April 29, 1941. E. J. MORIN 2,240,098

ELECTRIC OUTLET

Filed Feb. 8, 1940

Fig. 1.

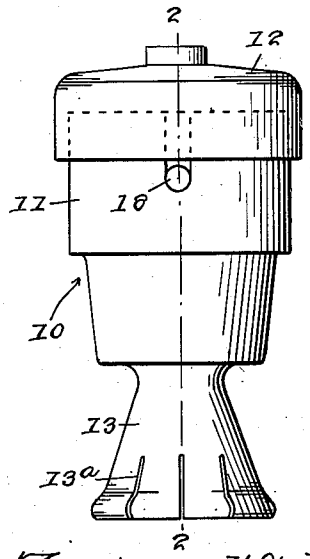


Fig. 2.

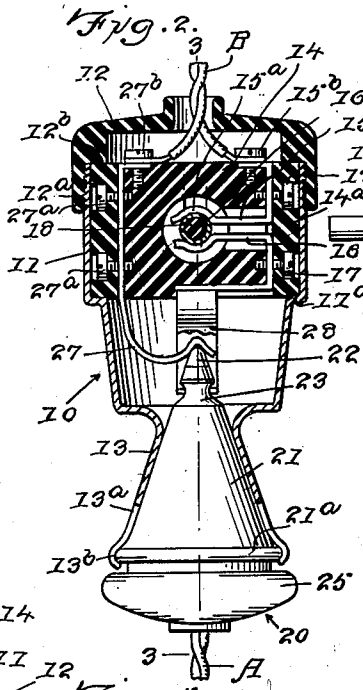


Fig. 3.

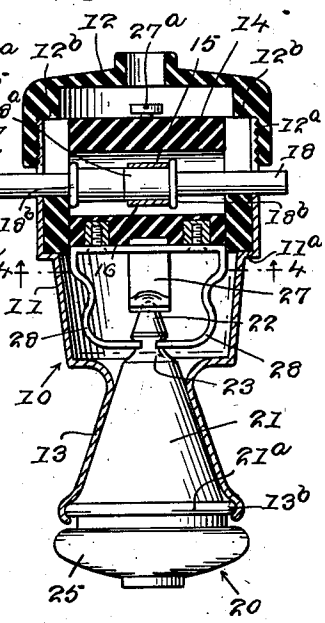


Fig. 4.

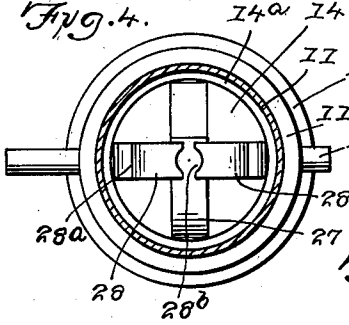


Fig. 5.

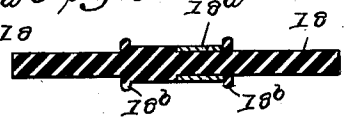


Fig. 9.

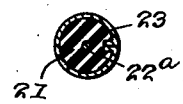


Fig. 8.

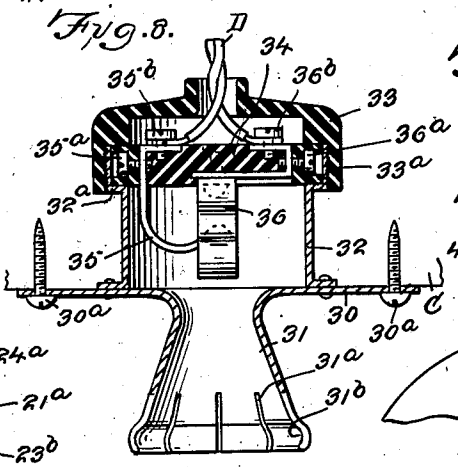


Fig. 7.

