

Dec. 21, 1937.

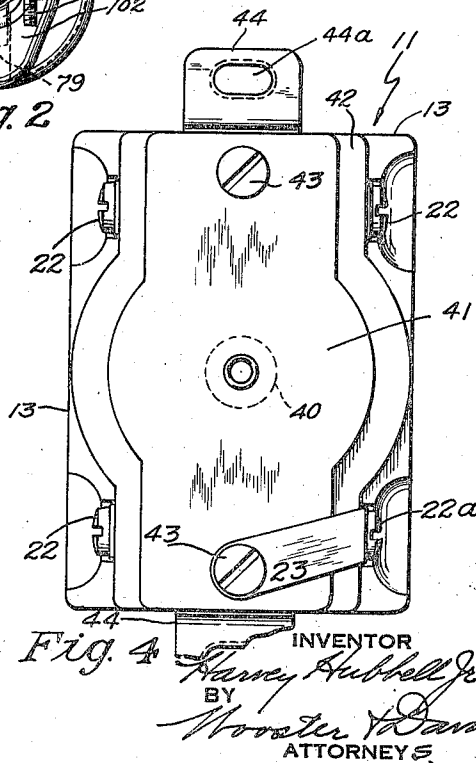
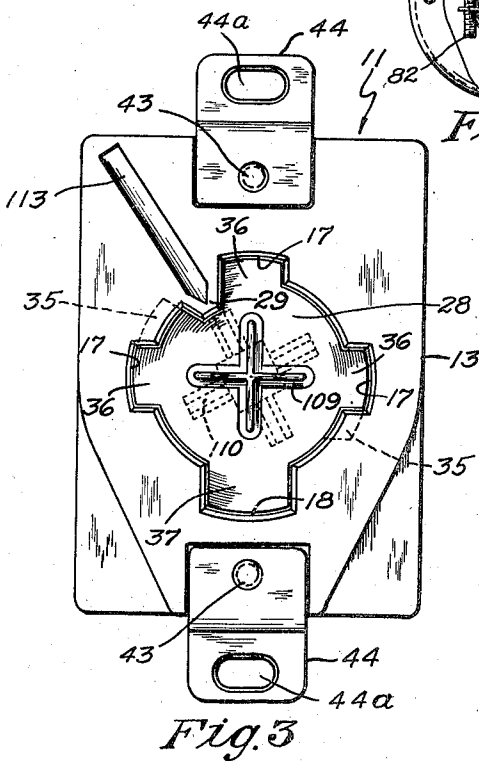
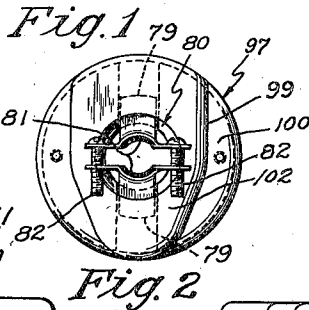
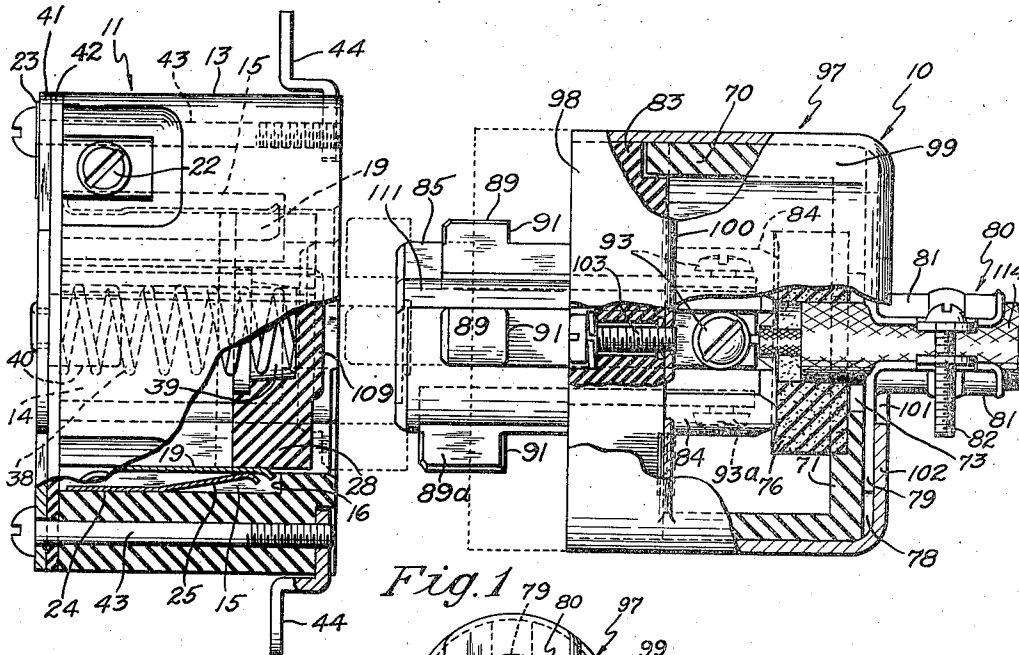
H. HUBBELL, JR

