

Oct. 21, 1924.

1,512,815

R. B. BENJAMIN

ELECTRICAL RECEPTACLE AND PLUG

Filed Oct. 8, 1920

3 Sheets-Sheet 1

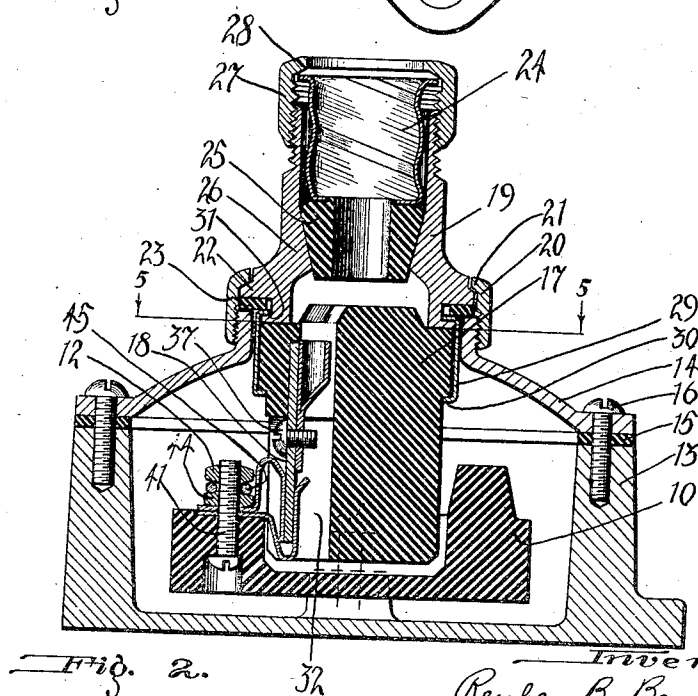
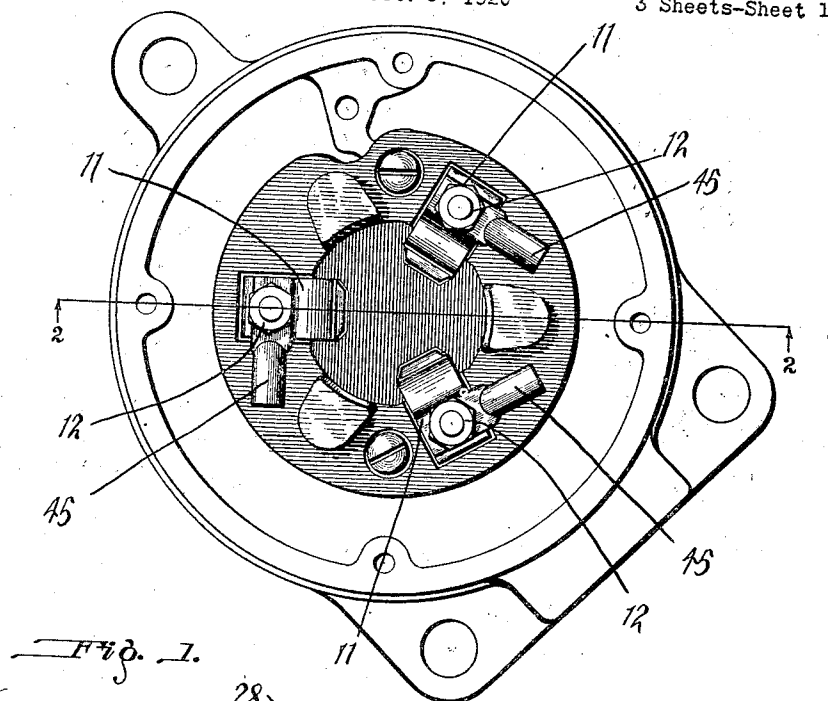


Fig. 2.

