Nov. 25, 1941. W. E. JOHNSTON 2,263,630

ELECTRICAL RECEPTACLE AND PLUG

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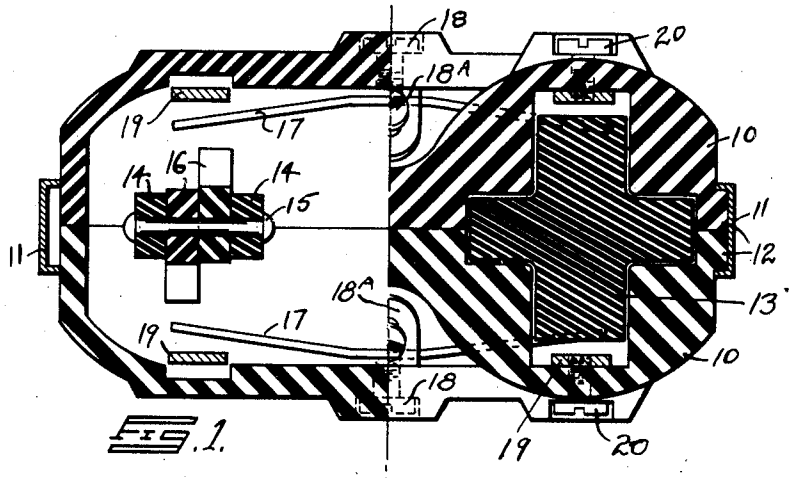


Fig. 1.

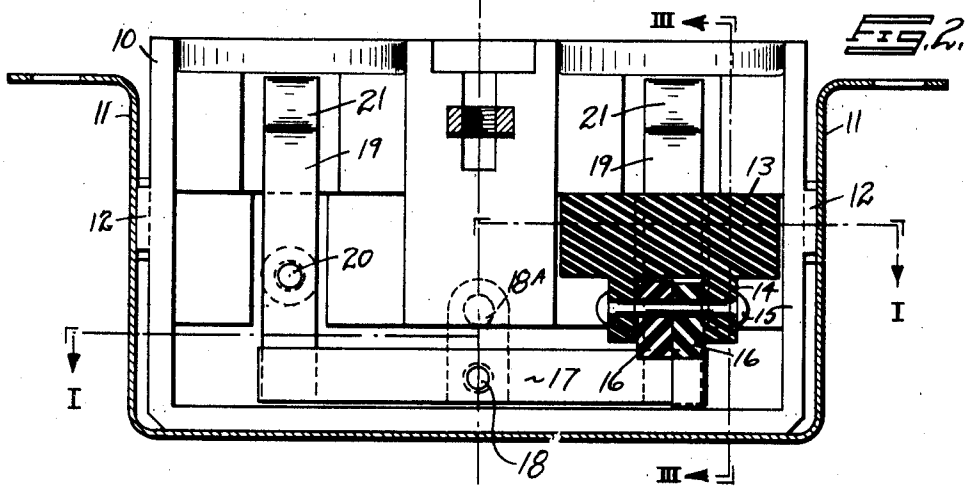


Fig. 2.

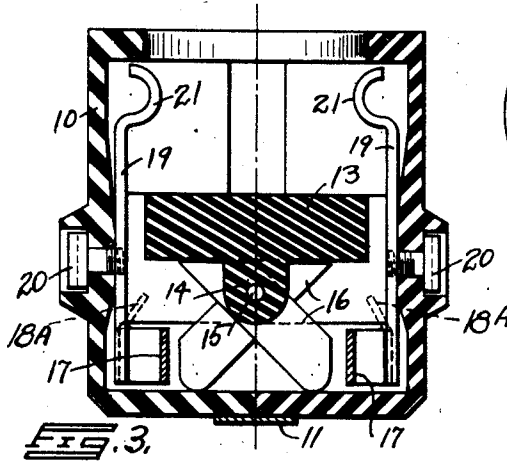


Fig. 3.

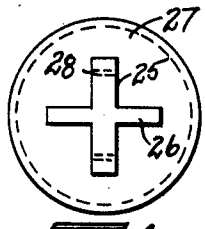


Fig. 4.

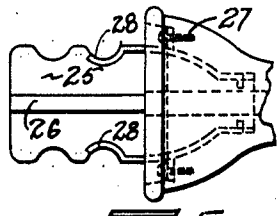


Fig. 5.

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ELECTRICAL RECEPTACLE AND PLUG

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3 Claims. (Cl. 173—330)

This invention relates to electrical wall outlets or receptacles and their complementary connection plugs as commonly used in electrical installations.

