June 21, 1960 J. A. MESSING 2,942,224

ELECTRIC RECEPTACLE

Original Filed Oct. 20, 1951

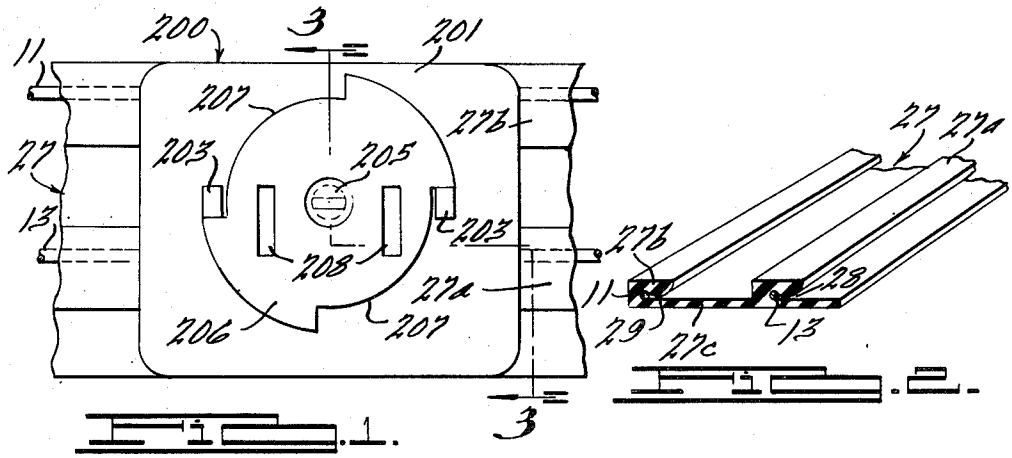


FIG. 1. FIG. 2.

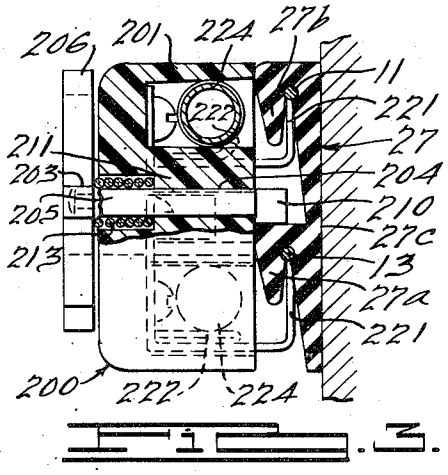


FIG. 3.

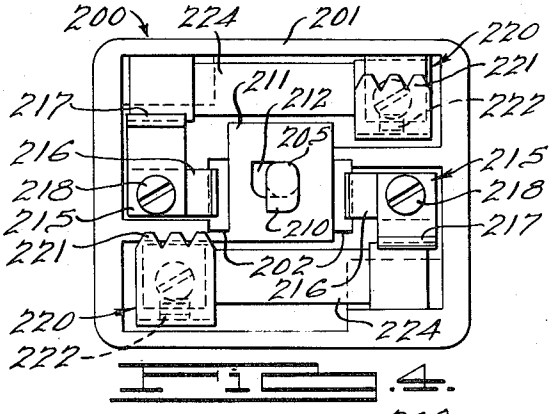


FIG. 4.

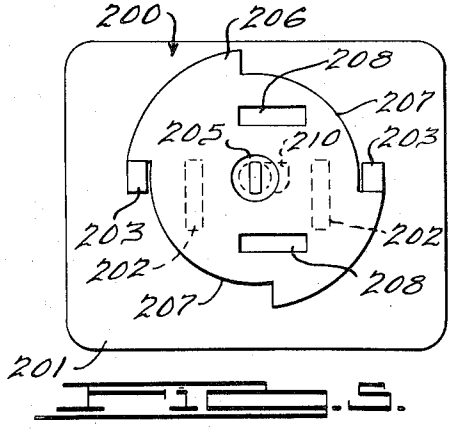


FIG. 5.

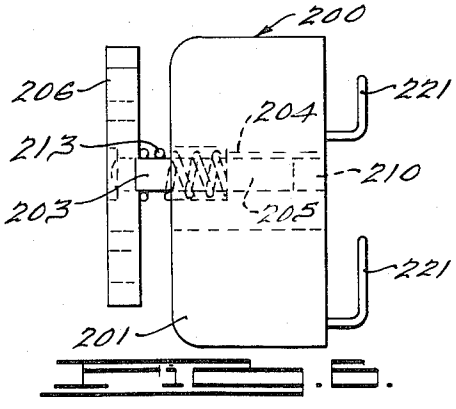


FIG. 6.