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3 Sheets-Sheet 2

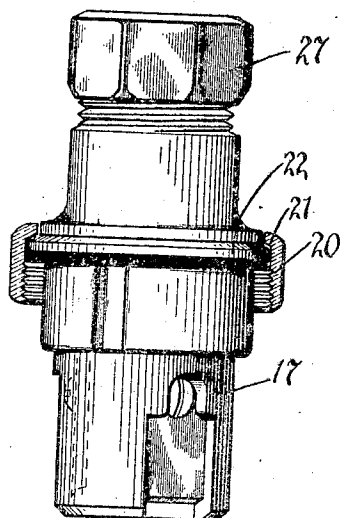


Fig. 3.

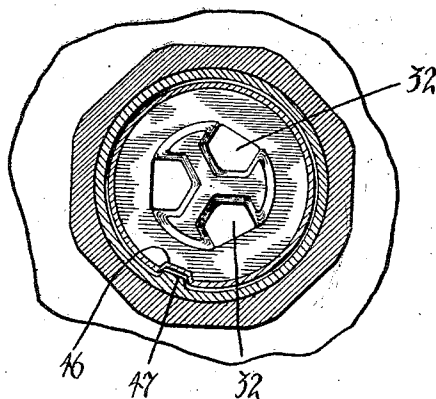


Fig. 5.

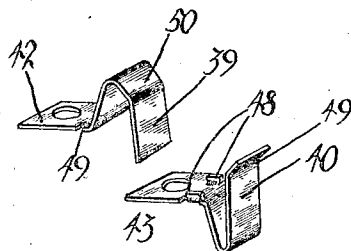


Fig. 6.

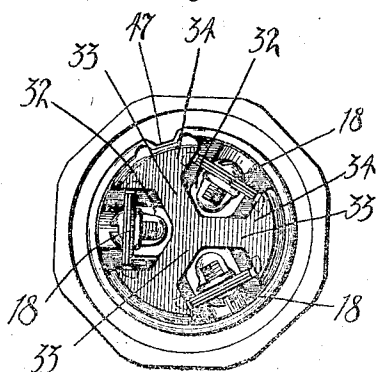


Fig. 4.

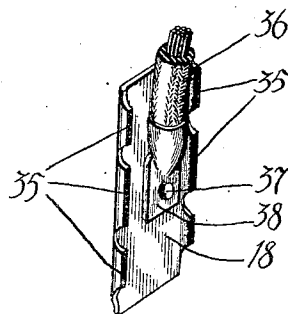


Fig. 7.