2,102,625

INTERLOCKING RECEPTACLE, CONNECTER, AND CAP

Filed March 20, 1935

3 Sheets-Sheet 1



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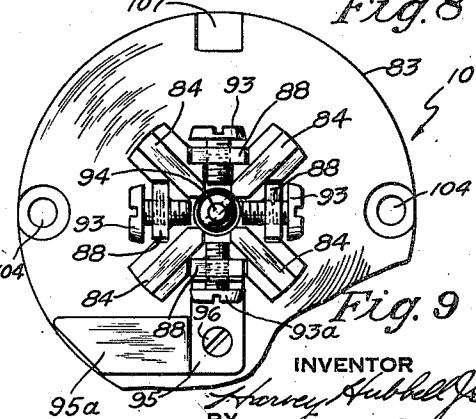
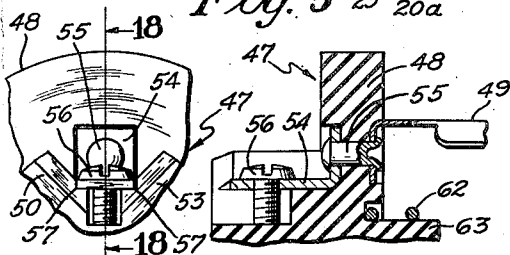
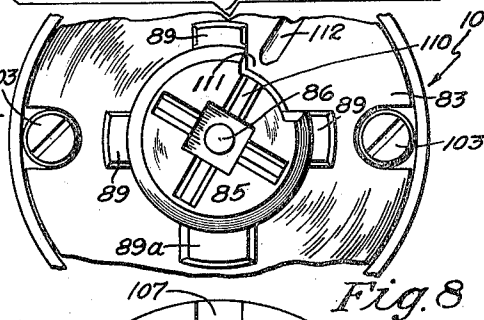
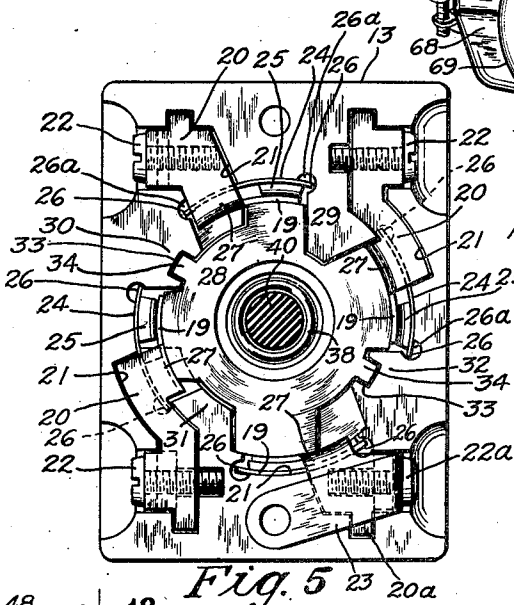
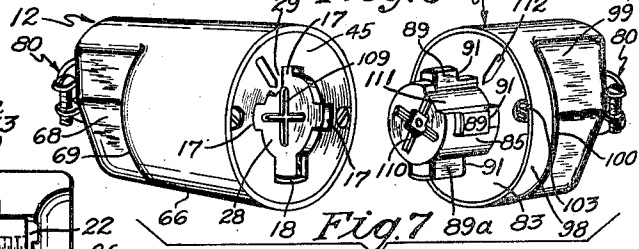
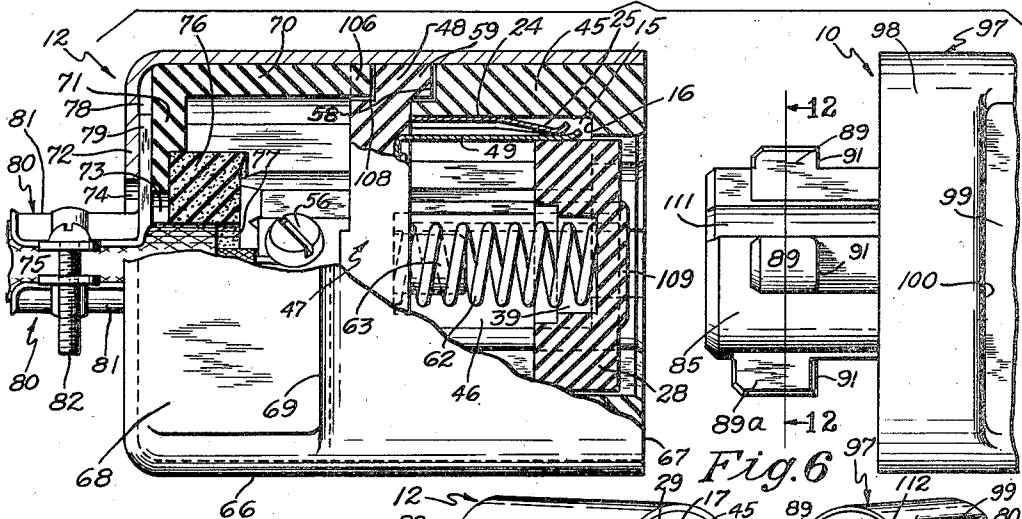
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2,102,625