The principal object of the invention is the provision of a simple and efficient form of a combination of receptacle and connection plug wherein movement of the connection plug opens or closes electrical switches within the receptacle so as to energize or deenergize the exposed contact portions of the receptacle.

A further object of the invention is the provision of a receptacle and complementary connection plug the structural portions of which are formed of insulating material and provided with metallic electrical connector portions through which the electrical circuit is established when the complementary plug is placed in connection position within the receptacle, the connection plug serving to actuate the switches within the receptacle when the plug is in connection position, and so formed that the electrical circuit is broken by partial removal of the connection plug from the receptacle prior to the opening of the switches within the receptacle so that arcing of the switch parts is avoided.

A further object of the invention is the provision of an electrical receptacle and complementary plug so formed that the various exposed portions are disconnected from the current supply until after the complementary plug is inserted therein thus providing a safety feature in that foreign articles inserted in the receptacle will not result in the blowing of the fuses in the supply lines and, further, children accidentally or deliberately inserting their fingers in the receptacle will be unharmed as there will be no energized exposed portions from which they may be burned or electrocuted.

Specifically, the plug and receptacle shown and described herein provide a combined receptacle and switch whereby the action of inserting the connection plug into the receptacle closes the switch so as to establish electrical connection between the receptacle and the supply lines. The various parts of the receptacle and plug are so formed and aligned that upon removal of the complementary connection plug the electrical circuit is broken at its connection point on the plug prior to the disconnection of the switches within the receptacle. The complementary connection plug and the registering portions of the receptacle are preferably cruciform in shape so as to necessitate the insertion of the connection plug in desirable polarized position at all times.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a top plan view of a receptacle the righ hand portion of which shows the complete assembly while the left hand portion is in cross section as indicated on lines 1—1 of Figure 2.

Figure 2 is a cross sectional side elevation of the receptacle.

Figure 3 is a cross sectional end elevation of the receptacle taken on lines 3—3 of Figure 2.

Figure 4 is an end elevation of the complementary plug.

Figure 5 is a side elevation of the complementary plug.

By referring to the drawing and Figure 1 in particular it will be seen that the receptacle as shown in Figures 1 and 2 comprises a pair of connection plug receiving portions and is formed of two half body sections 10. These body sections 10 are assembled in registering relation as shown and are held in that position by means of a metallic band 11 which passes around the back of the body portions and holds the same together by reason of inturned flanges at the sides thereof which register with and hold together two pairs of lugs 12 formed on the ends of the body portions 10. It is obvious that if desired a bolt may be passed through the center sections of the receptacle if necessary to hold the half sections in assembled position or that any other convenient means may be employed. Each of the pair of plug receiving receptacles formed by the body members 10 are of appropriate size and depth to receive and retain in operative position a plunger block 13 of cruciform shape which is provided with a pair of downturned arms 14 through which a pivot rod 15 is positioned. By referring to Figure 3 it will be seen that a pair of toggles 16 are pivoted on the pivot rod 15 and that the toggles are pivoted in off center relation to the toggle portions themselves as shown in Figure 3 so that a snap like elevating action is obtained when pressure is brought to bear against the lowermost ends of the toggles 16. These toggles 16, pivoted as they are to the plunger block 13, serve to support the plunger block in elevated relation to the bottom of the receptacle at such times as the complementary connection plug is not in position in the receptacle, and it is obvious that if desired springs may be placed beneath the plunger blocks 13 to help elevate the same.

By referring again to Figures 1 and 2 of the drawing it will be seen that a pair of horizontally positioned metallic contact strips 17 are

positioned adjacent the bottom portions of the receptacle by centrally positioned bolts or rivets 18 and that the horizontally positioned contact strips 17 are bowed inwardly therefrom as shown thus placing their end sections in operative relation to the lowermost portions of the toggles 16. Positioned in recesses in the side sections of the body portions 10 vertical metallic contact strips 19, as shown in Figures 1, 2 and 3, are positioned by means of supporting bolts or rivets 20 positioned through the sides of the body sections 10. These vertically positioned metallic contact strips 19 have inwardly extending partially looped portions 21 formed at their upper ends, (see Figures 2 and 3) which serve to contact matching curved portions of the complementary connection plug and by referring to Figures 1 and 3 of the drawing it will be observed that the side wall sections of the body portion 10 immediately adjacent these vertically positioned contact strips 19 are cut away slightly in relation thereto so that a spring like action of the vertical connector strips is possible both at their upper and lower ends.