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ELECTRIC RECEPTACLE

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Original application Oct. 20, 1951, Ser. No. 252,272. Divided and this application Jan. 13, 1956, Ser. No. 558,883

7 Claims. (Cl. 339—21)

This invention relates to a continuous outlet electric distribution system generally and particularly to an outlet receptacle utilized with such system.

Such a system comprises a flexible duct formed of a dielectric material which contains a pair of concealed conductors, and outlet receptacles and feed-in devices that are readily attachable to the duct at any point along its length. The outlet receptacle used is of the type that contains a plurality of apertures into which conventional pronged connector plugs can be inserted.

This application is a division of the William H. Frank et al. application Serial Number 252,272, which was filed October 20, 1951, assigned to the assignee of this application and now abandoned.

A primary object of the invention is to provide an outlet receptacle for use in a continuous outlet distribution system which is easily and directly connectible thereto at any point along its length without requiring piercing of the conductor insulator covering, or any other type of connection that may require tools or special working.

Another object is to provide a novel type of outlet receptacle that is easily and positively attachable to the continuous outlet conductors, this receptacle being of simplified design and presenting an attractive, functional appearance.

Another object of this invention is to provide an outlet receptacle for attachment to a continuous outlet power distribution duct wherein the connection between the receptacle and the live conductor of the distribution duct is through a fuse element that forms a part of the outlet receptacle.

Another object is to provide a means for establishing the polarity of the outlet receptacle so it can be attached to the conductor duct in only one way to insure proper fusing of the system, etc., on in instances having one wire grounded, the grounded conductor may be uniformly recognized by its relation to the polarizing scheme employed.

Another object is to provide a detachable outlet receptacle for such a distribution system designed so that it is impossible to attach the receptacle to the duct or detach the receptacle from the duct while there are pronged plug connectors (which would indicate a load) attached to the outlet receptacle. This arrangement is such that arcing, if any occurs, will always be between the connector plug prongs and the associated receptacle contact apertures rather than between the receptacle connections to the duct conductors within the distribution system.

A further object of this invention is to provide a snap-on outlet receptacle having positive, direct electrical contact between the receptacle and the duct conductors.

Still other objects and advantages of this invention will be apparent to those skilled in the art after a consideration of the description and drawings wherein:

Fig. 1 is a top plan view of a receptacle, which is an embodiment of the invention, shown engaged with a conductor duct;

Fig. 2 is a perspective view of a conductor duct with which the receptacle is used;

Fig. 3 is a partial cross sectional view on line 3—3 of Fig. 1;

Fig. 4 is a bottom plan view of the receptacle;

Fig. 5 is a top plan view of the receptacle disengaged from a conductor duct;

Fig. 6 is a side elevational view of the receptacle.

Referring to Fig. 1 of the drawings a receptacle 200 is shown which is an embodiment of the invention. Receptacle 200 is adapted to be mounted on the continuous outlet conductor duct 27 shown in perspective in Fig. 2 and in cross section in Fig. 3. Conductor duct 27 is composed of a dielectric material and comprises a body portion 27 and overlying, downwardly extending lip portions 27*a* and 27*b*. Upper lip 27*b* is folded over from the upper edge of body portion 27*c*. Lip 27*a* is spaced inwardly from the lower edge of duct 27 along a line adjacent to the center line of body portion 27*c*. As illustrated in Fig. 3 the lips 27*a*, 27*b* extend in the same direction to form slots 28 and 29 which open from the lower side of duct 27 when the duct 27 is installed in a wall or the like. Partially enclosed by lips 27*b*, 27*a* are metallic conductors 11, 13 which are contacted by the contacts of the receptacle described herein to supply electric current to the receptacle 200 and to electrical apparatus connected thereto. For a further detailed description of the conductor duct reference is made to a co-pending divisional application of the above mentioned application Serial Number 252,272.

Receptacle 200 (Figs. 1, 3, 4, 5, 6) comprises a substantially hollow box-like case 201 of a suitable dielectric material that has a pair of prong receiving apertures 202 (Fig. 5) piercing its top wall. Projecting upwardly from the outer side of the top wall of the receptacle case 201 are a pair of diametrically opposed stops 203. The function of the stops 203 will become evident from the subsequent description. The central portion of the case 201 has a bore 204 extending therethrough that is adapted to journal a rotatable pin shaft 205. Shaft 205 has a knob disc 206 (Figs. 1, 3) fixed to its outer end. The periphery of the disc 206 is formed with a pair of recessed arcuate slots 207 that are arranged to provide for limited rotation of the disc 206 relative to the case stop 203. Knob disc 206 is also pierced by a pair of diametrically opposed prong receiving apertures 208.