INTERLOCKING RECEPTACLE, CONNECTER, AND CAP

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3 Sheets-Sheet 2



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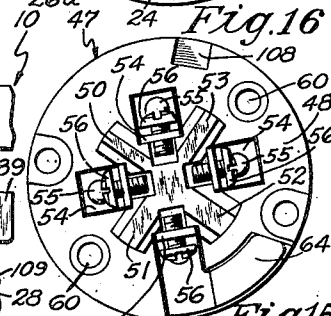
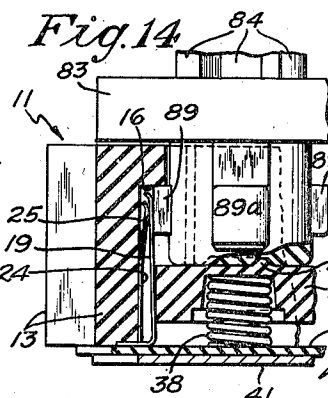
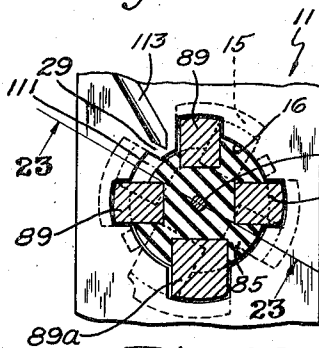
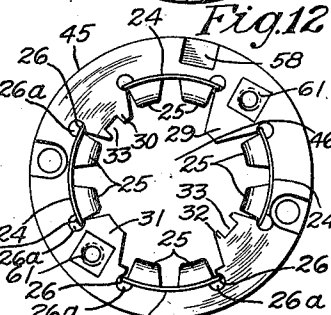
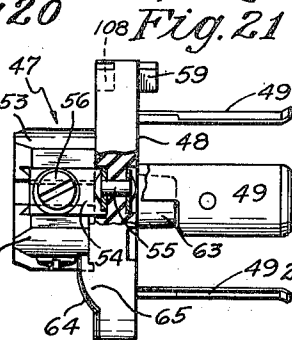
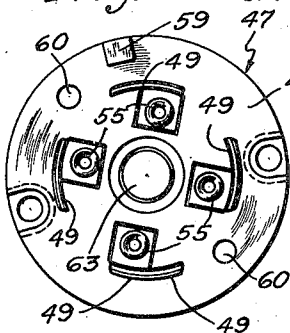
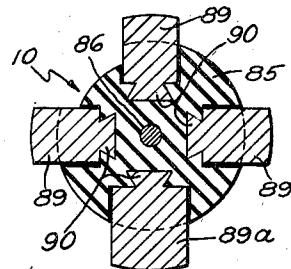
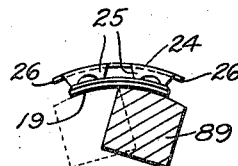
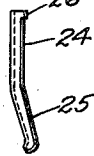
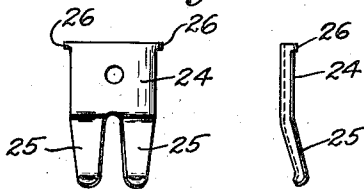
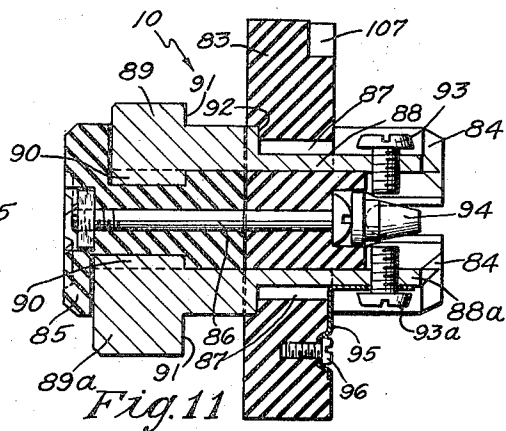
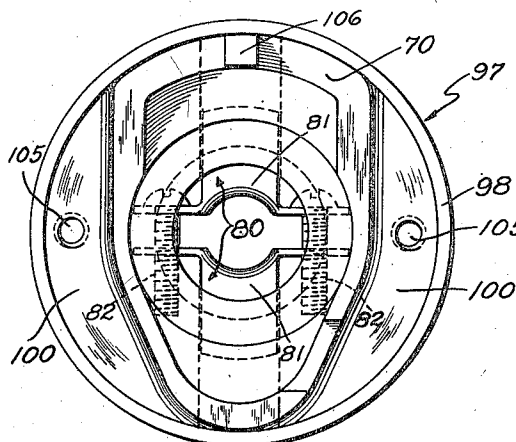
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INTERLOCKING RECEPTACLE, CONNECTER, AND CAP

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3 Sheets-Sheet 3



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2,102,625

INTERLOCKING RECEPTACLE, CONNECTER,
AND CAP

Harvey Hubbell, Jr., Bridgeport, Conn.