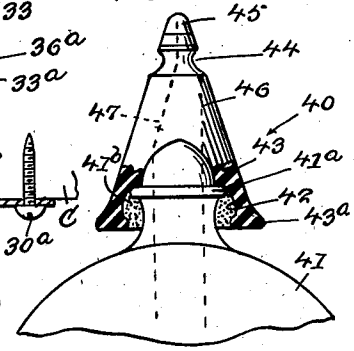
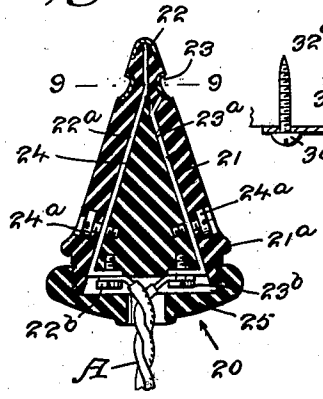


Fig. 6.



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ELECTRIC OUTLET

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Application February 8, 1940, Serial No. 317,982

5 Claims. (Cl. 200—51)

This invention relates to improvements in connector units and especially is concerned with a novel type of electrical socket and plug for use in combination with the socket which permits effective and facile connection and disconnection of electrical cables, one with another.

It is an object of this invention to provide a simple but effective electrical connector unit comprising a plug and socket which possess the inherent characteristics of being radially interengaged whereby the socket and plug are especially well suited to use in outdoor connection of cables under conditions such that lighting is not adequate to assure correct interengagement of certain types of cable connectors now commonly in use.

Another object of this invention is to provide a simple but nevertheless rugged construction for cable connector units which, while satisfying the requirements of such units as resist ready engagement and disengagement of the elements, also satisfy the industrial want for a unit of this type which can be manufactured under conditions of mass production by simple stamping and molding operations.

An important advantage of the novel connector unit according to this invention over other types of connectors in use at this time is that engagement of the connector plug and socket is in the first instance effectuated merely by pressing the parts together whereas in connectors of the second class referred to above interengagement frequently is effectuated by screwing the parts together or by aligning a plurality of tines with corresponding openings. It of course will be obvious to those skilled in this art that a simple mode of interconnection of the connector elements provided by this invention promotes quick connection and disconnection as occasion may demand.

A feature of the novel connector unit according to this invention is that the metallic shield thereof can not, except by demolition of the internal structure of the socket, become connected or shortcircuited with either of the connector terminals with the result that possibility of shock to the person using the connector is in this instance substantially minimized.

Other objects, advantages and features of the new and improved electric outlet according to the present invention will be apparent to those skilled in this art during the course of the following description.

Regarded in certain of its broader aspects the novel connector unit according to this invention comprises in combination a conical plug and a receptacle therefor, the plug being provided near its base with a rib engaging with intrinsically resilient portions of the cup whereby the plug when positioned within the cup is firmly but removably held, plug terminals near the apex of the conical plug but axially with respect each to the other engaging with yielding arms mounted within the cup, and a supporting plug within the cup carrying said arms whereby the same are rigidly held in preselected relationship.

In order to faciliate a fuller and more complete understanding of the present invention a specific embodiment thereof herein illustrated will be hereinafter described, it being clearly understood, however, that the illustrated embodiment, although presently preferred, is provided solely by way of example of the practice of this invention and not by way of limitation thereof except insofar as the invention is recited in the subjoined claims.

Referring then to the drawing,

Figure 1 is substantially a side elevational view of a socket embodying the present invention,

Fig. 2 is essentially a vertical sectional view of Fig. 1 taken along the line 2—2 thereof but with a plug shown in position within the socket,

Fig. 3 is a vertical sectional view of the socket taken along the line 3—3 of Fig. 2 showing the plug in position,

Fig. 4 is essentially a horizontal sectional view of Fig. 3 taken along the line 4—4 thereof,

Fig. 5 is a longitudinal sectional view of a portion of the switch mechanism illustrated in the foregoing figures,

Fig. 6 is substantially a vertical sectional view of the plug illustrating the interior structure thereof,

Fig 7 is a side elevational view with parts broken away for clearness of illustration of a plug for use in conjunction with a lamp attached thereto,

Fig. 8 illustrates in vertical sectional view a socket attached to wall mountings, and

Fig. 9 is a horizontal sectional view of Fig. 6 taken along the line 9—9.

