

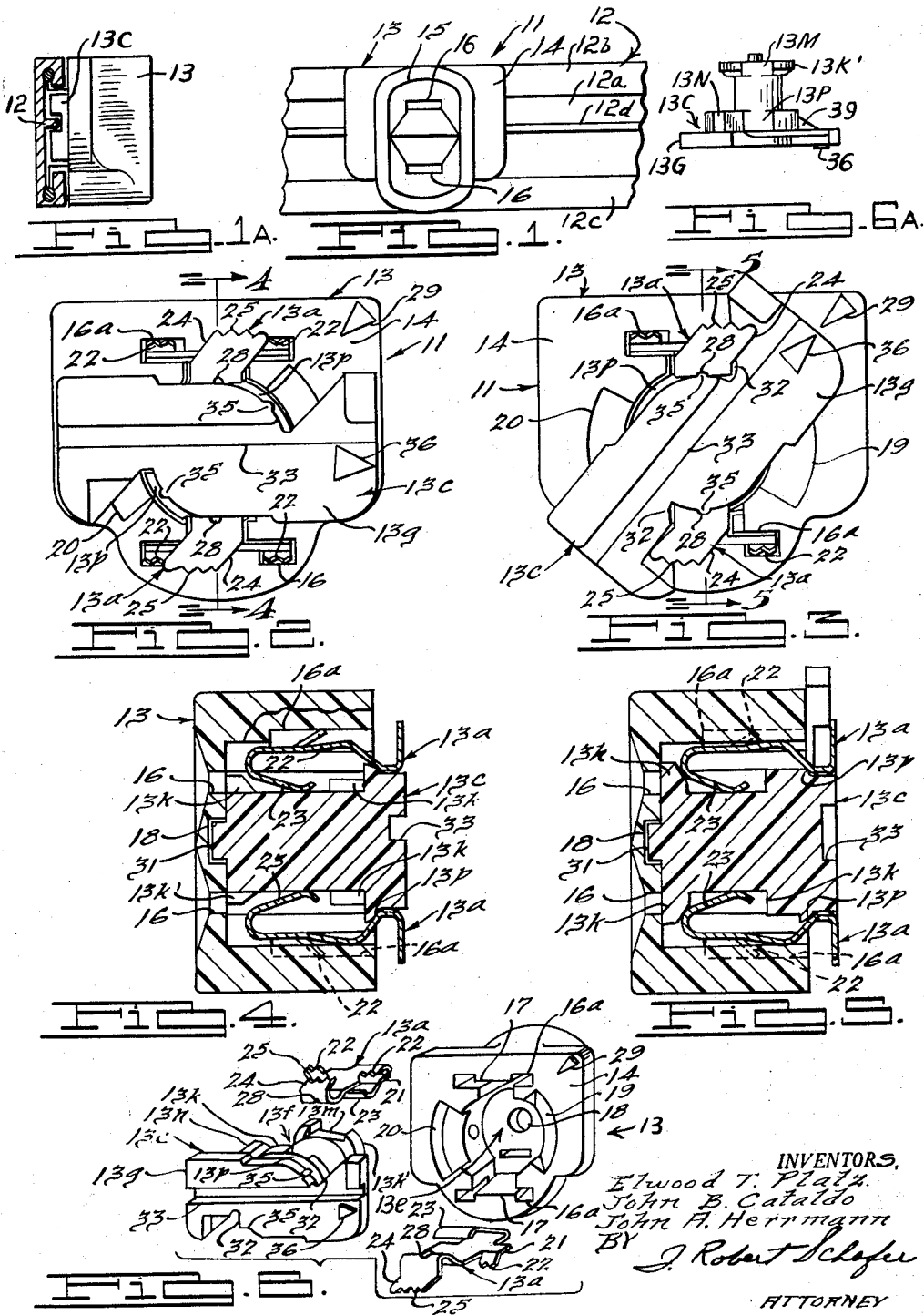
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ELECTRIC RECEPTACLE

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ELECTRIC RECEPTACLE

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This invention relates to electrical receptacles generally and particularly to electrical receptacles for continuous multi-outlet electrical distribution systems.

