

Oct. 24, 1933.

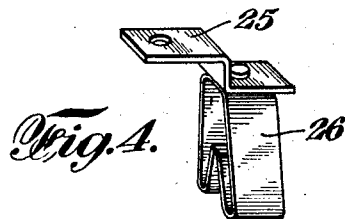
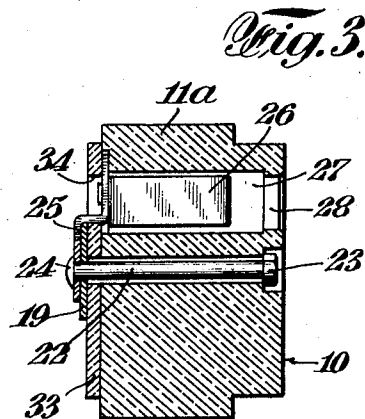
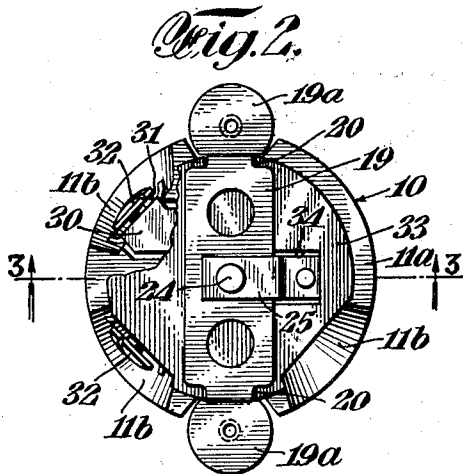
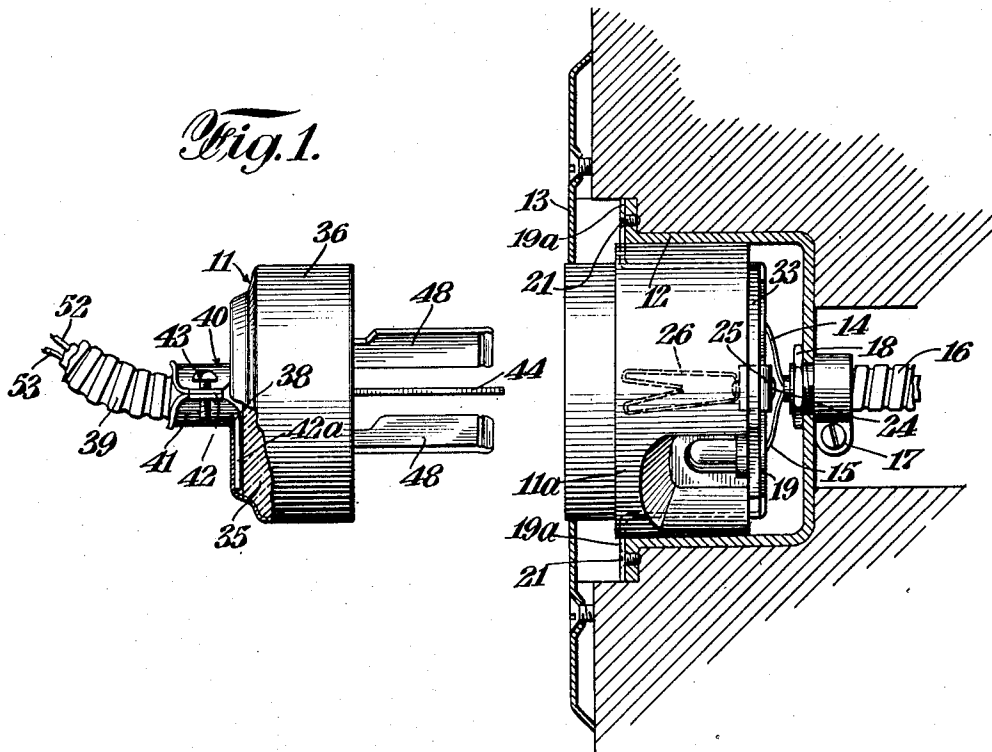
H. HUBBELL, JR

1,932,018

ELECTRICAL CONNECTER

Filed July 8, 1931

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 8.

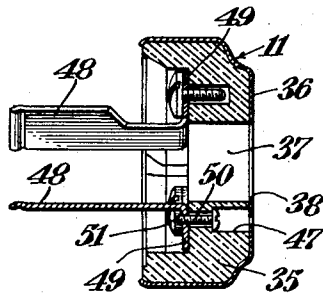


Fig. 5.

