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LOCKING ELECTRICAL CAP AND CONNECTOR

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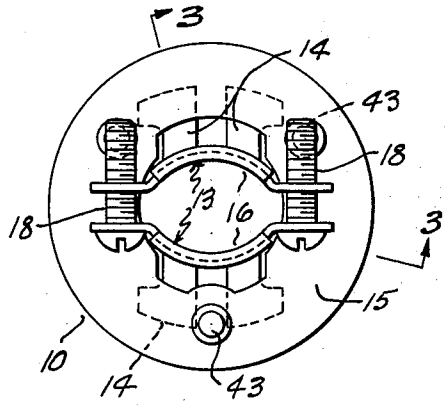


Fig. 2.

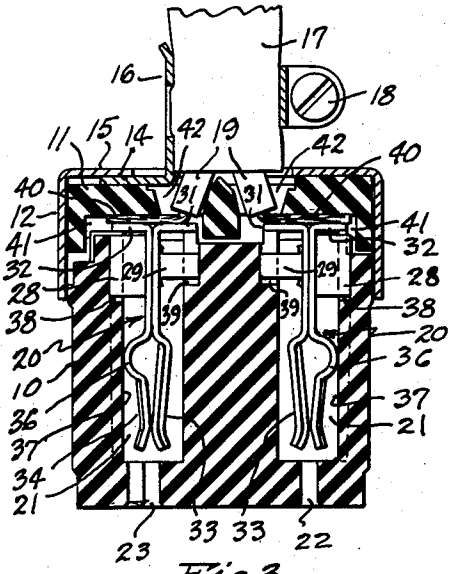


Fig. 3.

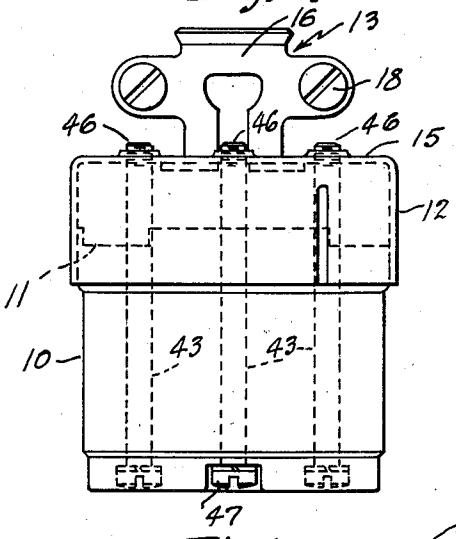


Fig. 1.

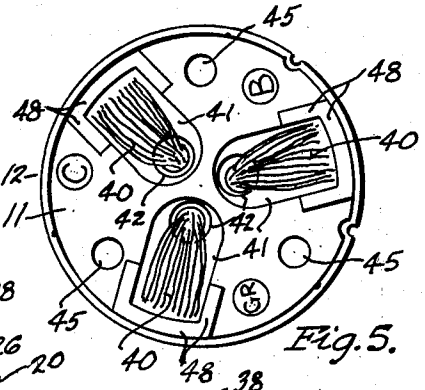
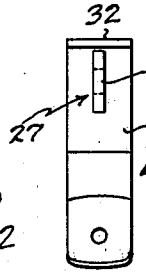


Fig. 5.



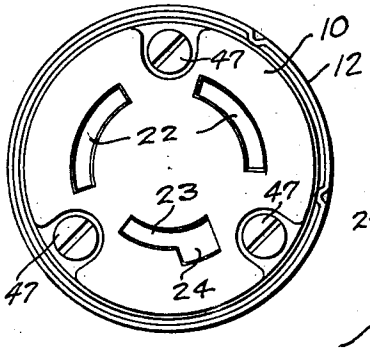


Fig. 4.

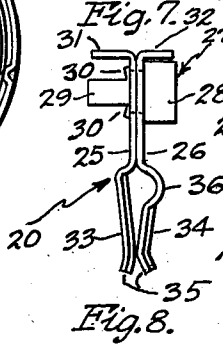


Fig. 8.