Application March 20, 1935, Serial No. 11,942

6 Claims. (Cl. 173—330)

This invention relates to new and useful improvements in electrical devices and has particular relation to devices such as outlet receptacles, connectors and the like and the plug caps to be used therewith.

An object of the invention is to provide devices of the kind indicated, and including means whereby the plug cap when engaged with the receptacle or connector is locked therewith against casual separation therefrom.

Another object is to provide devices such as receptacles, connectors and the like, and wherein an auxiliary tensioning spring is associated with each contact so that the resilient action of the contacts is not solely depended upon for the making of electric contact with the contacts of a plug.

Amongst the other objects is the providing of devices of simplified and sturdy construction whereby the devices will have long useful life even though subjected to abusive treatment.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein a satisfactory embodiment of the invention is shown. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a side elevational view with parts broken away and showing a receptacle constructed according to the present invention; together with the plug cap, and in dotted lines suggesting the manner of connecting the receptacle and plug cap;

Fig. 2 is an end view of the plug on a reduced scale;

Fig. 3 is a front elevational view of the receptacle;

Fig. 4 is a rear elevational view of the receptacle;

Fig. 5 is a rear elevational view of the body portion of the receptacle the rear plates being omitted;

Fig. 6 is a view partly in side elevation and partly in section showing the invention as embodied in a connector, with a side elevational view of the forward portion of the plug cap positioned to enter the connector;

Fig. 7 is a perspective view on a reduced scale of the connector and cap showing their proper

relative positions just before inserting the cap into the connector;

Fig. 8 is a front elevational view of the plug cap;

Fig. 9 is a rear elevational view of the insulating mounting for the contacts of the plug cap removed from the metal casing;

Fig. 10 is a front elevational view of the casing of the plug cap although except for a matter of length this same casing is used for the connector;

Fig. 11 is a sectional view through the plug cap inner parts;

Fig. 12 is a sectional view taken substantially along the plane of the line 12—12 of Fig. 6;

Fig. 13 is a front elevational view of the contact carrying portion of the connector;

Fig. 14 is a view at right angles to Fig. 13 and with a portion broken away to show the mounting of a contact;

Fig. 15 is a rear elevational view of the part shown in Fig. 13;

Fig. 16 is a rear elevational view of the body portion of the connector with the auxiliary tensioning springs for the contacts in place therein;

Fig. 17 is an enlarged detail elevational view showing the arrangement of a binding screw and contact terminal at the rear of the contact carrying portion of the connector;

Fig. 18 is a detail sectional view taken substantially along the plane of the line 18—18 of Fig. 17;

Fig. 19 is a front elevational view of one of the auxiliary tensioning springs for the contacts of the receptacle and connector;

Fig. 20 is an edge elevational view of the spring;

Fig. 21 is a detail view showing the manner in which the contacts of the plug cap remain in engagement with the contacts of the receptacle or connector during relative turning movement of the parts while connected;

Fig. 22 is a view showing a portion of the receptacle in front elevation and showing the forward portion of the plug cap in transverse section and entering the receptacle, the dotted lines indicating the locked position; and

Fig. 23 is a view partly in section and partly in elevation at right angles to Fig. 22 and showing the locking engagement between the plug cap and the receptacle.

The present invention relates particularly to devices adapted for making detachable electrical connections, such for example as are used for connecting electric motors and other electrical devices to sources of current supply in garages

and factories, and includes a plug cap generally designated 10 and a socket which may be in the form of a wall receptacle generally designated 11 (Fig. 1) or of a portable connector such as is generally designated 12 (Fig. 6). Referring in detail to the drawings and at first particularly to the receptacle 11, the same includes a body or block 13 of insulating material having an opening or bore 14 therethrough from front to rear, and having recesses 15 in the side walls of said bore. The forward end of each recess 15 is restricted by a shoulder 16 and (see Fig. 3) the entrance openings 17 to three of the recesses from the front face of the receptacle are of one size while the entrance opening 18 to the other recess is of a larger size. The shoulders 16 are laterally of the entrance openings 18 and are inwardly of the front ends of said openings.