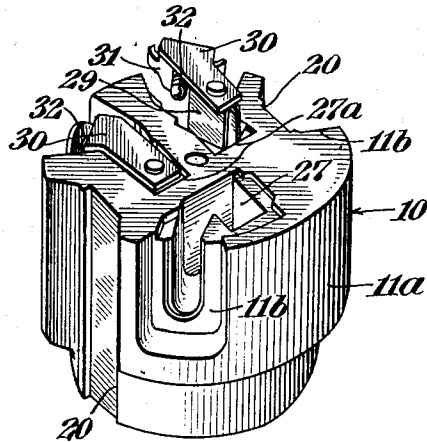


Fig. 6.

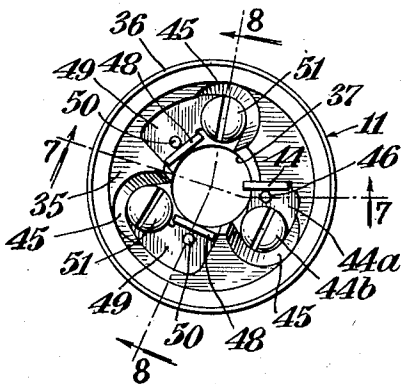


Fig. 7.

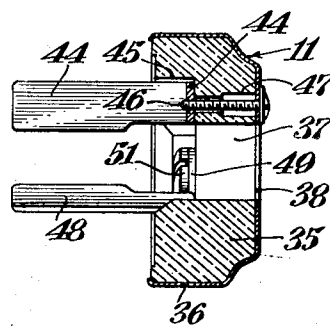


Fig. 9.

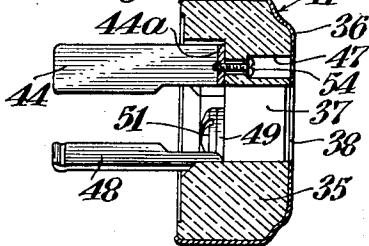


Fig. 11.

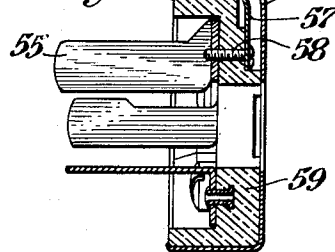
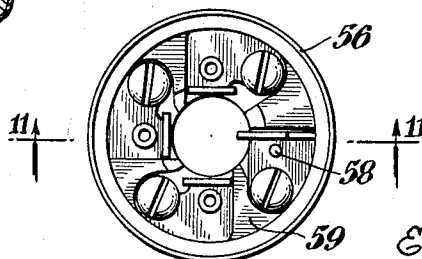


Fig. 10.



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UNITED STATES PATENT OFFICE

1,932,018

ELECTRICAL CONNECTER

Harvey Hubbell, Jr., Bridgeport, Conn.

Application July 8, 1931. Serial No. 549,453

3 Claims. (Cl. 173—361)

My invention relates to electrical connecting devices, and particularly to two-part separable connectors commonly called receptacles and plugs.

The general object of the invention is to provide new and improved connectors of this sort which while capable of being made to standard forms or patterns are readily adaptable to varied requirement.

To this general end, the invention consists in the features of construction and combination of parts as herein described and particularly pointed out in the claims.

The invention will be described in connection with the accompanying drawings, wherein

Fig. 1 is a vertical elevation, partly in section, of a construction embodying the invention;

Fig. 2 is a rear elevation, partly in section, of the receptacle element shown in Fig. 1;

Fig. 3 is a sectional view on the section line 2—3 in Fig. 2;

Fig. 4 is a perspective view of a contact device or clip;

Fig. 5 is a perspective view of the receptacle element of Fig. 1;

Fig. 6 is a face view of the plug element shown in Fig. 1;

Figs. 7 and 8 are sectional views taken respectively on the lines 7—7 and 8—8 in Fig. 6;

Fig. 9 is a view corresponding to Fig. 7 but showing the plug changed to provide for a different use;

Fig. 10 is a face view of a plug element embodying a modified construction, and

Fig. 11 is a sectional view on the line 11—11 of Fig. 10.

The embodiment of the invention herein shown comprises a receptacle or outlet element designated generally as 10, and a plug element 11, these elements being shown separated but ready for connection in Fig. 1. The receptacle element comprises a body or receptacle proper, 11a, of molded insulating material, cylindrically shaped, which is surrounded or seated in a flanged metallic cup or shell 12 that may be introduced in a pocket or recess in the wall as is usual, an outer metallic facing or cover being provided that is suitably secured in place and apertured to leave uncovered the outer face of the receptacle.