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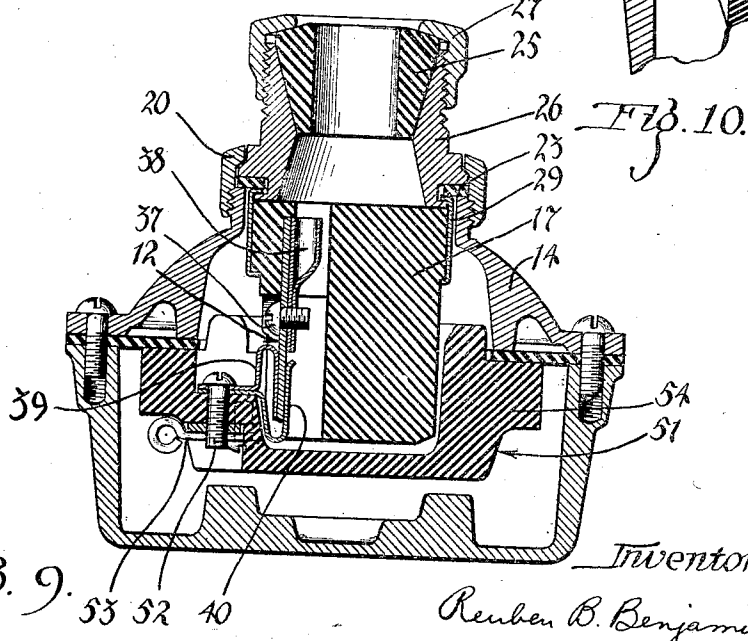
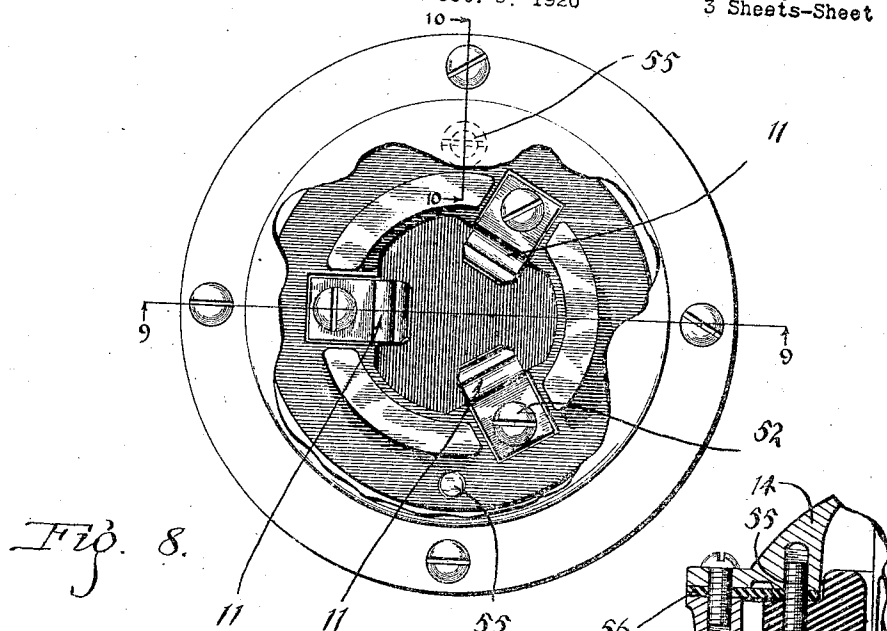
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

REUBEN B. BENJAMIN, OF CHICAGO, ILLINOIS, ASSIGNOR TO BENJAMIN ELECTRIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTRICAL RECEPTACLE AND PLUG.

Application filed October 8, 1920. Serial No. 415,489.

To all whom it may concern:

Be it known that I, REUBEN B. BENJAMIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electrical Receptacles and Plugs, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to electrical connector devices and more specifically to a heavy duty watertight receptacle and plug.

Among the objects of my invention is to provide a connector device of the type indicated, which will be efficient and durable in use, simple in construction and cheap to manufacture.

Further objects will appear from the detailed description to follow and from the appended claims.

In the drawings in which two embodiments of my invention are shown—

Fig. 1 is a plan view of a watertight receptacle with the cover removed;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a side elevation of the plug-in device;

Fig. 4 is a bottom plan view of the device shown in Fig. 3;

Fig. 5 is a section on the line 5—5 of Fig. 2;

Fig. 6 is an exploded perspective view of the receptacle contact members;

Fig. 7 is a perspective view of a plug contact and wiring terminal;

Fig. 8 is a plan view of a different form of watertight receptacle, part of the cover being broken away;

Fig. 9 is a section on the line 9—9 of Fig. 8; and

Fig. 10 is a fragmentary sectional view of the line 10—10 of Fig. 8.

Referring first to Figs. 1 to 7 inclusive, the construction shown comprises in a general way, a receptacle portion mounted in a cylindrical metal casing, having a waterproof cover, and a plug-in portion having contacts for cooperation with the receptacle contacts, and having provision whereby a waterproof connection is made between the plug and the cover, when the plug is inserted. The plug is further provided with means whereby a helically-armored cable

can be connected with it, and a waterproof connection provided between the armored cable and the plug.

Referring now to the drawing in detail, the receptacle shown is a three pole receptacle comprising an insulating base 10, and three contact devices 11, electrically connected with the three feed wires by means of wiring terminals 12 respectively. The receptacle is located in a cylindrical housing 13 which is provided with a cover 14. In order to make a watertight connection between the cover 14 and casing 13, a washer 15 is interposed between the two, the cover being secured to the casing by means of screws 16.