It is desirable that a receptacle for use in such distribution systems be of simple, inexpensive construction, positive action, easily installed and removed from the system, and so designed to prohibit attachment and removal of the conventional plug cap when the receptacle is not attached to the system.

Accordingly, a primary object of the invention is to provide an electrical receptacle which insures positive, efficient connection in an electrical distribution system.

Another object of the invention is to provide a receptacle which cannot be installed or removed when under electrical load.

Another object is to provide a receptacle which is easily and positively attached and removed from a distribution system.

Still another object is to provide a receptacle which is automatically locked in a distribution system when a plug cap is in place.

Still another object is to provide a receptacle in which the contacts positively and efficiently engage the conductors of a distribution system.

Still another object is to provide a receptacle which can not be accidentally disengaged from an electrical distribution system.

Still another object is to provide a receptacle of simple construction which is easily assembled of a minimum number of parts.

Still other objects and features will appear from the following description and drawings, in which:

Fig. 1 is an elevational view of a portion of an electrical distribution system showing a receptacle which is an embodiment of the invention.

Figure 1a is a right angle view of Figure 1.

Fig. 2 is an elevational view of the back of the receptacle showing the relationship of the parts when the receptacle is installed in a distribution system.

Fig. 3 is an elevational view of the back of the receptacle showing the relationship of the parts prior to installation of the receptacle in a distribution system.

Fig. 4 is a cross-sectional view on line 4—4 of Fig. 2.

Fig. 5 is a cross-sectional view on line 5—5 of Fig. 3, and

Fig. 6 is an exploded view of the receptacle showing the component parts in detail.

Figure 6a is a side view of the locking member.

Referring to the drawings Fig. 1 shows a receptacle 11 which is an embodiment of the invention engaged with the duct 12 of a multi-outlet electrical distribution system. The particular duct shown is an embodiment of the invention shown and described in abandoned application Number 252,272, which was filed October 20, 1951, with William H. Frank, John A. Herrmann, Elwood T. Platz, and Joseph A. Messing as inventors and which is assigned to the assignee of this application. The duct 12 is preferably formed of a plastic material and includes a wall

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12a having the upper and lower portions folded downwardly and upwardly, respectively, to form lips 12b and 12c which enclose electrical conductors (Figure 1a). Formed integrally with the wall 12a, intermediate lips 12b and 12c, to one side of the center line of duct 12 is a polarizing rib 12d. The duct forms no part of this invention, and for a more detailed description of that invention, reference is made to the above-mentioned application.

As shown in Fig. 6, the receptacle 11 includes a molded one-piece housing 13 of plastic material, a pair of contacts 13a (Figs. 4, 5, 6) and a locking member 13c (Figs. 2, 3, 6, 6a), which will be described in greater detail. The lower portion of the housing 13 comprises a base 14. The top wall 15 of housing 13 is recessed, as shown (Figs. 1, 4, 5), and contains plug prong openings 16, which permit insertion of the conventional plug cap prongs. The interior of housing 13 is formed to provide a cylindrically-shaped cavity 13e (Fig. 6), which receives and journals portions of lock member 13c. Opening into the wall of cavity 13e are contact slots 16a which are partly filled by abutments 17 opposite, and of the same width as, the opening in the wall of cavity 13e. These abutments 17 extend the length of slots 16a to the undersurface of the top wall 15 to a point spaced from the outer edge of prong openings 16. A smaller cylindrically-shaped recess 18 (Fig. 6) is formed in the undersurface of the top wall 15. At the right side (Fig. 6) a portion 19 of the edge of cavity 13e is beveled to form clearance for a reinforcing web on the lock member 13c. A portion 20 of the left edge (Fig. 6) of cavity 13e is cut away rectangularly to provide a lock member stop. An index marker 29 of arrow shape is embossed in the upper right corner of the lower surface of base 14 of housing 13 (Figs. 2, 3, 6).

