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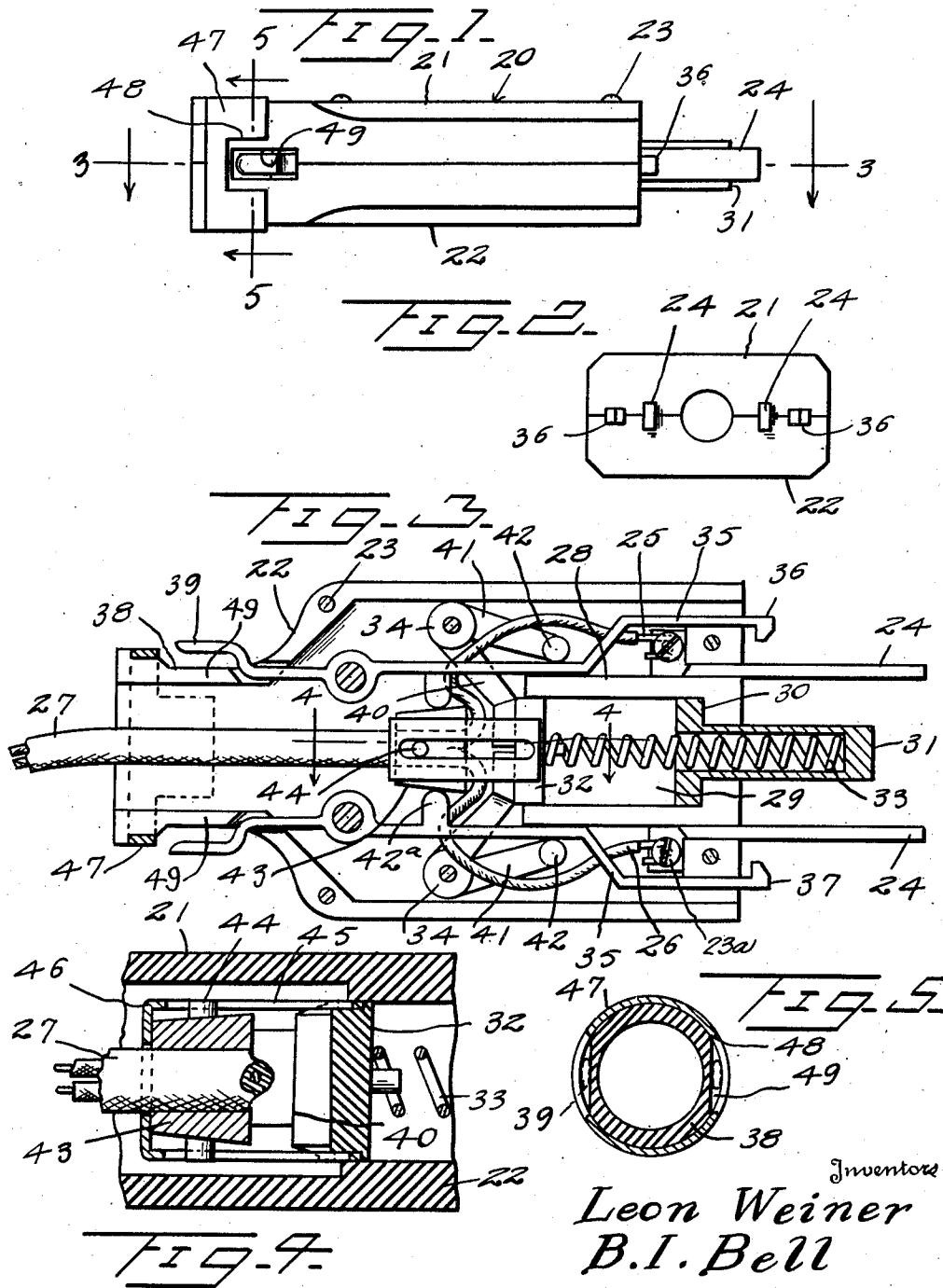
L. WEINER ET AL

2,456,548

ELECTRICAL PLUG AND SOCKET.