Within each recess 15 and exposed through the open side thereof is a resilient metal contact blade 19 and such contact blades are carried by mounting portions 20 fitted in recesses 21 in the rear surface of the block 13, and each is equipped with a binding screw 22 for the connection of lead wires. One of the contact mountings designated 20a is of the ground contact, and secured to it by a rivet is a strap 23. The contact may also be provided with a binding screw 22a, but the binding screw is seldom used when ground strap 23 is used, as a wire is usually unnecessary when the ground strap is used. When strap 23 is not used the binding screw is used for connecting the ground wire. In each recess 15 at the rear side of each contact 19 is an auxiliary tensioning spring 24. Each of these tensioning springs comprises a piece of resilient metal, the lower end portion of which is divided to provide legs 25 (Figs. 19 and 20) bent slightly out of the plane of the body of the piece, and at its upper end each spring is provided with a pair of lateral lugs 26 resting on the bottoms of recesses 26a in the insulating body 13.

When the springs 24 are in place their body portions are against the inner walls of the recesses 15 while their leg portions 25 are against the forward or free end portions of the contacts 19 as shown best in Fig. 1. The blades 19 are connected with the mounting portion 20 by narrower necks 27, and the springs 24 being positioned as indicated serve to maintain the blades 19 in their proper positions and prevent them from becoming set in a displaced position after repeated use.

A plunger and closure 28 is movable longitudinally in the bore 14, and ribs 29, 30, 31 and 32 projecting into the bore and extending longitudinally thereof serve to guide the plunger and hold it against any turning movement in the bore. The ribs 30 and 32 are provided with longitudinally extending grooves 33 which open through the rear face of the body 13 but are closed at their forward ends, and the plunger is provided with ribs 34 extending into said grooves, which ribs on engaging the closed forward ends of the grooves limit forward movement of the plunger. Also, the plunger may be provided with shoulders 35 to engage shoulders on the forward portion of the body just back of the front face thereof to limit movement of the plunger toward the forward side of the body. Ribs 36 of the plunger are shaped of the size of the entrances 17 to certain of the recesses 15, while the rib 37 of the plunger is of a size of the recess entrance 18.

The plunger is normally held in a forward po-

sition as in Figs. 1 and 3 closing the forward or entrance end of the bore 14. This is accomplished by means of a coil spring 38 the forward end of which is disposed in a socket 39 in the inner side of the plunger, and the rear end of which surrounds a projection 40 carried at the inner side of a plate 41 disposed against the outer side of an insulating closure plate 42. The latter has an opening therethrough for the passage of the projection 40, and screws 43 are passed through the two plates and through the body 13 and are threaded into mounting clips 44, which have slots 44a to receive screws for securing the lugs to the ears of a wall outlet box (not shown) and mount the receptacle therein in the well known manner. One of the screws 43 (see Fig. 4) also passes through the strap 23 connected with the ground contact of the receptacle whereby this contact is thus grounded on the wall outlet box which is grounded in the usual manner.

As above suggested, instead of the socket being in the form of the wall receptacle 11 it may be in the form of a portable connector such as generally indicated at 12 (Figs. 6 and 7). This connector includes a forward body portion 45 of insulating material having a bore 46 therethrough corresponding with the bore 14 of the wall receptacle, and having the ribs 29, 30, 31 and 32 projecting into the bore and extending longitudinally thereof. Also, the body 45 is provided with the recesses 15 corresponding in all respects with the recesses of the wall receptacle and each receiving one of the auxiliary tensioning springs 24 and resilient metal contacts 49 corresponding to the contacts 19 of the receptacle 11.

To the rear or inner end of the body 45 there is secured a section 47 including a disc-like portion 48 of insulating material from the forward side of which extends the contact blades 49 projecting into the body 45 and disposed in the recesses 15 thereof at the inner sides of the springs 24. An irregular block of insulating material comprising wings 50, 51, 52 and 53 projects from the rear side of the disc 48, and terminal pieces 54 having lateral feet disposed in recesses in said side of the disc 48 are separated by said wings and are connected with the respective contact blades 49 as by rivets 55 (Fig. 14) passing through said terminal pieces and the disc 48. Each terminal piece 54 carries a binding screw 56, and the terminal pieces have their vertical edge portions received in notches 57 formed in opposing faces of the wings as shown best in Fig. 17.

In its rear surface the body 45 is provided with a locating notch 58 (Figs. 6 and 16) and on its forward face the disc 48 is provided with a locating lug 59. When the contact carrying member 47 is assembled on the body 45 with the contacts 49 in the recesses 15 the entrance of the lug 59 into the notch 58 insures that the parts are properly aligned. The disc 48 is provided with openings 60 which align with threaded metal inserts 61 in the body 45 whereby screws may be used to secure the parts together. One of the plungers or closures 28 is arranged in the bore 46 through the body 45 and may be moved longitudinally of said bore but is held against turning movement by the ribs 29, 30, 31 and 32 as will be understood. A coil spring 62 at its forward end enters the socket 39 in the plunger and at its rear end is disposed about a stud 63 carried by the disc 48 and bears against said disc whereby to normally maintain the plunger 28 in a position closing the forward end of the bore 46. One

of the blades 49 is the ground contact and its terminal element 53a, and has a laterally extending contact member 64 secured to it and disposed on the outer side of a cam-like thickened portion 65 of the disc 48, the member 64 being thus positioned to engage the inner surface of one of shoulders 69 (Fig. 6) of casing 66 when the device is assembled therein and thus ground the contact on the casing.