Contacts 13a are made of a resilient electrically conductive metal, such as Phosphor bronze. As shown in Figs. 4, 5, and 6, each contact is formed with a rectangular center portion 21 having serrated lugs 22 stamped and bent outwardly from each side to secure each contact 13a within slot 16a. Extending from the lower side of rectangular center portion 21 is a load contactor 23 which is formed by bending a projecting tongue back upon itself. Extending from the opposite side of center portion 21 and bent at an angle of 90° is a line contactor 24 of U shape with the lower leg of parallelogram shape. A locking indentation 28 is formed in the bight of the U. The upper edge is serrated to provide teeth 25 which insure good electrical contact when the receptacle is engaged with the duct 12.

Disposed in cavity 13e of housing 13 is a locking member 13c (Figs. 4, 5, 6, 6a). This member is substantially T-shaped with a cylindrical upper portion 13f and a projecting rectangular lower portion 13g (Fig. 6). Upper portion 13f is formed with two collars 13k, 13k', one at the lower end and one adjacent to the upper end of portion 13g, each containing diametrically opposed notches 13m which permit plug cap prongs to be inserted into the interior of housing 13 when the receptacle 11 is installed upon the duct 12. The upper surface of the lower collar 13k is beveled, as shown in Figs. 5 and 6. A locking lug 13n projects from the periphery of the upper collar 13k' and seats itself in top 20 of housing 13 upon assembly of the receptacle. A cylindrical projection 31 extends from the bottom surface which is received by journal 18 in top wall 15 of housing 13. A triangular-shaped web 39 shown in Figure 6a is formed on the opposite side of upper collar 13k from guide lug 13n and seats itself on the beveled edge 19 of cavity 13e of housing 13. The locking member 13c is retained in cavity 13e by the engagement of the bight portion of

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line contactors 24 with a tapered shoulder of the lower collar 13k of locking member 13c (Figs. 2, 3, 6).

Lower portion 13g of lock member 13c is substantially rectangular in shape with portions being cut away, as shown (Figs. 2, 3, 6) to form relief slots 32, which provide clearance for line contactors 24 when housing 13 is rotated to the disengaged position for removal of the receptacle 11 from the duct 12. Extending longitudinally of the upper surface of upper portion 13g of lock member 13c is a polarizing slot 33 located off center, which receives polarizing rib 12d of duct 12 to position and secure the receptacle to duct 12. Projections 35 are formed in the defining surface of relief slots 32 to cooperate with indentations 28 of line contactors 24 to index the locking member 13c to the disengaged position as shown in Fig. 3. A locking member index 36 of arrow shape is embossed in the lower right corner of lock member 13c to correlate the respective positions of housing 13 and locking member 13c prior to installation of receptacle 13 on the duct 12.

It will be observed, therefore, that the locking member 13c is rotatable relative to housing 13 through an angle of approximately 45° as limited by the engagement of locking lug 13n with the end walls of 20.

The receptacle functions as follows: In the disengaged position of Fig. 3 the upper collar 13k' is beneath prong openings 16 of housing 13, thus preventing the insertion of plug cap prongs into openings 16. It is necessary, therefore, to first place the receptacle 13 on the duct 12 before the plug connection can be made. To attach the receptacle to the duct 12, the respective indexes, 36 on locking member 13c, and 29 on housing 13, are aligned, as shown in Fig. 3. In this position load contactors 25 are disposed in relief slots 32. The locking member 13c is then placed against the duct 12 between upper and lower lips 12b, 12c with polarizing rib 12d disposed in polarizing slot 33. Because of the off center location of rib 12d and slot 33, the receptacle can be placed on the duct 12 only in a position which conforms to the polarization of the system. In this position the housing 13 will be disposed at an angle of approximately 45° with the centerline of duct 12. To complete the attachment of the receptacle 11 to the duct 12, the housing 13 is rotated clockwise, forcing line contactors 24 beneath lips 12b, 12c into engagement with the duct conductors. Serrations 25 of line contactor 24 will penetrate the surface of the conductors, assuring electrical conductivity between the duct conductors and the contacts 13a. The plug cap may then be installed by inserting the plug cap prongs in openings 16 of housing 13. Upon being pushed in, the plug cap prongs will engage the inner surface of load contactors 23. The inward bias of load contactors 23 assure electrical conductivity between the plug cap prongs and the load contactors 23. The electrical circuit is thus established from the duct conductors to line contactors 24 to load contactors 23 to the plug cap prongs to the particular equipment desired to be electrically serviced. In this position (Fig. 1) with the plug cap prongs inserted into the receptacle 11 the prongs are disposed in slots 13m of locking member 13c. The rotation of housing 13 relative to locking member 13c is thus prohibited. Removal of receptacle 11 from the duct 12 is therefore impossible while the plug cap is engaged with receptacle 11.