By referring to Figure 3 it will be seen that when the plunger block 13 is pressed downwardly by means of the complementary plug inserted in the receptacle the bottom portions of the toggles 16 move outwardly against the ends of the horizontally positioned contact strips 17 and effectively move them into electrical contact with the lower ends of the vertically positioned contact strips 19 and in as much as electrical supply lines have been connected to these horizontally positioned contact strips 17 by means of bolts 18A positioned in connector tabs formed thereon, which connector tabs extend upwardly from the contact strips 17 and partially out of the enclosed lower portion of the receptacle which is possible by reason of the fact that, as best illustrated in Figure 1 of the drawing, the upper portion of the receptacle is narrower than the lower portion of the receptacle and thus leaves an opening, in which opening the connector tabs are positioned. By referring to the right hand portion of Figure 1 this construction may be seen. The left hand portion of Figure 1 is taken on a lower elevation and shows the enlarged lower portion of the receptacle and the contact strips 17. The electrical current is thus connected to the vertically positioned contact strips 19 therethrough which in turn conveys the same to the contact portions of the complementary plug.

By referring to Figures 4 and 5 of the drawing wherein detail views of the complementary plug are shown, it will be seen that the cruciform shape of the engaging portions of the complementary plug are of different size and shape and correspond to the shape and size of the cruciform opening in the receptacle above the larger cruciform shaped plunger block 13, so that the plug must be inserted properly to make electrical connection. In Figures 4 and 5 the larger cruciform body portions are indicated by the numerals 25 and the smaller or guiding portions by the numerals 26 while the cap portion of the plug is indicated by the numeral 27. The metallic contactor strips of the complementary plug are indicated by the numerals 28. It will be seen by again referring to Figures 1, 2 and 3 of the drawing that the receptacle and complementary plug are so formed that the toggles 16 effectively move the horizontal contact strips 17 into electrical connection with the vertical contact strips 19 when the plug is inserted in the receptacle and that when the plug is withdrawn from the receptacle the electrical connection is broken with the plug prior to the disengagement of the horizontal and vertical contact strips 17 and 19 due to the springing action thereof which permits the partial following movement of the same prior to the actual disengagement. This action effectively avoids arcing of these parts upon disengagement and thus insures the long life and satisfactory operation of the article.

It will thus be seen that a practical and convenient electrical receptacle and complementary plug have been disclosed wherein a safety feature is incorporated in that exposed portions of the devices are deenergized prior to the complete insertion of the plug in the receptacle.

What I claim is:

1. An electrical connection receptacle provided with one or more cruciform sockets each of which is adapted to receive a complementary connection plug cruciform in cross section, each of the said sockets provided with a pair of vertically positioned contact strips the uppermost ends of which are adapted to engage matching connection sections on the said plug, a pair of horizontally positioned contact strips positioned in the inner end of each of the said sockets adapted to be moved into contact with the innermost ends of the said vertically positioned contact strips, a plunger block carrying a crossed pair of pivoted toggle arms positioned in the said socket in operative relation to the said contact strips so that the toggle arms move the contact strips into electrical connection at such times as the plunger block is moved inwardly of the socket by the insertion of the connection plug thereinto.

2. An electrical connection receptacle provided with one or more sockets each of which is adapted to receive a complementary connection plug, each of said sockets provided with a movable plunger block carrying a pair of crossed and pivoted toggle arms adapted to actuate electrical switch means formed at the inner end of the said socket, the said switch means comprising a pair of vertically positioned contact strips positioned on opposite sides of each socket, their uppermost ends adapted to establish electrical connection with the said complementary plug and their lowermost ends positioned adjacent to the outermost ends of a pair of horizontally positioned contact strips, the said contact strips adapted to be moved into electrical connection by the said crossed and pivoted toggle arms when the said plunger block is moved into the said socket.

3. The combination of a receptacle and connection plug, the receptacle having a cruciform shaped socket and the plug being of appropriate shape to fit thereinto, the said cruciform shaped socket provided with a movable member carrying a pair of crossed and pivoted toggle arms adapted to actuate electrical switch means positioned within the said cruciform shaped socket, the said switch means comprising a pair of contact strips positioned on opposite sides of the said cruciform shaped socket their uppermost ends adapted to establish electrical connection with the said complementary plug and their lowermost ends positioned adjacent free ends of a pair of secondary contact strips, the said contact strips adapted to be moved into electrical contact by the said crossed and pivoted toggle arms when the said movable member is moved into the said cruciform shaped socket.

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