Referring now particularly to Figs. 1 to 6 inclusive and Fig. 9, it will be noted that the novel socket according to the present invention generally designated by the reference character 10 comprises an essentially cylindrical shell 11 closed at the top by a cap 12 attached thereto by threading 12a and opening at the bottom to present a conical cup 13 split near marginal portions

thereof as indicated by the reference character 13a and internally grooved near the base of the cup as indicated by the reference character 13b. The shell preferably is formed from material by stamping operations but it is preferred that the cap be formed from electrical insulative material although, of course, metal can be used if conditions warrant. Shoulders 11a formed in side portions of the shell 11 receive a tubular plug 14 of insulative material which is positioned with its axis extending transversely across the interior of the shell. The tubular member is rigidly held within the shell by reason of abutment of shoulders 12b against the top of the member when the cap 12 is positioned upon the shell. A pair of spaced electrically isolated tines 15 and 16 formed of electrically conductive material are mounted upon side portions of the tubular member 14 and extend within the interior thereof to present opposed grooved end portions 15a and 16a respectively.

The tines are held in position by means of an annular body of insulative material 14a which serves to press the bent end portions of the tines against the side of the member, being assisted in this respect by screws 17. A rod 18 formed of electrically insulative material is freely slidingly mounted in slots formed in side portions of the shell and extends within the tubular member 14 along the axis thereof in a manner such that it is positioned between the tines 15 and 16 hereinabove described. While the rod is formed of electrically insulative material and hence would not complete an electrical circuit between the tines, an annulus of electrically conductive material 18a is rigidly mounted upon the rod in a manner such that during a portion of the sliding motion of the rod, which is limited by the stops 18b, the electrically conductive annulus is positioned between the tines, thereby establishing an electrical circuit therewith.

The plug generally designated by the reference character 20 comprises a conical portion 21 formed of electrically insulative material having a rounded first terminal 22 on the apex thereof substantially as shown and beneath said first terminal a second terminal spaced along the axis of the cone and comprising a peripherally grooved annulus having its edges flush with the cone surface. The terminals 22 and 23 are attached to lead lines 22a and 23a respectively which extend within the body of the conical member 21 being held in position by a plug 24 held in place by screws 24a whereby the parts of the assembly are rigidly held in the illustrated relation. The end portions of the connectors 22a and 23a respectively are bent and pierced to receive screws 22b and 23b respectively for facilitating connection of the cable A to the terminals. A cable 25 is provided on the base of the plug to complete the assembly and it is to be noted that the edges of the cable are spaced with respect to the radially projecting annular rib 21a formed on the base of the cone whereby, when the socket and plug are interengaged, the rib 21a is received within the internal groove 13b formed in marginal portions of the cup 13 hereinabove described, thereby permitting the parts to be held in the desired relationship while not inhibiting disengagement of the plug from the socket. The marginal portions of the conical cup in effect are elastic and, accordingly, yield when the plug is forced into the socket thereby permitting interengagement as mentioned above.

A yielding electrically conductively intrinsically resilient first arm 27 mounted on the tubular member 14 by means including screws 27a passing through the annulus 14a and received in parts of the member 14 extends downwardly from the member and across the axis of the shell 11 in a locality such that when the plug 20 is within the cup 13, as above described, the free end of the arm 27 engages and makes electrical contact with the first terminal 22 of the plug. The opposite end of the arm 27 is bent and pierced to receive the screws 27b for facilitating connection of one of the wires of the cable B thereto substantially as shown in Fig. 2. A pair of second arms 28 also mounted upon parts of the tubular member 14 are electrically connected to the tines 16 and the arms which are formed of intrinsically resilient material are bent substantially as shown in Fig. 3 whereby the end portions thereof are disposed in opposite relationship in a locality such as to engage with the second terminal 23 of the plug 20 when the last mentioned is positioned within the cup 13 as above described. The end portions of the arms 28 are cut away as designated by the reference character 28b in Fig. 4 of the drawing to facilitate the making of good electrical contact between the arms and the plug terminal. It also will be observed that inasmuch as the arms are intrinsically resilient, they will serve by engagement with the terminal to facilitate holding the plugs within the socket. The tine 15 is bent at its free end and pierced to receive a screw 15b for facilitating connection to the tine of one of the wires of the cable B substantially as shown.