Filed March 25, 1946

3 Sheets-Sheet 1



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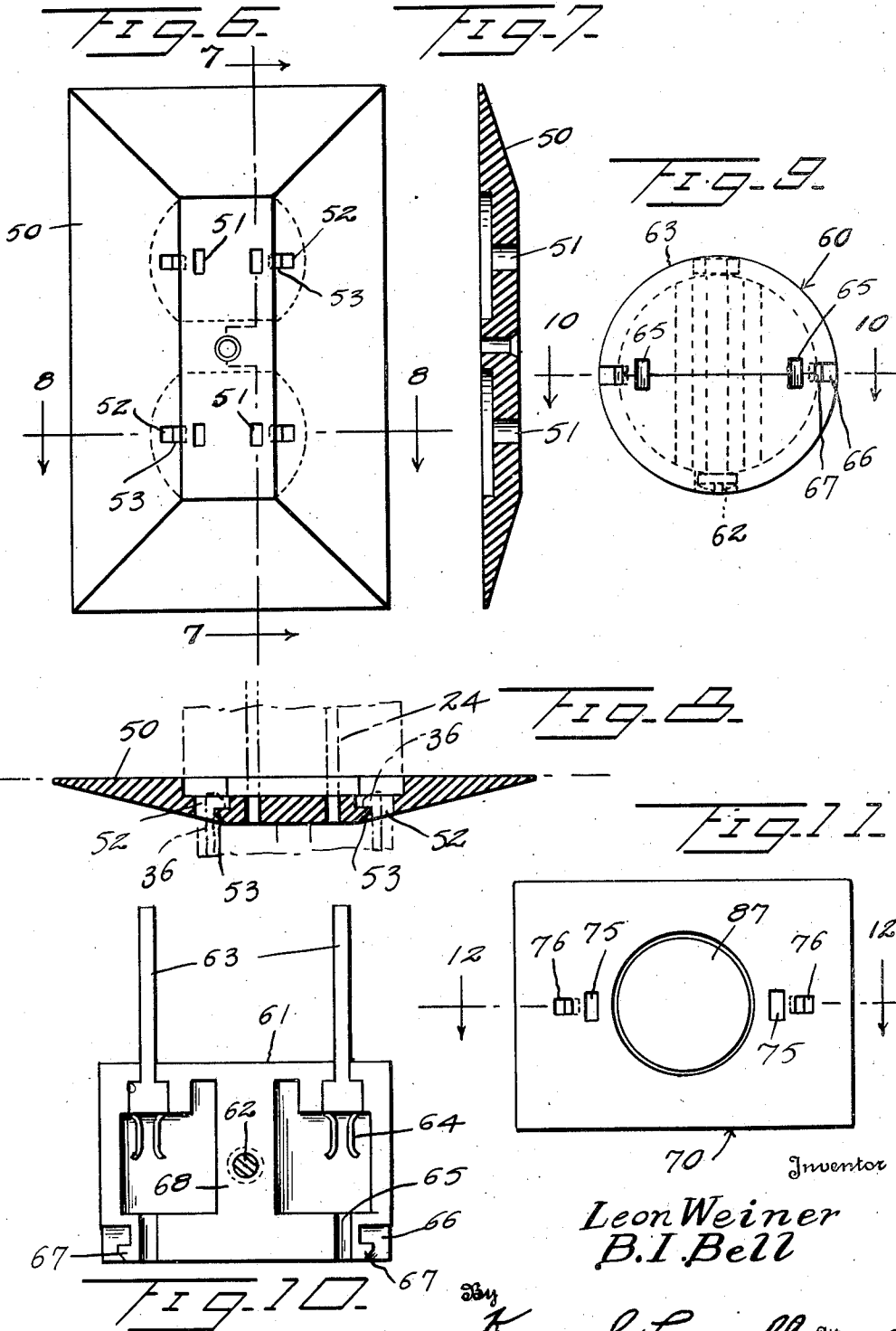
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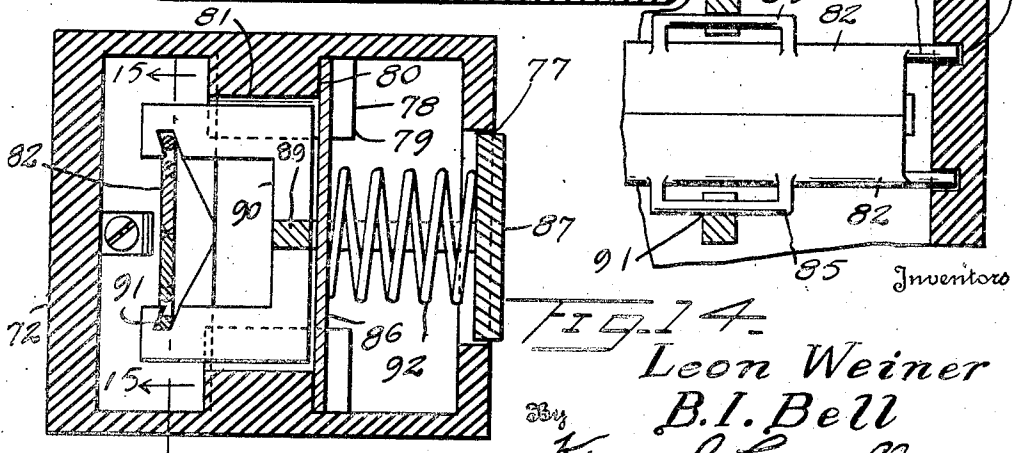
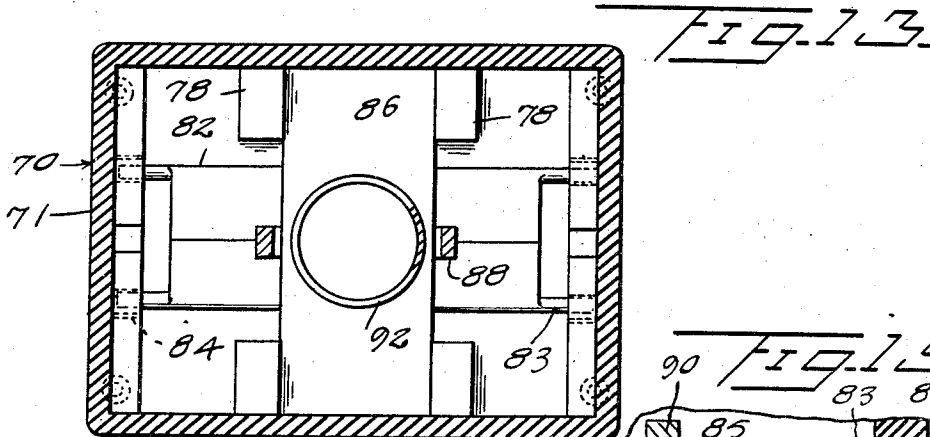
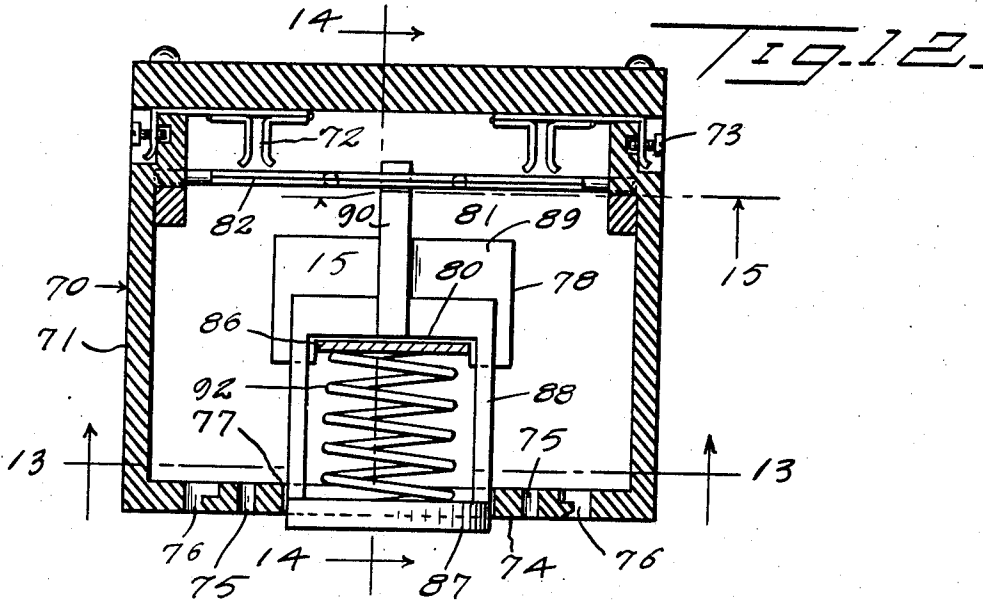
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,456,548

ELECTRICAL PLUG AND SOCKET

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2 Claims. (Cl. 173-361)

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This invention relates to an improved electrical plug for a socket and more particularly for an electric cord plug which is locked in engagement with the socket.