In the form of the invention shown in Figs. 1 to 3, the receptacle and plug elements are wired for a two-wire current and a ground wire connection. The current conductors or wires 14 and 15 to the receptacle are housed in an ordinary flexible metallic conduit or sheath 16 suitably

clamped at 17, 18 to the shell 12, the conductors 14 and 15 extending therethrough to the receptacle 10.

The receptacle element is connected to ground through the shell 12 by means comprising a metallic strap 19, which is generally U-shaped, the parallel portions fitting in grooves 20 at diametrically opposite sides of the receptacle body 11, and terminating in ears 19a which are secured to the flange of the shell 12 by screws 21. The cross portion of the strap 19 receives a headed pin 22, which passes through a central opening in the body 11a and terminates in a nut or head 23 which is seated in a recess in the front face of the body.

Interposed beneath the rear head 24 of the pin and the strap is a metallic angle-plate or connecting device 25 which extends transversely of the strap and has secured to its outer end a metallic contact which may be a spring clip 26 of suitable construction, as best shown in Fig. 4. The contact 26 is received in a chamber indicated at 27 formed in the receptacle body 11a and terminating in a contracted mouth portion 28, through which the co-operating contact of the plug is adapted to pass. With the shell 12 connected to ground it will be apparent that the plug contact hereafter described, that co-operates with the receptacle contact 26 will be grounded through the connection comprising the plate 25 and strap 19.

The two current conductors 14 and 15 are provided with contacts in the form as shown of metallic spring clips 29, preferably of the same construction as the spring clip 26, that are housed in chambers 27a in the body or block 11a and which terminate in contracted mouths in the face of the block for the reception of the live conductor contacts of the plug element. The contacts 29 are suitably secured to angular metallic plates or supports 30 which terminate in end portions 31, that are seated in depressions 11b in the body 11a and carry binding screws 32 for the associate conductors 14 and 15. Interposed between the cross portion of the strap 19 and the rear face of the body 11a is a plate 33 of insulating material which insulates the plates 30 from the strap or ground connector 19. The end portion of the plate 25, which is offset as shown, passes through the insulating plate 33 from the outer to the inner face thereof through an opening 34, as clearly shown in Fig. 3.

The receptacle 10 as described comprising the body 11a, with the current carrying contacts and the strap 19 with the ground wire contact, may

it will be understood, readily be furnished as a manufactured unit.

The plug element 11 shown in Figs. 1 and 6 to 8, comprises a cylindrical body or core 35 of molded insulating material surrounded by a metallic sheath or cap 36. It is formed centrally with an opening indicated at 37, the cap having a similar opening indicated at 38 to afford passage for the conductors connected to the plug, these being housed in a flexible metallic conduit or sheath 39 similar to the sheath 16. At its end opposite from the plug this sheath has a metallic ground connection to the implement mechanism or machine (not shown herein), which is to be electrically connected to the two current conductors housed by the conduit 39. Metallic connection between said conduit 39 and the cap 36 is effected by a clamp 40 comprising two separable parts 41 shaped to surround the conduit and provided with outwardly projecting ears 42 which receive clamping screws 43. As clearly shown in Fig. 1 each clamping part 41 is provided with an angularly disposed extension 42a which extends inside the face of the cap 36 with which they effect a metallic contact. These extensions 42a preferably fit in seats or depressions in the outer face of the body 35. It will be understood that when the clamping screws are tightened a metallic connection is made from the metallic portion of the implement or device to be operated through the conduit 39 and clamp 40 to the cap 36.

The ground wire contact of the plug is as herein shown a blade or prong 44 of suitable construction having an angular offset or foot 44a which seats in a depression indicated at 45 and is detachably secured in place by a screw 46 which passes freely through an opening indicated at 47 in the body 35 from the outside of the cap and is threaded through the foot 44a, thus clamping the blade 44 in position. The plane of the blade is radial of the plug as shown and the free receiving ends of the clip 26 are also radially disposed in order to enable the blade 44 properly to pass between and contact with them. The head of the screw 46 is preferably large so as to insure good contact with the shell 36. Said screw performs the double function of securing the blade 44 in place and providing an electrical connection between it and the cap 36. The foot 44a also carries a binding screw 44b which, however, is not made use of when the construction is employed as now being described and explained.