The assembly comprising the body 45 and the contact carrying section 47 are mounted in a metal shell or casing 66 (Figs. 6 and 7) the forward portion 67 of which is cylindrical to accommodate the assembly and the rear portion 68 of which has opposite flattened sides to provide a hand grip. The portions 67 and 68 are connected by shoulder portions 69, and when the above mentioned assembly is inserted into the shell, its movement into the shell is limited by the shoulders 69 and the ground contact element 64 engages one of said shoulders while the peripheral edges of the body 45 and disc 48 are embraced by the forward cylindrical portion 67 of the shell. In the rear or flatted portion of the shell there is secured an insulating lining 70 preferably of rigid moulded material, and the rear wall 71 of this lining and the rear wall 72 of the shell are provided with aligned openings 73 and 74 for the passage of a cord or cable 75 containing lead wires to the various binding posts 56.

A relatively thick soft rubber pad 76, such for example as sponge rubber, is disposed at the inner side of the rear wall 71 of the lining 70 and is provided centrally with an opening 77 of such size that the cable 75 may be forced through it. This pad is held against the end wall 71 of the lining by the wings 50 through 53 above referred to as disclosed at the rear side of the disc 48. The pad serves as a seal to exclude dust, dirt and moisture from the interior of the connector. In its outer surface the end wall of the lining 70 is provided with grooves 78 extending radially from the opening 73 and in each such groove is arranged an arm 79 of an element 80 of a cable clamp. These elements are L-shaped and the other arm 81 of each element extends outwardly through the opening 74 in the rear wall of the metal shell and such arms 81 are adjustably connected by screws 82 whereby the elements may be clamped against the cord 75.

The plug 10 is for use with the described socket whether the socket takes the form of the wall receptacle 11 or the connector 12 or any other desired form. Plug 10 includes a body portion 83 comprising a relatively thick disc of insulating material, and projecting from the rear side of said body and integral therewith are lugs 84 the purpose of which will later more fully appear. A post 85 also of insulating material extends from the forward side of the body 83 and has one end clamped against said body as by a screw 86 passing through the post and body. Said end of the post bears against the central portion of the body, and about said central portion the body is provided with openings 87 through which extend the arms 88 of metal contacts 89 each cut from a piece of conducting metal and each at its inner side having a dovetail 90 whereby when it is molded into the post 85 it is securely interlocked therewith. If preferred a groove may be molded in the bakelite and the contacts slipped in place.

Contacts 89 extend radially beyond the outer

surface of the post 85 and each contact also includes an inner shoulder 91, the purpose of which will later appear, and a shoulder 92 clamped in a notch in the forward face of the body 83 (see Fig. 11) on tightening of the screw 86. The arms or extensions 88 of the contacts each project between a pair of the lugs 84 and between said lugs each such arm is provided with a binding screw 93 for connection of lead wires of a cable 114 leading to a motor or other electrical device. A plug 94 of insulating material may be arranged to insulate the inner ends of the binding screws 93 from one another. From the foregoing it is to be understood that the contacts 89 and 89a are moulded into the post 85 and are then with the post clamped to the body 83 on tightening of the screw 86. With this construction it will be apparent that the contacts are securely held in place and that a rigid assembly is provided. One of the contacts designated 89a is larger than the others and this is the ground contact. Its binding screw 93a secures to its extension 88a a strip 95 of conducting material having a lateral extension 95a at the face of body 83, which strip is also secured to the body 83 by a screw 96. The extension engages one of the shoulders 100 of shell or casing 97 when assembled therein and so the casing is grounded by this contact.

The assembly thus far described and shown particularly in Figs. 11 and 12 is to be mounted in an outer metal shell 97 comprising a forward substantially cylindrical portion 98 embracing the peripheral edges of the body 83 and a rearward portion 99 flattened on its opposite sides so as to be shaped for gripping. These portions 98 and 99 are connected by shoulders 100 and when the body and its contacts are assembled in the shell the conductor strip 95 from the ground contact engages one of the shoulders 100.

Within the flattened portion 99 of the shell there is secured one of the rigid moulded linings 70 described above in connection with the shell 66 of the connector 11, and this lining has the opening 73 in its end wall aligned with an opening 101 in the end wall 102 of the shell 97. A cord clamp comprising the elements 80 is mounted on the shell 97 as in the case of the shell 66. Further, within the lining 71 one of the soft or sponge rubber pads 76 is provided and is held in place by the lugs 84 extending from the rear surface of the body 83. Short screws 103 are passed through openings 104 in the body and threaded into tapped openings 105 in the shoulders 100 of the shell 97 whereby to secure the parts together.