It is an object of this invention to provide an electric plug which is provided with means for fastening the plug to a socket.

Another object of this invention is to provide a plug which is provided with means, independent of the contact prongs, for locking the plug to a socket and means for disengaging the plug from the socket.

Still another object of the invention is to provide a plug which is adapted to be removably secured to a socket and which contains spring means for disengaging the plug from the socket upon releasing the means which secures the plug to the socket.

Yet another object of this invention is to provide a plug which is engageable with the socket for locking the plug to the socket and means whereby a tension of the cord will cause the plug to be disengaged from the socket.

A further object of this invention is to provide a plug for a socket having means for locking the plug to the socket and a ring for holding the locking means in the locked position.

A still further object of this invention is to provide a socket plate particularly adapted to the plug which may be locked to the socket.

Yet another object of this invention is to provide an adapter whereby this lockable plug may be used with a conventional socket and plate.

Still another object of this invention is to provide a socket for use with the locking plug wherein the socket is so constructed that the contact terminals are concealed within the socket by plates which are spring pressed to a concealing position and are opened to permit access to the terminals by the insertion of the lockable plug into the socket.

To the foregoing objects, and others which may hereinafter more fully appear, the invention consists of the novel construction, combination and arrangement of parts, as will be more specifically referred to and illustrated in the accompanying drawings, but it is to be understood that changes, variations, and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a side elevation of an improved electric plug constructed according to an embodiment of our invention.

Figure 2 is an end view of the plug,

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Figure 3 is a section taken on the line 3-3 of Figure 1,

Figure 4 is a fragmentary detail section taken on the line 4-4 of Figure 3,

Figure 5 is a detail section taken on the line 5-5 of Figure 1,

Figure 6 is a top plan of a socket cover adapted to the plug,

Figure 7 is a section taken on the line 7-7 of Figure 6,

Figure 8 is a section taken on the line 8-8 of Figure 6,

Figure 9 is a top plan view of an adapter for the plug, to be used with a conventional socket,

Figure 10 is a section taken on line 10-10 of Figure 9,

Figure 11 is a plan view of a socket particularly adapted to this plug,

Figure 12 is a section taken on the line 12-12 of Figure 11,

Figure 13 is a section taken on the line 13-13 of Figure 12,

Figure 14 is a section taken on the line 14-14 of Figure 12, and

Figure 15 is a section taken on the line 15-15 of Figure 12.

Referring to the drawings, the numeral 20 designates generally an electrical plug constructed according to an embodiment of our invention. The body of the plug consists of two half sections 21 and 22 held together by screws 23 or other suitable fastening means. The body is made of rubber or other non-conducting material. One of the sections, as 21, is a cover and the other parts are secured into the other section 22.

A pair of metal prongs 24 are fixed into the section 22 and extend therefrom in a conventional manner. The wires 25 and 26 of the cord 27 attach to the prongs 24 within the plug 20 by screws 23a or other conventional means of attachment.

The body sections 21 and 22 are formed with inside walls 28 forming a cylindrical guide or channel 29. The head 30 of the piston or plunger 31 is slidable in the guide 29, and the plunger 31 extends through the end of the plug 20 between the prongs 24. A plug 32, having limited sliding movement in the guide 29 is adapted to close the inner end of the guide 29. A spring 33 which projects into the plunger 31 is held between the plunger 31 and the plug 32 and constantly urges the plunger 31 outwardly and plug 32 inwardly. One arm 40 of each of a pair of V-shaped bell cranks 34, rockably secured to the body section 22, bears against the rear side of the plug 32 to

prevent the plug 32 from sliding out of the guide 29.

A pair of pivotal locking levers 35 are pivoted within the section 22, near the outer end of the body 22, extend forwardly and project from the inner end outwardly from the prongs 24. The levers 35 are formed at their projecting ends with an inwardly opening hook 36 and an inwardly extending chamfer 37. The other ends of the levers 35 extends outwardly from the outer end of the body 22 and lie substantially parallel to the shank 38 of the body 22, spaced from the shank 38 to form handles 39 which may be pressed inwardly by the fingers of an operator to spread apart and open the hooks 36.