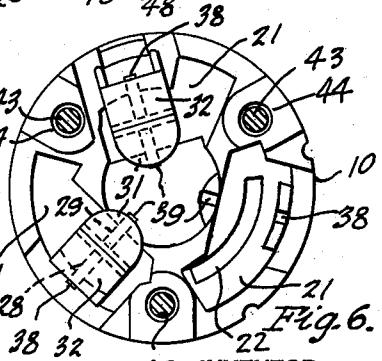


Fig. 6.

INVENTOR

Benjamin C. Webster

BY

Wooster & Davis

ATTORNEYS.

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LOCKING ELECTRICAL CAP AND CONNECTOR

Benjamin C. Webster, Southport, Conn., assignor to Harvey Hubbell, Incorporated, Bridgeport, Conn., a corporation of Connecticut

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6 Claims. (Cl. 339—193)

This invention relates to electrical connectors adapted for use with attachment plug caps to provide means for supplying electrical current to electrical attachments or other electrically operated devices, and has for an object to provide a simple and improved construction for this type of device, including an improved construction for the receptacle contacts with improved means for locating and retaining them in their proper positions in the insulating body member, and also provide improved means for connecting the lead wires to the contacts without requiring the use of binding post screws and similar attaching means.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In this drawing:

Fig. 1 is a side view of a connector embodying this invention;

Fig. 2 is a top plan or end view thereof;

Fig. 3 is a longitudinal section substantially on line 3—3 of Fig. 2;

Fig. 4 is an end view looking toward the bottom of Fig. 1;

Fig. 5 is a view looking toward the under side of the upper end member of the connector with the body member removed;

Fig. 6 is an end view looking toward the top end of the body member with the end member and one of the contacts removed;

Fig. 7 is a side view of the improved contact, and

Fig. 8 is an edge view thereof.

As previously indicated, this connector is adapted for use with any suitable or ordinary type of attachment plug cap (not shown) for supplying electrical current to various electrical attachments or electrically operated devices, this connector comprising a body member **10** of suitable molded insulating material and an end member **11** also of insulating material connected to one end of the body member. The end member or cap **11** may be enclosed in a metal cup-shaped casing or shell **12** the side walls of which are preferably long enough to telescope with the adjacent end portion of the body member **10**, as shown in Fig. 3, to enclose the dividing line between the body and end members and also retain the two members in proper alignment. This shell also provides means for securing cord clamps or strain relief members **13** to the end member, which cord clamps can be of any suitable type, preferably angularly shaped members having laterally extending feet **14** slidable radially between the end wall **15** of the shell and the end of the end member **11**, and having curved clamping portions **16** adapted to be clamped on opposite sides of an insulated electrical cable or cord **17** by any suitable means such as the screws **18**, which cord includes suitable insulated conductor wires **19**

for connection to the receptable contacts **20** in the connector.

The body member **10** is preferably molded of any suitable insulating material such, for example, as "Bakelite" or other suitable plastic material, and is provided with longitudinally extending sockets **21** opening through the inner end of this body member, which is the upper end as seen in Fig. 3, and therefore these sockets extend inwardly from this end longitudinally of this body member, the contacts being insertable into these sockets from this end of the body member. At its opposite end wall the body member is provided with entrance openings **22** and **23** for entrance of the attachment plug cap contacts for engagement with the receptacle contacts **20**, these openings leading from the outer end of the body member to the sockets in alignment with the contacts **20**. In the form shown they are elongated curved slots to receive similarly shaped contact blades of the cap, and one of them, as the slot **23**, has an offset portion **24** to receive a similar offset on the cap contact, which will permit insertion of the cap blades in one position only for polarizing purposes, and the receptacle contact behind this slot may be a grounding contact.