Lug 106 on the lining 70 on entering a notch 107 in the body 83 assures that the body is properly located within the shell. A similar lug 106 is used in the case of the connector 11 and enters a notch 108 in the disc 48 of the contact carrying element 47 of the connector. From the foregoing taken in connection with the drawings it will be understood that the only difference between the shells 66 and 97 resides in the fact that the cylindrical portion 67 of the shell 66 is of greater length than the cylindrical portion 98 of the shell 97. The insulating linings 70 are the same in each case as are the cord clamps and the pads 76.

On its forward face the plunger 28 in each instance is provided with a raised portion or locking projection 109. It is shown in the form of a cross but may be of other shapes, and in its forward end the post-like portion 85 of the

plug is provided with a similarly shaped recess 110. Also, the post 85 is provided with a longitudinally extending groove 111 of a depth and size to accommodate the longitudinally extending rib 29 which projects into the bore of each socket. This groove 111 is wider than rib 29 so as to permit a limited turning movement of the cap in the receptacle and the connector. Further, on the forward face of the body portion 83 of the plug there is an indicating mark 112 which may be of a color contrasting with the color of the body and a similar mark 113 is provided on the forward face of each socket.

Assuming that the various contacts of the devices each have a lead wire connected with them, when it is desired to connect the plug 10 with either of the sockets 11 or 12 the forward end of the post 85 of the plug is placed against the forward face of the plunger 28 with the cross shaped recess 110 out of alignment with the cross shaped projection 109, as suggested by the dotted lines in Fig. 3. The positions are well shown in Fig. 7. The arrangement is such that the projection 109 and the recess 110 must be out of alignment in order that the post 85 of the plug and the contacts on said post may enter the bore of the socket. That is, when the projection and recess are crossed as suggested in Fig. 3 the large ground contact 89a of the plug is in alignment with the enlarged recess entrance 18 of the socket and the groove 111 in the post of the plug is aligned with the projection or rib 29 of the socket. Therefore, with the parts correctly relatively positioned the post portion of the plug may be forced into the socket by a longitudinal movement and this action will result in the plunger 28 being forced inwardly against the action of the coil spring 38 or 62 which normally holds it in its forward position closing the bore of the socket.

As the plug is pushed into the socket the contacts 89 and 89a of the plug engage those (19 or 49) of the socket, and when the plug is within the socket to the extent that the shoulders 91 of the plug contacts are inwardly with respect to the shoulders 16 at the outer ends of the recesses 15 of the socket the plug and socket are rotated relatively to carry the shoulders 92 of the plug contacts over the shoulders 16 of the socket. Thereafter, on the plug being released the action of the coil spring 38 or 62 forcing the plunger 28 against the plug presses the shoulders 92 of the plug contacts against the shoulders 16 of the socket. The mentioned turning movement between the plug and socket also causes the recess 110 in the end of the plug to align with the projection 109 on the forward face of the plunger and such projection enters such recess since the plunger is being forced forwardly by the coil spring. This interlocking engagement between the plug and plunger prevents casual turning of the plug relative to the socket in a direction to carry the plug contacts away from the socket shoulders 16 and into alignment with the entrance openings 17 and 18 for the plug contacts.

From the above it will be understood that the plug contacts engage the socket contacts as the plug is pushed into the socket and that such contacts remain in engagement during the relative turning movement of the plug and socket. Also, this relative turning causes an interlocking of the plug and socket since the shoulders 91 of the plug contact are by the turning movement disposed over the shoulders 16 of the socket so that the plug and socket cannot be separated by

relative longitudinal movement. To withdraw the plug from the socket the parts must be turned relatively in the opposite direction to again align the plug contacts 89 and 89a with the entrances or openings 17 and 18 to the socket and the spring pushing the plunger forwardly will eject the plug from the socket. When the shoulders 91 of the plug contacts are in position overlapping the shoulder 16 of the socket the projection 109 of the plunger being held in the recess 110 in the forward end of the plug casual turning movement of the plug in the socket in a direction to release the plug is prevented, and the plug is thus locked in the receptacle or connector against casual separation in use. As the side walls of the ribs 109 and grooves 110 are inclined they do not prevent reverse turning movement of the plug by forced operation of the operator when it is desired to remove the plug from the receptacle or connector. In this operation these inclined walls have a camming action to force the plunger 28 inwardly to remove the ribs 109 from grooves 110.

With special reference to the connector 12 and the plug 10 it is noted that these parts are so constructed that the flattened outer end portions in a measure serve to indicate when the plug and connector are properly aligned so that the plug may be pushed into the connector. When these flattened outer end portions of the plug and connector are in substantial alignment with one another the plug may be pushed into the connector after which it is given a partial turn to bring about the above described interlocking of the parts.

With either socket when the indicating mark 112 on the plug is aligned with the indicating mark 113 on the socket the parts are correctly positioned for the plug to be pushed into the socket. Fig. 21 indicates the manner in which the plug contacts engage the socket contacts on initial movement of the plug into the socket and during the turning movement to render effectual and ineffectual the interlocking of the plug and socket. In Fig. 22 the full lines indicate the plug entering the socket and the dotted lines indicate the shoulders of the socket with which the plug will interlock after the relative turning movement above referred to.

