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G. B. BENANDER

2,253,164

ELECTRICAL CONNECTOR

Filed Feb. 1, 1939

Fig. 1.

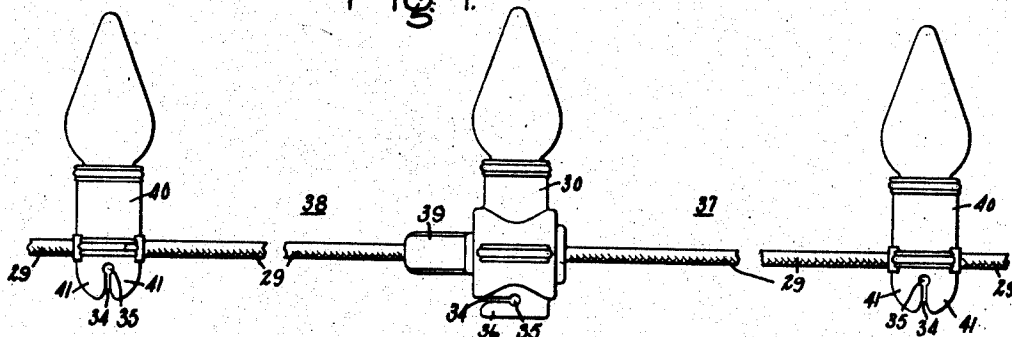


Fig. 2.

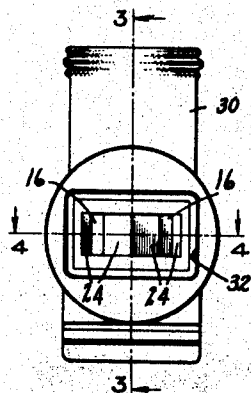


Fig. 3.

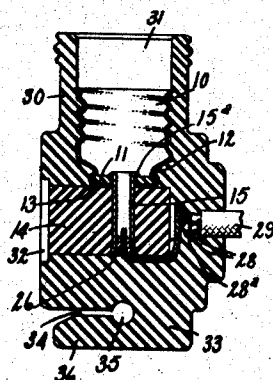


Fig. 4.

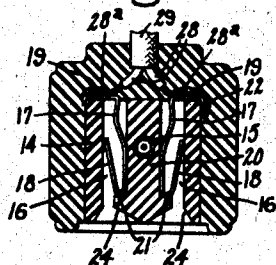


Fig. 5.

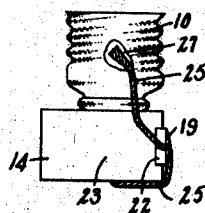
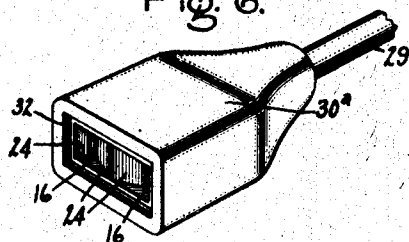


Fig. 6.



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UNITED STATES PATENT OFFICE

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ELECTRICAL CONNECTOR

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3 Claims. (Cl. 173—334)

The present invention relates to electrical connectors and more particularly to a combined socket and receptacle. The connector of the present invention is well adapted for use in decorative lamp sets.

It is an object of this invention to provide an improved electrical connector of weatherproof construction.

It is another object of this invention to provide an improved socket and receptacle which is durable and convenient in use and which, at the same time, is simple and economical to manufacture.

Further objects and advantages of the invention will become apparent as the following description proceeds, reference being had to the accompanying drawing, in which Fig. 1 is an elevational view of decorative lamp sets illustrating an application of the present invention; Fig. 2 is an elevational view of a combined socket and receptacle embodying the present invention; Fig. 3 is an elevational view in section taken along the line 3—3 of Fig. 2; Fig. 4 is a sectional view along the line 4—4 of Fig. 2; Fig. 5 is an elevational view of a socket and receptacle assembly with the outer casing removed, and Fig. 6 is a perspective view of an attachment plug receptacle.