From a consideration of Figs. 1 and 5 it will be noted that when the receptacle 200 is mounted on the duct strip 27 the knob disc 206 has been turned to a position to align the prong receiving apertures 208 in the disc 206 with the apertures 202 in the top wall of the case 201. Accordingly the receptacle 200 cannot be attached to the duct strip 27 while the plug-in connector prongs (not shown) are disposed in the receptacle 200. The inner end of the pin shaft 205 carries an elongated cam element 210 that is adapted to be engaged with the lip portion 27*a* of the duct strip 27 to lock the receptacle 200 on the duct 27. The receptacle case 201 has a depending column 211 projecting from the central area of the underside of the case top wall that contains the journal bore 204 for the pin shaft 205 (Fig. 3). The lower end of column 211 (see Fig. 4) has a recess 212 that is adapted to receive the cam element 210 when the knob disc 206 has been turned to the position shown in Fig. 5. A compression spring 213, that encircles the outer end of pin shaft 205, retracts the cam element 210 into its mating recess 212 when the knob disc 206 has been turned to the Fig. 5 position.

Mounted on the underside of the top wall of the case 201 are a pair of spaced apart combination contact elements 215 (Fig. 4). Each combination element 215 in-

cludes a prong receiving socket portion 216 and a fuse support portion 217. Screws 218 can be used to anchor the elements 215 to the underside of the top wall of the case 201. Also mounted on the underside of the top wall of case 201 are a pair of L-shaped spring leg contact elements 220. Contacts 220 are formed with serrated free ends 221 that are adapted to engage the duct conductors 11, 13 when the receptacle 200 is mounted on duct 27. Contacts 200 each include a fuse support portion 222. When a fuse 224 is mounted between a pair of elements 215, 220 the fuse 224 provides the electrical connection between these contact elements and prevents overload damage to the system. Either or both of the conductors 11, 13 can be connected through a fuse 224 when the receptacle 200 is used.

To attach the receptacle 200 to the duct 27 the knob disc 206 is placed in the position shown in Fig. 5 and the cam 210 is then located in the recess 212. Receptacle 200 is then placed adjacent the outer side of the duct strip 27 with the contact lips 221 inserted in the slots beneath the strip lips 27*a* and 27*b*. Knob disc 206 is then pressed inwardly against the pressure exerted by spring 213 to position the pin shaft cam portion 210 on the upper side of the duct lip 27*a* substantially as shown in Fig. 3. Next the knob disc 206 is rotated approximately 90 degrees clockwise so as to position disc 206 as shown in Fig. 1. Rotation of the disc 206 in the clockwise direction causes the cam 210 to work against the lip 27*a* and force the serrated ends of the spring leg contacts 221 into engagement with the duct strip conductors 11, 13. On rotation of the knob disc 206 in a counterclockwise direction to effect release of the receptacle 200 from duct 27, the spring 213 will withdraw the cam 210 into the recess 212 and force the knob disc 206 outwardly away from the top of case 201. It should be noted that the receptacle 200 cannot be detached from the duct strip 27 until after removal of the associated plug-in connector prongs from the prong receiving apertures 202, 208. After removal of the plug-in connector prongs from apertures 202, 208, the knob disc 206 is rotated counter clockwise to the position of Fig. 5. It may then be removed from the duct strip 27.

It will readily be evident that receptacle 200 can be attached to the conductor duct 27 in only one way. In the particular conductor duct illustrated the upper conductor 11 is the "hot" or live conductor and the lower conductor 13 is the "dead" or grounded conductor. Polarization of the receptacle in the system is thus accomplished so as to insure proper fusing and connection throughout the system.

The above specification presents a novel outlet receptacle for use in a continuous duct electrical distribution system. Polarization of the receptacle provides a safe, efficient, and readily usable source of electricity.

For a determination of the scope of the invention reference should be had to the following claims in which I claim:

1. The combination of a continuous outlet electric distribution system and an outlet receptacle removably secured thereto; said distribution system comprising an elongated duct and two parallel spaced conductors imbedded therein; said duct comprising a flat body portion and two spaced lips formed integrally with said body portion and extending parallel to the longitudinal axis of said duct; each of said lips having a first edge directly connected to said body portion and a second edge spaced from said body portion; said lips and said body portion cooperating to form two slots running parallel to the longitudinal axis of the duct; both of said slots being enterable at points intermediate the ends thereof, from the same direction; said outlet receptacle comprising a case having a pair of prong receiving apertures extending through a first surface thereof, a pair of prong receiving contact elements mounted within the case and aligned with the prong receiving apertures, a pair of conductor engaging contacts mounted fixedly within said case with each contact conductively connected with a prong receiving contact element, rotatable means extending through said case including a rotatable operator at one end thereof overlying said first surface; said rotatable means also including a rotatable cam means at the other end thereof; said cam means being positioned between said conductor engaging contacts and positionable to bear against the first surface of the one of said lips which faces the second surface of the other of said lips; said operator being rotatable about a rotational axis of said rotatable means from a first to a second position; rotation of said operator from said first to said second position, when said cam means bears against said first surface of said one of said lips, being effective to move said case in a first direction transverse to the longitudinal axis of said duct whereby said conductor engaging contacts enter said slots and engage said conductors; said conductor engaging contacts and said lips cooperating to prevent movement of said case perpendicular to said body portion, when said operator is in said second position; said cam means bearing against said one lip first edge together with the conductor engaging contact in engagement with the one of said conductors disposed in the slot formed by said other lip cooperating to prevent movement of said case perpendicular to said duct longitudinal axis in a plane parallel to said body portion, also when said operator is in said second position; cooperation between said conductor engaging contacts and the portions of said duct forming said slots preventing rotation of said receptacle about axes extending parallel to the longitudinal axis of said electric distribution system.