To remove the receptacle 11 from duct 12, the plug cap is withdrawn removing the plug cap prongs from engagement with slots 13m of locking member 13c and load contactors 23. Housing 13 is then rotated counterclockwise, removing line contactors 25 from beneath lips 12b, 12c of duct 12 into alignment with the edges of locking member 13c as permitted by relief slots 32. The receptacle may then be removed from the duct 12.

From the above description it can be seen that the locking member 13c engages the duct polarizing rib 12d and the inner edges of lips 12b, 12c to provide a fulcrum

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for relative movement of housing 13 when the receptacle 11 is being installed, or removed from, the duct 12. Furthermore, the receptacle 11 cannot be removed from the duct 12 other than in the manner above described. The construction of the contacts 13a provide efficient electrical current transmission from the duct conductors through receptacle 11 to the equipment to be energized.

For an understanding of the scope of the invention, reference should be had to the following claims.

We claim:

1. An electrical receptacle including a housing having plug openings therein, electrical contacts disposed in said housing, each contact having a load contactor adjacent one of said openings, a locking member movable relative to said housing, said locking member having polarizing means for polarizing said receptacle in an electrical distribution system, said locking member having obstructing means positionable in said openings for selectively prohibiting the attachment of a plug cap to said receptacle, said contacts having portions engaging said locking member to thereby secure said locking member in said housing.

2. An electrical receptacle including a housing having plug openings therein, electrical contacts disposed in said housing, each contact having a load contactor and a line contactor, each of said load contactors being adjacent one of said openings, a locking member movable relative to said housing, said locking member having obstructing means positionable in said openings for selectively prohibiting the attachment of a plug cap to said receptacle, said contacts having portions engaging said locking member to thereby secure said locking member in said housing, said locking member having its outer surfaces shaped to cooperate with said housing and form passageways for the reception of said line contactors to thereby permit said receptacle to be installed in an electrical distribution system.

3. An electrical receptacle including a housing having plug openings therein, electrical contacts disposed in said housing, each contact having a load contactor and a line contactor, each of said load contactors being adjacent one of said openings, a locking member movable relative to said housing, said locking member having polarizing means for polarizing said receptacle in an electrical distribution system, said locking member having obstructing means positionable in said openings for selectively prohibiting the attachment of a plug cap to said receptacle, said contacts having portions engaging said locking member to thereby secure said locking member in said housing, said locking member having its outer surfaces shaped to cooperate with said housing and form passageways for the reception of said line contactors to thereby permit said receptacle to be installed in an electrical distribution system.

4. An electrical receptacle including a housing having plug openings therein, electrical contacts disposed in said housing, each contact having a load contactor and a line contactor, each of said load contactors being adjacent one of said openings, a locking member movable relative to said housing, said locking member having obstructing means positionable in said openings for selectively prohibiting the attachment of a plug cap to said receptacle, said contacts having portions engaging said locking member to thereby secure said locking member in said housing, said housing having bearing means for supporting and guiding said locking member, said locking member having its outer surfaces shaped to cooperate with said housing and form passageways for the reception of said line contactors to thereby permit said receptacle to be installed in an electrical distribution system.