The plug element 11 also carries current wire contacts in the form of blades or prongs 48 provided with angularly disposed foot portions 49 which are seated in depressions 45 in the body 35. The foot portions 49 receive headed screws 50 by which the blades 48 are secured in place on the plug element. Said foot portions also are provided with binding screws 51 for securing the ends of the current conductors 52 and 53 housed by the conduit 39. To prevent improper insertion of the plug in the receptacle the blade portions of the contacts 48 are disposed irregularly in relation to the blade 44. In the present instance the blades 48 are substantially tangential to a circle centering in the plug element. Preferably the open end of the cap 36 is upset or rounded over the face of the body 35 as shown in order to prevent accidental disconnection of the parts. It will be seen that the plug 11 comprising the body 35 with the single ground-wire contact and the two current carrying contacts, together with the clamp 41 is so made as readily to be furnished as a manufactured unit.

From what has been said it will be apparent that the form of the invention above described is particularly adapted for use in providing separable connectors, one of which is flexibly connected to an implement or machine and the other to the power source, the connectors being wired for a two-wire current with an additional ground connection to insure against shocks and short-circuiting.

When the plug 11 is inserted in receptacle 10, the contact 44 engages the contact 26, and the contacts 48 engage the associate contacts 29. As a result the implement or machine is operated from the circuit constituted by the conductors 14 and 15 through the contacts 29 and 48 and the conductors 52, 53; while said implement or machine is grounded through conduit 39, clamp 40, cap 36, at contacts 44 and 26, strap 19 and shell 12.

The invention makes provision whereby either or both of the unitary connectors 10 and 11 may readily be altered to dispense with the ground connection and provide for a three-wire current connection. As to the receptacle 10, it is only necessary to remove the special ground wire contact element comprising the plate 25 and the contact 26 and to substitute therefor another contact element of the 29, 30 form. The chamber 27, 28 with the associate depression or seat 11b from which the ground wire contact 25, 26 is removed are so shaped as to permit such substitution. The third current wire of the receptacle is of course to be connected to the binding screw 32 of the substituted contact. At the same time it is preferable to substitute for the insulating plate 33 having the cutout 34 another plate without such cutout.

In converting the plug element 11 to a three-wire current connector it is only necessary, as will be understood by comparing Figs. 7 and 9, to remove the screw 46 connecting the contact 44 with the cap 36, and to substitute therefor a short screw 54, which has no contact with the cap, the head of the screw 54 abutting against the shoulder portion of the opening 47. The third current-wire of the plug is to be connected to the contact 44 through the binding screw 44b.

While the described exemplification of the invention relates to connectors having two current wires or conductors and a ground wire, and the alteration of such connectors to dispense with the ground wire and provide for three current wires or conductors, it will of course be understood that the principles of the invention may be embodied in connectors with varying numbers of contacts for desired numbers and sorts of conductors.

It will also be understood that variations of construction may be resorted to within the scope of the invention. An example of a modified construction is illustrated in Figs. 10 and 11 which show a plug in which the connection between the ground wire contact blade 55 and the metallic cap 56 is effected internally. In the modification the screw connector 46 of the prior construction is substituted by a spring strip or plate 57 which is secured at its inner end by a screw 58 passing through the body 59 of insulating material to the foot portion of the contact blade 55. Prior to assembly, the free end or tip of the strip 57 extends beyond the periphery of the body 59 so as to insure proper contact with the inner wall of the cap 56 when it is assembled on the body 59.

By the invention, standard forms of connectors are provided which may be adapted to suit varying requirements in a simple and inexpensive manner.

I claim:

1. A convertible electrical plug adapted for flexible connection with an implement or device to be operated and also for connection to an electrical receptacle or outlet, said plug comprising a body portion of insulating material, a plurality of current wire contacts, a ground wire contact, a metallic cap outside the body portion, and a metallic connector between said cap and said ground wire contact, said connector being removable to permit the ground wire contact to be used as a current wire contact.
2. A convertible electrical plug adapted for flexible connection with an implement or device to be operated and also for connection to an electrical receptacle or outlet, said plug comprising a

body portion of insulating material, a plurality of current wire contacts, a ground wire contact, a metallic cap outside the body portion, a metallic screw device extending from said cap freely through said body portion and securing the ground wire contact thereto, said screw device replaceable by a shorter screw device spaced from the cap when the ground wire is to be employed as a current-wire terminal.

3. A unitary electrical connecting device comprising a body of molded insulating material, a surrounding metallic cap, a contact, and a detachable connector between the contact and the cap, said connector being within said cap but exterior of said body.

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25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150