From the foregoing description it will be obvious to those skilled in this art that when the sliding rod 18 is positioned as illustrated in Fig. 3, that is to say, with the electrically conductive annulus 18a in contact with the tines 15 and 16, an electrical circuit is completed between the wires of the cable B and through the terminals of the plug 20, the cable A. When the rod 18 is slidingly moved to interpose a portion of its electrically insulative mass between the tines 15 and 16, the circuit is of course interrupted since current can not flow from the tine 15 through the tine 16 to the terminal 23 of the plug.

In Fig. 7 of the drawing a modified form of plug is illustrated connected to a conventional light bulb a portion of which is broken away in the illustration. The assembly generally designated by the reference character 40 comprises, it will be noted, a bulb 41 having a flanged edge portion 41a received within an opening 42 formed in the bottom of the conical plug 43. The bulb is held in position with respect to the plug by suitable sealing means 41b which can comprise sealing wax or the like. The base of the plug 43 is provided with a radially projecting annular rib 43a corresponding to the rib 21a of the first described embodiment of the invention and terminals 44 and 45 are provided near the apex of the plug similar to the terminals hereinabove described. Lead wires 46 and 47 serve to connect the terminals with the bulb in a manner which will be familiar to those skilled in this art. This bulb and plug assembly desirably is used in conjunction with a wall type socket such as the socket illustrated in Fig. 8 which now will be described.

The socket illustrated in Fig. 8 comprises a first plate 30 attached to the wall C by appropriate fastening means such as the signals 30a and having integrally formed therewith a conical socket 31 marginal split as designated by the

reference character 31a and turned in at its edges to present an internal groove 31b. The socket is formed of intrinsically resilient material and accordingly the edge portions thereof are in effect elastic. A substantially cylindrical shell 32 fastened to the first plate 30 is expanded near the distal end thereof to provide shoulders 32a and the edge portions of the shell are threaded to engage with the internally threaded portions 33a of the cap 33. A plug of electrically insulated material 34 rigidly held upon the shoulders 32a of the shell 32 by abutment of parts of the cap 33 thereagainst carries a first arm 35 formed of electrically conductive intrinsically resilient material corresponding to the arm 27 in the first described embodiment of this invention. The arm 35 is held in position upon the plug 34 by appropriate mounting means such as the screw 35a and the end of the arm is pierced to receive a screw 35b for facilitating connection of one of the wires of the cable D to the arm. A pair of second arms 36 mounted upon the plug 34 by means of a screw 36a and provided with appropriate means such as the screw 36b for facilitating connection of one of the wires with the cable D thereto serve to engage with the second terminal of the plug positioned within the socket 31 and in this respect correspond to the arms 28 in the first described embodiment of this invention. The mode of engaging and disengaging the plug with the wall type socket illustrated in Fig. 8 is substantially the same as that described in connection with the embodiment of the invention illustrated in the first six figures of the drawing.

It is to be understood that this invention is capable of extended application and is not confined to the precise illustrated forms nor described construction and, therefore, such changes and modifications may be made therein as do not affect the spirit of the invention nor exceed the scope of the appended claims.

Having described the present invention, what it is desired to secure by Letters Patent is:

1. An electric connector unit comprising a hollow essentially cylindrical shell closed at one end and at the opposite end open and flared downwardly to present a conical cup, marginally internally grooved, split and formed of intrinsically resilient material imparting an elastic character to the cup edges; a transversely tubular member rigidly held within the shell; a switch comprising a pair of spaced electrically isolated tines formed of electrically conductive material mounted upon said member extending transversely across the interior thereof, and a rod of electrically insulative material having a transversely extending locality of electrically conductive material, freely slidingly mounted in openings formed in the shell and positioned axially within said tubular member in a manner such that the electrically conductive portion of said rod can be slidingly moved into position between said tines establishing an electrical circuit therebetween; a conical plug receivable within said cup, having a radially projecting annular rib formed near the base thereof engageable with the grooved elastic edges of the cup whereby the plug can be held in position therein; terminals on said plug; and means for connecting said plug terminals and said switch.