Referring to the drawing a sheet metal terminal shell 10 for the reception of a screw base lamp is closed at one end by an insulating washer or disk 11. The washer is positioned between an inwardly extending shoulder 12 and a flange 13 both of which are formed as an integral part of the shell terminal 10. A receptacle body 14 of substantially rectangular shape is preferably formed of a comparatively rigid insulating material such as a phenolic condensation product. The shell terminal is secured to one side of the receptacle body by a hollow rivet 15 extending through suitable openings formed in the insulating washer and receptacle body. The rivet is flanged over against the upper face of the insulating washer and the lower face of the receptacle body to hold them securely in assembled relation. The end of the rivet flanged over the upper face of the washer forms a central contact 15a for the socket.

Extending longitudinally of the receptacle body are the spaced parallel passages 16 for the reception of conducting strips 17 which form the contact and terminal structure of the receptacle. Each strip is of identical construction and preferably comprises a sheet metal stamping of good conducting material. A resilient contact clip 18

is formed by bending one end of the strip back upon itself to form a substantially U-shaped structure. The other end of the strip is bent laterally to form a terminal 19 which extends at right angles to the central portion of the strip. As illustrated in Fig. 4 the passages 16 are separated by a longitudinally extending barrier 20 having laterally projecting shoulders 21 formed thereon near one end of the receptacle body. One of the conducting strips is mounted edge-wise in each passage 16 with the base of the U-shaped contact clip abutting the shoulder 21. The strip preferably has frictional engagement with the walls of the passage to hold it positioned therein until an outer casing is applied. The terminal portion of the strip extends across the end of the receptacle body and is provided with an upstanding flange 22 which engages the outer surface of a side wall 23 of the receptacle body to hold the contact end of the conducting strip in engagement with the shoulder 21. At the contact end of the receptacle body the barrier 20 and the ends of the side walls 23 are provided with sloping walls 24 to facilitate the entrance of the contact prongs of an attachment plug cap.

The terminals of the receptacle are connected to the terminals of the socket by suitable stranded conductors 25. One of the conductors 25 is soldered to the lower end of the hollow rivet 15 as shown at 26 and at its other end to one of the terminals 19. Another conductor 25 is soldered at one end to the shell terminal 10 of the lamp socket as shown at 27 and at its other end to the other terminal 19 of the receptacle. The bared ends 28a of the insulated conductors 28 of a cord 29 are secured to the terminals 19 in any suitable manner as by soldering.

The construction thus far described provides a combined socket and receptacle requiring a minimum number of parts which are assembled into a unitary and self-supporting structure prior to the application of an outer casing. This feature is of particular advantage where a molded casing is applied over the socket and receptacle since the molding operation is materially simplified. In the drawing I have shown a casing 30 of rubber or a rubber compound molded directly on the receptacle body 14, the socket 10 and the conductors attached thereto. The cord 29 may to advantage be rubber covered so that a strong bond between the cord and casing results from the molding operation. The casing is provided with a circular opening 31 at one end communicating with the open end of the terminal shell 10 to permit the insertion of a lamp base and with

an opening 32 of generally rectangular shape communicating with the contact end of the receptacle body 14 to permit the insertion of the contact prongs of an attachment plug cap. The weatherproof socket and receptacle provided by this construction is well adapted for outdoor use.

It is apparent that the receptacle construction described above in connection with the combined socket and receptacle is capable of separate use. In Fig. 6 I have shown the receptacle body 14 provided with a suitable molding casing 30a to form an attachment plug receptacle of the type used on electric cord sets. The structure of the receptacle body and contacts are the same as that previously described in connection with Figs. 2 to 5. It will of course be understood that the rivet 15 and the conductors 25 are omitted when the receptacle body is used apart from the socket to form an attachment plug receptacle. With this construction the contact and terminal structure are mounted within the receptacle body and temporarily held there by frictional engagement therewith so that no difficulty is experienced in positioning the contacts during the molding operation.