The plug-in portion comprises an insulating base 17, three contact devices 18 for cooperation with the receptacle contact 11 respectively, and a connecting member 19 for connecting the armored cable to the plug.

In order to secure the plug in position in the receptacle, an internally-threaded retaining ring 20 is provided, which has an inwardly-extending annular flange 21, which bears on an annular shoulder 22 on the connecting member 19.

In order to make a watertight connection between the plug-in member and the cover portion 14, a washer 23 is provided, underneath the shoulder 22.

The connecting device 19 comprises a helical sheet metal member 24, which can be threaded onto the helical armor of the cable, an annular bushing or packing member 25, for closely surrounding the end of the cable from which the armor has been removed, a bushing or sleeve 26 in which the packing member 25 and helical member 24 are mounted, and a cap member 27 having an inwardly-extending flange 28 which bears on the upper edge of the helical member 24, to hold the helical member in place, and to force the tapered packing member 25 downwardly into sealing engagement with the end of the cable.

In order to connect the sleeve 19 with the insulating base 17 of the plug-in device, an annular sheet metal connecting member 29 is provided, which is flanged over as indicated at 30 to engage a shoulder on the insulating base 17, and is also flanged over as indicated at 31 to engage a shoulder on the sleeve 19.

The contact devices 18 of the plug-in de-

vice are mounted in longitudinally extending recesses 32 in the side of the insulating base 17, these recesses 32 being separated from each other by radially and longitudinally extending ribs 33, these ribs 33 terminating in enlargements 34, in which the laterally-extending wings 35 of the contact devices 18 are embedded. The conductors 36 are connected to the contact members 18 by means of screws 37 which extend through openings in the contact members 18 and are threaded into the terminal clips 38 with which the ends of the conductors 36 are provided.

Each of the receptacle contact devices 11 comprise two contact members 39 and 40 respectively, between which the contact member 18 of the plug extends when the plug is inserted. These contact members 39 and 40 are secured in position on the receptacle base 10 by means of screws 41 which extend through the base portions 42 and 43 of the contacts respectively, and are threaded into nuts 44. The terminal clips 45 of the feed wires are secured in electrical connection with the receptacle contact devices 11 by means of the wiring terminals 12.

In order to insure that a certain one of the plug contact devices 18 will always engage a certain one of the receptacle contact devices 11, the plug-in device is recessed as indicated at 46 for cooperation with an inwardly-extending boss or lug 47 on the neck of the cover 14. (Figs. 4 and 5.)

In wiring the plug-in device, the cap 29, the helical member 24, and the packing member 25 are slipped onto the cable, and the three clips 38 of the cable are threaded into the three recesses 32 at the side of the plug and are connected to the three plug contact members 18 by means of the three screws 37. The packing member 25 is then pressed down into place by means of the helical member 24, and the cap member 27 is threaded down onto the connecting member 19 to force the conical packing member 25 tightly into engagement with the cable. The helical member 24 serves as a securing means and strain relief by engaging the helical armor of the cable.

The circuit may be any circuit for which a three pole connector is adapted.

In order to insure the proper relative positioning of the contact members 39 and 40 of the receptacle contact device, the contact member 40 is provided with a pair of upturned lugs 48, which engage in corresponding notches 49 in the base portion of the contact member 39. In order to insure the proper entrance of the contact member of the plug-in device, with the contact abutment of the receptacle, the contact member 40 is provided with an inclined lip 49, while the contact member 39 is provided with an

inclined portion 50, the inclined portions 49 and 50 cooperating to guide the contact devices 18 into proper engagement with the contact devices 11.