2. An electric connector unit comprising a hollow essentially cylindrical shell closed at one end and at the opposite end open and flared downwardly to present a conical cup, marginally internally grooved split and formed of intrinsically resilient material imparting an elastic character to the cup edges; a transversely extending insulative member rigidly held within the shell; a switch on said member; a conical plug formed of electrically insulative material receivable within said cup, having a radially projecting annular rib formed near the base thereof engageable with the grooved elastic edges of the cup whereby the plug can be held in position therein; a first terminal formed of electrically conductive material on the apex of the conical plug and a second terminal comprising a peripherally grooved annulus on said plug spaced along the cone axis with respect to the first terminal; and means for connecting said plug terminals and said switch, comprising a yielding electrically conductive intrinsically resilient first arm mounted on said insulative member and pressing against said first terminal when the plug is positioned within the cup, a pair of second arms electrically connected to one pole of said switch, each mounted at one end on said insulative member and bent at the opposite end toward the other arm, the opposed free ends of said arms being cut away to receive and engage with the said second terminal when the plug is positioned within the cup.

3. An electric connector unit comprising a hollow essentially cylindrical shell closed at one end and at the opposite end open and flared downwardly to present a conical cup, marginally internally grooved, split and formed of intrinsically resilient material imparting an elastic character to the cup edges; a transversely extending insulative tubular member rigidly held within the shell; a switch comprising a pair of spaced electrically isolated tines formed of electrically conductive material mounted on said member extending transversely across the interior thereof, and a rod of electrically insulative material having a transversely extending locality of electrically conductive material, freely slidingly mounted in openings formed in the shell and positioned axially within said tubular member in a manner such that the electrically conductive portion of said rod can be slidingly moved into position between said tines establishing electrical circuit therebetween; stops on said rod for limiting the sliding motion thereof; a conical plug formed of electrically insulative material receivable within the said cup, having a radially projecting annular rib formed near the base thereof engageable with the grooved elastic edges of the cup whereby the plug can be held in position therein; a first terminal formed of electrically conductive material on the apex of the conical plug and a second terminal comprising a peripherally grooved annulus on said plug spaced along the cone axis with respect to the first terminal; means for connecting said plug terminals and said switch comprising a yielding electrically conductive intrinsically resilient first arm mounted on said tubular member and pressing against said first terminal when the plug is positioned within the cup, a pair of second arms electrically connected to a first of said tines, each mounted at one end on said tubular member and bent at the opposite end toward the other arm, the opposed free ends of said arms being cut away to receive and engage with said second terminal when the plug is positioned within the cup; and means for facilitating connection of wires to said first and second terminals of the plug and to said first arm and the second of said tines.

4. An electric connector unit, comprising a hol-

low essentially cylindrical shell closed at one end and open at the opposite end and flared downwardly to present a conical cup, marginally internally grooved, split and formed of resilient material imparting an elastic character to the cup edges, a transversely tubular member rigidly held within the shell, a switch comprising a pair of spaced electrically isolated tines formed of electrically conductive material mounted upon said member extending transversely across the interior thereof, and a rod of electrically insulative material having a transversely extending locality of electrically conductive material, freely slidingly mounted in openings formed in the shell and positioned axially within said tubular member in a manner such that the electrically conductive portion of said rod can be slidingly moved into position between said tines establishing an electrical circuit therebetween, a conical plug receivable within said cup and held by the elastic cup edges, and means for connecting said plug terminals and said switch.

5. An electric connector unit, comprising a shell closed at one end and the opposite end flared downwardly to receive a conical plug, a contact arm having a looped portion extending over the center of the open flared end of the shell, two oppositely arranged contact arms within the shell and having inwardly turned ends below the first mentioned contact arm, a conical plug within said flared opening and formed of insulating material, an electrical contact carried by the apex of the plug and adapted to contact the looped portion of the first contact arm, said plug having a peripheral groove below the apex and a circumferentially arranged plate within the groove and forming an annular groove to receive the inwardly turned ends of the oppositely arranged contact arms, an electric terminal passing through the plug and connected to the plate within the groove.

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