The other arm 41 of the bell crank 34 is provided with a lug 42 which engages the outer side of the levers 35 so that the force of the spring 33 is transmitted through the plug 32 through the bell crank 34 to hold the levers 35 inwardly and the hooks 36 in the locking or engaging position.

An inwardly projecting cam lug 42a or rounded projection is provided on the forwardly extending arm of the lever 35 for opening the hooks 36. A wedge-shaped cam or sleeve 43 is fixed to the cord 27 and is engageable with the lugs 42a. The sleeve 43 is slidably secured within the body 22 by projecting guide lugs 44 which are slidable in the slot 45 of the guide plate 46, which plate 46 is fixed to the plug 32.

A locking ring 47 is rotatable about the shank 38 and is formed with opposed cutout sections 48 to provide for selectively locking or unlocking the handles 39. The ring 47 fits between the shank 38 and handles 39 so that the handles 39 can not be pressed inwardly until the ring 47 is turned so the openings 48 align with the handles 39 and the recesses 49 in the shank 38.

In the use and operation of this plug 20, the plug is simply pressed into a socket adapted to receive this plug until the hooks 36 engage the socket plate. By pressing the plug 20 into place the plunger 31 is forced against the tension of spring 33, which tension is transmitted to the levers 35 to hold the hooks engaged. The plug may be locked in engaged position by rotating the ring so that the handles 39 cannot be pressed inwardly. The plug 20, when unlocked, may be removed in two ways. First, by pressing the lever handles 39 together the hooks 36 are disengaged and the plunger 31, bearing against the center of the socket plate, urges the plug 20 out of the socket. Secondly, a pull on the cord 27, moves the wedge-shaped cam 43 rearwardly. The projections 42a on the levers 35 are forced apart by the cam until the hooks 36 are disengaged from the socket plate and the plunger 31 urges the plug out of the socket. The cam 43 is urged back into position when the hooks are spread apart upon reinsertion of the plug into the socket, at which time the outward motion of the hook arms 35 is transmitted through the bell crank arms 41 by means of the lugs 42, so that the flat ends of the arms 41 press upward against sliding plug 32, moving guide plate 46 upward so that the end of the slot in it engages the lug 44 on the sliding wedge 43, putting sliding wedge 43 back to normal position and allowing hook arms 35 to close to normal locking position. When hook arms 35 are in normal locking position, bell cranks 34 move back and allow sliding plug 32 to slide down under pressure of the spring 33. The slotted plate 46 is then moved into a position leaving room in the slot for the wedge

lug 44 to move when the plug is again released by tension on the cord.

In Figures 6, 7, and 8, we have illustrated a socket plate which is adapted to be used with the above described plug. The socket plate 50 is of a generally conventional design with a two socket installation. For each socket and plug there are the conventional openings 51, through which the prongs 24 are inserted. Outwardly from the openings 51 are openings 52 which are provided for the engagement of the hooks 36. The openings 52 are provided with a rim 53 along the inner edge thereof and the forward side of the rib 53 is beveled to urge the hooks 36 apart as they are pressed inwardly. The hooks 36 then engage the rear straight edge of the rib 53 to lock the plug 20 to the socket plate 50.

In Figures 9 and 10 we have shown an adapter plug for using the plug 20 with a conventional socket and socket plate installation. The adapter plug 60 is formed with an annular two section body 61 held together by a bolt 62. Prongs 63, fixed into the body 61 are adapted to be inserted into a standard socket. Within the body 61 the prongs 63 terminate in spring metal terminals 64. The front surface of the adapter 60 is provided with openings 65, through which prongs 24 are inserted and engage in the terminals 64. The edge of the front surface is formed with notches 66 having inner beveled ribs 67, with which the hooks 36 are engaged. A central wall 68 is provided within the adapter 60 to reinforce the front surface so it may withstand the force of the spring pressed plunger 31.

In Figures 11 to 15, we have illustrated a socket which is especially adapted to this plug 20 and in which the terminals are concealed or covered and are exposed only at the time a plug is inserted, at which time the plug 20 actuates means for exposing the terminals.