Fig. 7 shows the plug and connector in proper position for insertion of the plug or cap in the connector. As the enlarged contact 89a cannot enter any of the grooves 17 but only the groove 18 it will be evident the plug can be inserted only so that all the contacts on the plug engage the proper contacts in the receptacle or the connector. However, mechanics using the device have been known to grind down the large contact 89a so the plug could be inserted in other positions with consequent ruination of the apparatus. To obviate this the rib 29 is provided in the receptacle and connector with the longitudinal groove 111 in the plug to receive it. The plug can thus be inserted only when rib 29 is in the groove 111. This groove is made sufficiently wide to permit the limited turning movement of the plug to the locking position after it has been inserted in the receptacle or connector.

Although a four wire device is shown and described the same construction and arrangement can be used for two and three wire devices.

Having thus set forth the nature of my invention, what I claim is:

1. In an electrical device, a socket, a plug, said socket comprising a body of insulating material

having a bore therein and recesses at the sides of said bore and opening through the front end of the body, contacts in said recesses and extending lengthwise of the body, tensioning springs in said recesses in the rear of the contacts and bearing against the walls of the recesses and the forward end portions of the contacts, laterally extending lugs on said springs, said body having locating recesses receiving said lugs to position said springs, and contacts carried by said plug and engageable with the first contacts on insertion into said bore.

2. In an electrical device, a socket, a plug, said socket comprising an insulating body having a bore therein and contacts at the sides of the bore, a plunger reciprocable in the bore and held against turning therein, a spring normally maintaining the plunger in position closing the forward end of the bore, contacts on the plug and engageable with the first contacts on insertion of the plug into the bore by forcing the plunger inwardly against the action of the spring, said plug and body adapted for limited relative turning movement, interlocking means to prevent separation of the socket and plug by a longitudinal movement and mounted to become effective by a relative turning of the plug and socket in one direction, and cooperating means on the plug and plunger and thereafter preventing casual relative turning movement of the plug and socket in the opposite direction.

3. In an electrical device, a socket, a plug, said socket comprising an insulating body having a bore therein and contacts at the sides of the bore, a plunger reciprocable in the bore and held against turning therein, a spring normally maintaining the plunger in position closing the forward end of the bore, contacts on the plug and engageable with the first contacts on insertion of the plug into the bore by forcing the plunger inwardly against the action of the spring, said plug and body adapted for limited relative turning movement, interlocking means to prevent separation of the socket and plug by a longitudinal movement and mounted to become effective by a relative turning of the plug and socket in one direction, and means on the plug and plunger and brought into interlocking relation by such relative turning of the plug and socket and thereafter preventing casual relative turning of the plug and socket in the opposite direction.

4. In an electrical device, a socket, a plug, said socket comprising a body of insulating material having a bore and contacts at the sides of said bore, a plunger movable longitudinally in said bore and held against turning therein, a spring normally maintaining said plunger in position

closing the forward end of said bore, shoulders in said body, contacts on the plug and engageable with the first contacts on insertion of the plug into the bore by forcing the plunger inwardly against the action of the spring, said plug and socket adapted for relative turning movement while the plug is in the bore to bring the contacts of the plug over the shoulders and lock the plug and socket together against separation by a longitudinal movement, and means on the plug and plunger and brought into interlocking relation by said relative turning of the plug and socket to thereafter prevent casual relative turning of the plug and socket.

5. In an electrical device, a socket, a plug, said socket comprising an insulating body having a bore therein and contacts at the sides of the bore, a plunger reciprocable in the bore and held against turning therein, a spring normally maintaining the plunger in position closing the forward end of the bore, contacts on the plug and engageable with the first contacts on insertion of the plug into the bore by forcing the plunger inwardly against the action of the spring, interlocking means to prevent separation of the socket and plug by a longitudinal movement and mounted to become effective by a relative turning of the plug and socket in one direction, interlocking means on the forward face of the plunger and the forward end of the plug to resist relative turning movement of the plug and body and comprising a projection on one of said members and a recess, in the other member means whereby the plug may be inserted into said bore only when said projection and recess are out of alignment whereby as the plug and socket are turned relatively to render said first interlocking means effective the projection and recess are aligned and the spring forces the plunger toward the plug to have the projection enter the recess and hold the plug against casual turning movement relative to the socket.

6. In an electrical device, a socket comprising an insulating body having a bore therein and contacts adjacent the bore, a plunger and closure for the bore reciprocable therein and held against turning movement, a spring normally maintaining the plunger in position closing the forward end of the bore, a plug insertable in the bore and having contacts engageable with the first contacts, said socket and plug having means to lock the plug in the socket on relative turning movement of the plug in one direction, and cooperating separable means on the plunger and plug holding the plug against casual turning movement in the opposite direction.

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