2. The combination as set forth in claim 1 in which the case includes another surface having a recess therein constructed and operatively positioned to receive said cam means when said operator is in said first position; biasing means urging said cam means toward said first surface into said recess when said operator is in said first position.

3. The combination as set forth in claim 2 in which the operator when in said first position is movable toward said first surface and when so moved being effective to move said cam means out of said recess; said recess and said cam means being constructed to prevent rotation of said operator from said first position when said cam means is within said recess.

4. The combination as set forth in claim 3 in which the recess and the cam means are further constructed to prevent said cam means from entering said recess unless said operator is in said first position.

5. The combination of a continuous outlet electric distribution system and an outlet receptacle removably secured thereto; said distribution system comprising an elongated duct and two parallel spaced conductors imbedded therein; said duct comprising a flat body portion and two spaced lips formed integrally with said body portion and extending parallel to the longitudinal axis of said duct; each of said lips having a first edge directly connected to said body portion and a second edge spaced from said body portion; said lips and said body portion cooperating to form two slots running parallel to the longitudinal axis of the duct; both of said slots being enterable at points intermediate the ends thereof from the same direction; said outlet receptacle comprising a case having a pair of prong receiving apertures extending through a first surface thereof, a pair of prong receiving contact elements mounted within the case and aligned with the prong receiving apertures, a pair of conductor engaging contacts mounted fixedly within said case with each contact conductively connected with a prong receiving contact element, rotatable means extending through said case including a rotatable operator at one end thereof overlying said first surface; said rotatable means also including a rotatable cam means at the other end thereof; said cam means being positioned be-

tween said conductor engaging contacts and positionable to bear against the first surface of the one of said lips which faces the second surface of the other of said lips; said operator being rotatable about a rotational axis of said rotatable means from a first to a second position; rotation of said operator from said first to said second position, when said cam means bears against said first surface of said one of said lips, being effective to move said case in a first direction transverse to the longitudinal axis of said duct whereby said conductor engaging contacts enter said slots and engage said conductors; said conductor engaging contacts and said lips cooperating to prevent movement of said case perpendicular to said body portion, when said operator is in said second position; said cam means bearing against said one lip first edge together with the conductor engaging contact in engagement with the one of said conductors disposed in the slot formed by said other lip cooperating to prevent movement of said case perpendicular to said duct longitudinal axis in a plane parallel to said body portion, also when said operator is in said second position; cooperation between said conductor engaging contacts and the portions of said duct forming said slots preventing rotation of said receptacle about axes extending parallel to the longitudinal axis of said electric distribution system; said operator having a pair of prong receiving apertures aligned with the case prong receiving apertures when said operator is in said second position; said operator having portions operatively positioned to block entry of plug cap prongs into said case prong receiving apertures when said operator is in said first position.

6. An outlet receptacle securable to and removable from a continuous outlet electric distribution system at any point along the length thereof; said receptacle being comprised of a case having a pair of prong receiving apertures extending through a first surface thereof, a pair of

prong receiving contact elements mounted within said case and aligned with the prong receiving apertures a pair of conductor engaging contacts fixedly mounted to said case; a first end of each of said conductor engaging contacts being conductively connected to one of said prong receiving contact elements; said conductor engaging contacts having second end portions thereof extending beyond the confines of said case and facing in the same direction; rotatable means extending through said case; a first end of said rotatable means being positioned in the region of said first surface and a second end of said rotatable means including a rotatable cam means; said cam means being positioned between said conductor engaging contacts; said cam means being operatively positioned to bear against a formation of a distribution system and when thereafter rotated said cam means cooperating with the distribution system formation to move said conductor engaging second end portions into engagement with the distribution system conductors without the cam means contacting the conductor engaging contacts.

7. The receptacle as set forth in claim 6 in which the conductor engaging contacts second end portions are positioned in a single plane; each of said second end portions having a serrated edge.

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