The socket 70 is formed with a substantially rectangular hollow body 71. A pair of spring terminals 72 are fixed to the rear end of the body 71 and the electric wires are fastened to the terminals 72 by screws 73. The front wall 74 of the body 71 is formed with prong openings 75, ribbed hook openings 76, and a large central circular opening 77. Two opposite inner side walls are formed with a guide block 78. The front of the block 78 is formed with a centrally located recess 79 forming a ledge 80, and a rearwardly extending slot or groove 81. Pivotaly secured between the other two opposite side walls are a pair of closure plates 82 which cover the terminals 72 in their closed position. An extension 83 of one edge of each plate 82 is pivotaly supported by extending into bores 84 in the walls, and centrally of each plate 82 extending outwardly from the extended edges, a U-shaped lever 85 is fixed for rocking the plate 82 about the pivot 83.

A bearing plate 86 is fixed to the ledges 80 between the blocks 78. A circular plunger head or button 87 is supported in the opening 77 by the arms 88 of a U-shaped supporting member. The bight 89 of the U-shaped member is below the plate 86 and the arms 88 extend forwardly around the plate 86 to support the button 87. A U-shaped closure actuating member 90 is fixed to the bight 89 of the supporting member and the arms of the member 90 extend to engage the lever arms 85 of the closures 82. The member 90 is slidably supported in the grooves 81 and the arms of the member 90 are formed with inwardly and forwardly extending notches 91.

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The levers 85 engage in the notches 91 for actuating the closure plates 82. The spring 92, between the bearing plate 86 and the button 87 constantly urged the button 87 outwardly and the plates 82 closed.

The normal position of the socket is illustrated in Figures 11 to 15, in which the button 87 is normally in the opening 77 and the closure plates 82 are closed over the terminals 72.

When the plug 20 is pressed into engagement with the socket 70, the plunger 31 presses the button 87 inwardly as the prongs 24 are inserted in the openings 75. At the button 87 moves inwardly the actuating member 90 presses inwardly on the levers 85 thereby opening the closure plates 82 before the prongs 24 are fully within the socket, thus permitting further travel of the prongs 24 to engage the prongs 24 with the terminals 72. Upon complete insertion of the plug 20 the hooks 36 will engage the ribbed openings 76 to hold the plug 20 in engagement with the socket 70. The removal of the plug 20 is the same as stated before.

The exact configuration illustrated is regarded as the optimum, but some of the desirable results inherent in this disclosure may be obtained by various slight modifications including some departure from the exact configuration shown, and it is therefore requested that the scope of the invention should be regarded as limited only by the terms of the claims.

Having thus described our invention what we claim is:

1. An improved electric connecting plug comprising a hollow body, conducting prongs extending from an end of said body, a pair of elongated levers pivoted intermediate their length in said body extending therefrom adjacent said prongs at one end and extending outwardly from said body at the other end, hooks on said levers at said one end, a pair of bellcranks rockable in said body, a plunger slidable in said body, a plug slidable in said body, a compressible spring between said plunger and said plug, one arm of each bellcrank abutting an end of said plug, the other arm of said bellcranks engaging said levers for biasing said levers in opposite directions, a cam slidable in said housing fixed on an electric cord extending therein engageable with said levers for rocking said levers against the

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spring tension for releasing the plug from hooked engagement with a correlated socket.

2. An improved electric plug for hook engagement with a correlated socket comprising a hollow body, conducting prongs extending from said body, a pair of levers pivoted in said body, one arm of each lever extending from said body adjacent said prongs, a hook on said one arm for engagement with said socket, the other arm of said levers extending from said body constituting handles for rocking said levers manually, a plunger slidable in said body and extensible therefrom for urging said plug out of engagement with said socket, a sliding member slidable in said body, a spring between said member and said plunger, a second pair of levers rockable in said body, one arm of each of said latter levers engageable with said sliding member, the other arm of said latter levers engageable with said first levers biasing said hooks to opposed hooked position, in an electric cord in said plug connected to said prongs, a slidable cam member on said cord engageable with said first levers for rocking said first levers against the spring tension upon tensioning said cord whereby said plunger will urge said plug from engagement with said socket.

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BERNARD I. BELL.

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