5. An electrical receptacle including a housing having plug openings therein, electrical contacts disposed in said housing, each contact having a load contactor and a line contactor, each of said load contactors being adjacent one of said openings, a locking member movable relative

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to said housing, said locking member having polarizing means for polarizing said receptacle in an electrical distribution system, said locking member having obstructing means positionable in said openings for selectively prohibiting the attachment of a plug cap to said receptacle, said contacts having portions engaging said locking member to thereby secure said locking member in said housing, said housing having bearing means for supporting and guiding said locking member, said locking member having its outer surfaces shaped to cooperate with said housing and form passageways for the reception of said line contactors to thereby permit said receptacle to be installed in an electrical distribution system.

6. An electrical receptacle being comprised of a housing; a locking member, a pair of contacts; each of said contacts including a line contactor and a load contactor; said contacts being disposed within said housing and being secured thereto to move in unison therewith; said housing including prong openings adjacent to each of said load contactors; said locking member being mounted within said housing and journaled thereby for limited rotation with respect thereto; said locking member including a collar having notches cut therein; said notches being in alignment with said prong openings when said locking member is rotated to a first position to thereby permit the mounting of a plug cap to said receptacle; said collar being interposed between said load contactors and said prong openings when said locking member is rotated to a second position to thereby prevent the mounting of a plug cap to said receptacle.

7. An electrical receptacle being comprised of a housing; a locking member, a pair of contacts; each of said contacts including a line contactor and a load contactor; said contacts being disposed within said housing and being secured thereto to move in unison therewith; said housing including prong openings adjacent to each of said load contactors; said locking member being mounted within said housing and journaled thereby for limited rotation with respect thereto; said locking member including a collar having notches cut therein; said notches being in alignment with said prong openings when said locking member is rotated to a first position to thereby permit the mounting of a plug cap to said receptacle; said collar being interposed between said load contactors and said prong openings when said locking member is rotated to a second position to thereby prevent the mounting of a plug cap to said receptacle; said contacts including bight portions operatively positioned to retain said locking member within said housing.

8. An electrical receptacle being comprised of a housing; a locking member, a pair of contacts; each of said contacts including a line contactor and a load contactor; said contacts being disposed within said housing and being secured thereto to move in unison therewith; said housing

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including prong openings adjacent to each of said load contactors; said locking member being mounted within said housing and journaled thereby for limited rotation with respect thereto; said locking member including a collar having notches cut therein; said notches being in alignment with said prong openings when said locking member is rotated to a first position to thereby permit the mounting of a plug cap to said receptacle; said collar being interposed between said load contactors and said prong openings when said locking member is rotated to a second position to thereby prevent the mounting of a plug cap to said receptacle; said locking member and said contacts including cooperating latching means to latch said locking member in said second position.

9. An electrical receptacle being comprised of a housing; a locking member, a pair of contacts; each of said contacts including a line contactor and a load contactor; said contacts being disposed within said housing and being secured thereto to move in unison therewith; said housing including prong openings adjacent to each of said load contactors; said locking member being mounted within said housing and journaled thereby for limited rotation with respect thereto; said locking member including a collar having notches cut therein; said notches being in alignment with said prong openings when said locking member is rotated to a first position to thereby permit the mounting of a plug cap to said receptacle; said collar being interposed between said load contactors and said prong openings when said locking member is rotated to a second position to thereby prevent the mounting of a plug cap to said receptacle; said line contactors being operatively positioned, when said locking member is in said second position, to permit said receptacle to be installed in a continuous outlet electrical distribution system; said line contactors being operatively positioned, when said receptacle is installed in a continuous outlet electrical distribution system and said locking member is in said first position, to contact the conductors of said system and cooperate with said system to prevent the removal of said receptacle from said system; said locking member including a portion generally rectangular in shape having a notch therein positioned parallel to and spaced from the major axis of said rectangle, said notch adapted to cooperate with a polarizing rib of a continuous outlet electrical distribution system.

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