The construction shown in Figs. 8, 9 and 10 is quite similar to the construction shown in Figs. 1 to 7 inclusive, except that the three pole receptacle 51 is mounted on the cover 14, and removable therewith, and forms therewith a sort of housing for the receptacle contact. Also in this form, the plug does not have special provision for connecting it with an armored cable. The cover 14, the insulating base 17, the three contact devices 18, the retaining ring 20, the washer 23, the annular bushing or packing member 25, the bushing sleeve 26, the cap 27, and the sheet metal connecting member 29 may be substantially the same as in Figs. 1 to 7 inclusive. In this form, however, the cap member 27 bears directly on the packing member 25, instead of bearing on the helical connecting member as in Fig. 2.

As to the receptacle part, the contact devices 11 including the contact members 39 and 40 may be the same as in the form previously described. These contact devices 11 are held in place by means of screws 52 which extend through the base portions of the contact members 39 and 40 and are threaded into metal members connected with the wiring terminals 53, the screws 52 thus holding the contact devices 11 in place on the insulating receptacle base 54, and electrically connecting them with the wiring terminals. This construction enables the receptacle to be wired without disconnecting the insulating base 54 from the cover 14 and without exposing the contact devices 11. This lessens the danger of injury to the delicate spring contacts 39 and 40.

As previously intimated the insulating receptacle base 54 is mounted on the cover 14, this being effected by means of screws 55 which extend through openings in the insulating base 54, and the packing gasket or washer 56, and are threaded into the cover 14 (Fig. 10). The receptacle is thus mounted on the cover 14, which cover also carries the plug 17, when the plug is inserted into the receptacle so that as both plug and receptacle are supported by the same cover member, they will always engage properly and the engaging contacts will be held in the desired relative position. It will be noted that the insulating base 54 in conjunction with the cover 14 form a sort of housing member for the receptacle contacts, whereby the receptacle contacts are protected against accidental displacement or injury when the cover 14 is removed for wiring, or for any other reason.

While I have shown herein only two embodiments of my invention, it is to be under-

stood that many changes and variations therein may be made without departing from the spirit and scope of the appended claims.

5 What I claim as new and desire to secure by Letters Patent of the United States is:

1. A plug-in device comprising an insulating base provided with a plurality of longitudinally extending ribs and a contact member comprising a plate extending between said ribs and having its side edges secured thereto.

2. A plug-in device comprising an insulating base provided with a plurality of longitudinally extending ribs, a contact member comprising a plate extending between said ribs and having its side edges secured thereto, and wiring terminals secured to said plate.

3. A plug-in device comprising an insulating base provided with a plurality of longitudinally extending ribs, a contact member comprising a plate extending between said ribs and having its side edges secured thereto, and wiring terminals comprising a conductor clip and a screw extending through said plate and threaded into said clip.

4. A plug-in device provided with a plurality of longitudinally extending ribs, said ribs being enlarged at their outer extremities, and a contact plate extending between and embedded in the enlarged portions.

5. A plug-in device comprising an insulating base having longitudinally extending lateral recesses therein, contact plates extending between and embedded in the walls of said recesses, and means for securing

feed wires within said recesses, on the inside of said contact plates.

6. A plug-in device comprising an insulating base having a longitudinally extending groove in its side, a contact plate bridging across from one wall to the other of said groove, and having its middle portion spaced from the bottom of said groove, whereby a co-operating contact member may be received between the bottom of said groove and said plate, said insulating base having an opening in its end leading to the space between the bottom of the groove and said plate, whereby a conductor may be inserted through said passage and connected to the inner side of said plate.

7. A plug-in device comprising an insulating base having a longitudinally extending groove in its side, a contact plate bridging across from one wall to the other of said groove, and having its middle portion spaced from the bottom of said groove, whereby a co-operating contact member may be received between the bottom of said groove and said plate, said insulating base having an opening in its end leading to the space between the bottom of the groove and said plate, whereby a conductor may be inserted through said passage and connected to the inner side of said plate, and means for connecting said conductor to said plate comprising a clip to be secured to said conductor and a screw extending through said plate and threaded into said clip.

In witness whereof, I have hereunto subscribed my name.

REUBEN B. BENJAMIN.