an auxiliary pressure applying device, such as a camming mechanism, is provided which is actuated after the plug fingers are inserted between the jack springs to increase the contact pressure. More specifically, a plug having a plurality of fingers engage corresponding jacks, these elements being mounted in shells which are arranged to be telescopically engaged. The jack and plug are each mounted in a pile-up arrangement in their respective shells and loosely retained therein to permit their self-adjustment upon the inter-engagement of the shells. Resilient means is provided in each pile-up for exerting a predetermined contact pressure between the jacks and plugs upon the operation of a camming member mounted on one of the shells, which operation is also effective to positively retain the shells in their engaged position. The shells are each provided with a cover portion which is removable therefrom in order to give free access to the jacks and plugs for effecting soldered connections with the wires with which they are associated. These cover portions cooperate with their respective shells to form cylindrical openings, each having a series of ridges for gripping the cables in order to prevent the breaking of the soldered connections upon exerting tension on the cables when disengaging the shells.

In the drawing,

Fig. 1 is an assembly view of the connecter with portions of the shells cut away;

Fig. 2 is a side view thereof;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a sectional view of one of the shells showing the jack pile-up; and

Fig. 5 is a sectional view of the other shell showing the plug pile-up.

Through the several figures, 10 and 11 are metallic shells arranged to be telescopically engaged as shown in Figs. 1, 2 and 3. In the shell 10 there is mounted a plurality of U-shaped contact members or jacks 12, 13 and 14 which are insulated from the shell 10 and held in spaced relation with respect to each other by insulating strips 15. These contact members 12, 13 and 14 and the insulating strips 15 are mounted for lateral movement on bushings 16 and 17 which are in turn mounted on screws 18 and 19 threadedly engaging the shell 10 as shown. A steel plate 20 embodied in the jack pile-up and insulated from the jack 12 by one of the strips 15 is likewise loosely mounted on the bushings 16 and 17 and cooperates with a camming member 21 for exerting pressure between the contacts in a manner that will be hereinafter described in detail. A leaf spring 22 also held in place by screws 18 and 19 is provided for normally holding the jack pile-up and the steel plate 20 against the opposite side of the shell and in engageable relation with the surface of the cam 21 when the shells are inter-engaged as shown in Figs. 1, 2 and 3 and insulating strips, such as 27 are provided to prevent the deformation of the jacks 12, 13 and 14 when acted upon by the cam 21.

The portion of shell 10 which engages the shell 11 is provided with a slot 32 which registers with a pin 23 carried by the shell 11 for readily locating the proper engaged relation with the shells. In the shell 11 there is mounted a plurality of contact members or plugs 24, 25 and 26 insulated from each other by insulating strips 15' and the plug 24 from the shell 11 by insulating strip 28 and a rubber pad 50 and plug 26 by insulating strip 29. This plug pile-up is mounted

for lateral movement on bushings 51 and 52 shown in Fig. 3, in turn, mounted on screws 30 and 31 threadedly engaging the shell 11 as shown. The cam 21 is rotatably mounted on pivot 60 supported by the shell 11 and is held against free movement thereon by friction washers such as 41 shown in Fig. 2. This cam has a lever arm 54 provided for moving it in engagement with the outward projecting end of steel plate 20 when the shells 10 and 11 are inter-engaged as shown in Figs. 1 and 3. But it is to be noted that in this movement the cam 21 previous to its engagement with the plate 20 passes in an aperture 42 for positively locking the shells 10 and 11 against axial movement.

The shells 10 and 11 are each provided with a cover piece 35 and 36, respectively, which are removably held on the shells by screws, such as 37 and 38 to give access to the terminals of the jacks 12, 13 and 14 and plugs 24, 25 and 26 for effecting the soldered connection of the wires 39 and 40. These cover pieces 35 and 36 as well as the shells 10 and 11 form at their outer ends cylindrical apertures having gripping surfaces such as 53 shown in Fig. 3 provided for clamping the cables 33—34 therebetween and thereby relieving the soldered connections of the strain to which they are generally submitted by pulling on the cable when withdrawing the plugs from the jacks.

In the operation of this device with the shells 10 and 11 disengaged, the cam 21 is normally placed in position shown in Figs. 1 and 5 where it is retained by the friction washers 41 to permit the inter-engagement of the shells and the engagement of the plugs 24, 25 and 26 with their associated jacks 14, 13 and 12. Upon the inter-engagement of these shells and the plugs and jacks carried thereby the cam 21 is moved from position shown in Figs. 1 and 5 to position shown in Fig. 3 wherein the cam engages the free end of metallic plate 20 and compresses the spring 22, and the rubber pad 50 which in turn effect a corresponding contact pressure between the jacks and plugs. The movement of the cam simultaneously locks the shells in engagement through its engagement with the aperture 42 in shell 10. It is to be noted that due to the fact that the jacks and plugs are freely mounted on their insulating bushings, this permits the self-adjustment

of the plugs with respect to the jacks and vice versa, and the free movement of each pile-up along the insulating bushings under the action of the cam permits to obtain an equal contact pressure along the length of the jacks and plugs and thereby positive contacts therebetween. Connecters constructed according to this invention have been found to be free of the objections above specified and operate efficiently in a new circuit condition.

What is claimed is:

1. In an electrical connector, a pair of shells, a jack pile-up in one of said shells, a plug pile-up in the other shell for engaging said jacks with a predetermined contact pressure, a cam operable for increasing the contact pressure between said jacks and said plugs and means carried by one of said shells cooperating with said cam when in its operated position for interlocking said shells independently of the pressure applied between said jacks and said plugs.

2. In an electrical connector, a pair of telescopically engageable shells, a set of jacks mounted in one of said shells, a set of plugs mounted in the other shell for engaging the jacks upon the engagement of said shells, a cam carried by the last mentioned shell, means for actuating said cam, resilient means tensioned by the operation of said cam and acting on said jacks and plugs for increasing the contact pressure therebetween and means carried by the first mentioned shell cooperating with said cam for locking said shells in their engaged relation.

3. In an electrical connector, a shell, a pile-up of jacks in said shell, means engaging said shell and loosely supporting said jacks, another shell, a pile-up of plugs in said shell for engaging said jacks, means engaging the last mentioned shell and loosely supporting said plugs, said shells having inter-engaging portions each of said jacks being engaged by its respective plugs upon the engagement with said shells, and means carried by one of said shells and operable in position for engaging the other shell for holding them in locked condition and simultaneously increasing the contact pressure between said jacks and said plugs.

In witness whereof, we hereunto subscribe our names this 13th day of March, 1931.

WALTER L. BETTS.
ERNEST SORENY.