In the arrangement illustrated means forming a part of the resilient casing are provided for attaching the connector to a support. The end of the casing 33 opposite the terminal shell 10 is provided with a slot 34 communicating with a transversely extending opening 35. A resilient arm 36 is separated from the end of the casing by the slot 34. The opening 35 is preferably made circular in cross-section, thus adapting the socket for mounting on a cylindrical support such as a Christmas tree limb. In mounting the socket it is only necessary to force the limb or support through the slot 34 and into the opening 35. The slot 34 is preferably narrower than the opening 35 so that the resilient arm prevents the socket from being accidentally removed from the support. As shown in Fig. 3 the cord 29 and insulated conductors 28 are preferably brought straight out from the end of the receptacle body at substantially right angles to the axis of the terminal shell. This arrangement leaves the end 33 of the casing free from any obstruction and permits the socket to be mounted without interfering with the circuit wires. The mounting arrangement described in the above paragraph is described and claimed in my copending application, Serial No. 373,978, filed January 10, 1941, and assigned to the same assignee as the present invention.

In Fig. 1 I have shown a combined socket and receptacle embodying the present invention as the end outlet of a decorative lamp set 37. Another lamp set 38 is shown connected thereto by an attachment plug cap 39. On each of the lamp sets is shown a lamp socket having a molded casing 40 of substantially the same construction as that described in connection with the combined socket and receptacle. The lower end of each lamp socket is also provided with a slot 34 and a circular opening 35 to provide means for attaching the socket to a support. As illustrated in connection with the lamp sockets the slot 34 may extend axially of the casing. In this construction the support is held in the opening 35 by a pair of opposed resilient arms 41 which define the slot 34.

The present invention provides an improved receptacle structure and a novel manner of securing a socket thereto to form a combined socket and receptacle. The construction requires

relatively few parts of simple design which may be assembled into a single unit prior to molding a casing thereabout to form a weatherproof construction. It is apparent that the assembly and molding operations involved in the present construction are very simple and may be carried out at low cost.

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

1. A socket and receptacle comprising a terminal shell having a base, an insulating plate secured to one end of said shell, a receptacle body of rigid insulating material having spaced passages therein for reception of the contacts of an attachment plug, contacts of conducting material positioned in said passages, fastening means extending through said plate and said receptacle body to secure the base of said terminal shell to one side of said body, a conductor interconnecting said fastening means and one of said receptacle contacts, and a casing of resilient insulating material enclosing said terminal shell and said receptacle body, said casing having an opening formed in one end communicating with said terminal shell and an opening in one side communicating with one end of said receptacle body.

2. A lamp socket and receptacle comprising a terminal shell, an insulating disk positioned in one end of said shell and engaging a portion thereof, a receptacle body of insulating material having spaced passages formed therein and extending from one end thereof, conducting strips positioned in said passages, fastening means extending through said insulating disk and said body of insulating material to secure said terminal shell to one side of said receptacle body, one end of said fastening means forming a central terminal of said socket and a casing of insulating material molded directly on said receptacle body and said shell, said casing having an opening formed in one end communicating with said shell and an opening in one side communicating with one end of said receptacle body.

3. A lamp socket and receptacle comprising a terminal shell, an insulating washer positioned in one end of said shell and engaging a portion thereof, a substantially rectangular receptacle body of rigid insulating material having spaced passages formed therein and extending there-through in a direction parallel to the longitudinal axis of said body, conducting strips positioned in said passages, each of said strips having a contact portion positioned near one end of said body and a terminal portion near the other end of said body, fastening means of conducting material extending through said insulating washer and said body of insulating material in a direction perpendicular to the longitudinal axis of said body to secure said terminal shell to one side of said receptacle body, one end of said fastening means forming the central terminal of said socket, a conductor connecting the other end of said fastening means with the terminal portion of one of said conducting strips, another conductor connecting said terminal shell with the terminal portion of the other of said conducting strips, and a casing of insulating material molded directly on said receptacle body, said terminal shell and said conductors, said casing having an opening formed in one end communicating with said shell and an opening formed in one side communicating with the contact end of said receptacle body.

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