The receptacle contacts **20** in the sockets in the body member are of an improved construction comprising two side members **25** and **26** arranged side by side and secured together in this side-by-side relation by a transverse rivet **27**. This rivet is preferably a flat rivet extending through an elongated slot in the members **25** and **26** with an elongated substantially flat head **28** on one side and a substantially flat shank **29** projecting from the other side, with the sides of the shank riveted over at **30** to secure the contact members together with the plane of the rivet extending longitudinally of the contacts. The opposite end portions **28** and **29**, therefore, provide substantially flat end portions extending laterally from the opposite sides of the contact members **25** and **26** for an additional purpose presently to be described. At their upper ends the side members **25** and **26** are provided with oppositely extending substantially flat end portions or flanges **31** and **32**, and below the connecting rivet the free end portions **33** and **34** are shaped to provide opposite spring contact fingers to receive between them the cap contact inserted through the slots **22** or **23** to form an electrical connection therewith. Their free ends may be inclined outwardly, as indicated at **35**, to facilitate entrance of the cap contacts, and the outer member **26** is preferably bowed outwardly at **36** to engage the outer side wall **37** of its socket, as shown in Fig. 3, to prevent this member being shifted outwardly out of position by the cap contacts, although its free end portion below this offset is free to be forced outwardly against its resilient action by the cap contact about the point of contact of this offset with the wall **27** as a pivot. The inner member **33** is free to shift inwardly under its resilient action as the cap contact is inserted between them.

The substantially flat end portions **28** and **29** of the connecting rivet provide an effective means for rigidly and fixedly locating the contacts **20** in their proper positions in their sockets in the body member **10**. For this purpose opposite side walls of the socket, preferably the outer and inner walls, are provided with longitudinally extending recesses or channels **38** and **39** extending inwardly from the open ends of the socket at the upper or inner end of the body member, and these recesses or channels are respectively adapted to receive the end portions **28** and **29** of the connecting rivet as the contact **20** is inserted in the socket, thus rigidly and positively locating the contact in its proper position in the socket and retaining it therein against any action of the cap contacts to shift it out of position. The laterally extending end members **31** and **32** also rest against the upper

or inner end of the body member and provide still further locating and supporting means for the contacts.

Although the end members 31 or 32 could be provided with a binding post screw to connect the lead wires with the receptacle contacts, improved means is provided for securing the bared or stripped ends 40 of the lead wires 19 to these contacts to provide the electrical connection therewith. For this purpose the inner or under surface of the end member 11 is provided with recesses 41 communicating with the openings 42 for the lead wires 19 and preferably leading radially outwardly therefrom, as shown in Fig. 5. These recesses are in alignment with the open ends of the sockets 21 in the body member, and also over and in alignment with the laterally extending end portions 31, 32 of the receptacle contacts when located in their sockets. This permits the bared or stripped end portions 40 of the conductor wires inserted through the openings 42 to be bent laterally into the recesses 41 and lie over the end portions 31, 32 of the contacts, and then by drawing the body member 10 and the end member 11 together, these bared or stripped ends of the wires can be firmly clamped against the end walls 31, 32 of the contacts by the bottom surface of these recesses 41. A simple and effective means for connecting the body and end members 10 and 11, and securing this clamping action of the conductor wires to provide an effectual connection between them, comprises longitudinal screws 43 extending through suitable passages 44 and 45 in the body and end members and threaded into the end wall 15 of the shell or cap 12, as indicated at 46, the heads 47 of these screws being accessible for operation at the outer or free end of the body member.

The recesses 41 provide containing means for the bared or stripped ends 40 of the lead wires, and if this should be a stranded wire comprising a number of small strands as shown in Figs. 3 and 4, these recesses will properly retain these strands and prevent them from spreading out of position, and preventing the possibility of the strands of one conductor coming in contact with those of another conductor to form a short circuit. This effect may also be increased by providing a downwardly extending substantially U-shaped rib or flange 48 surrounding the outer end and a portion of the sides of these recesses, as shown in Fig. 5. The lateral end members 31 and 32 of the receptacle contacts 20 are also seated or located in these recesses 41, providing therewith additional means for retaining the receptacle contacts in their proper positions to prevent them from shifting or turning from these positions in use.

It will be understood from the above that this novel construction and arrangement provides a very simple construction for this connector, involving a minimum number of parts, and in which the receptacle contacts are positively and rigidly located in their proper positions as they are inserted in the sockets, and are positively retained in these positions against action of the cap blades tending to shift them out of position. Also the clamping arrangement of the bared or stripped ends of the lead wires by the bottoms of the recesses in the end member and the laterally extending portions 31, 32 of the contacts provide a simple and quickly operated means for clamping the lead wires against the contacts and effecting a positive electrical connection between them which will not loosen up or become inoperative in operation, and this electrical connection can be effected without the necessity of wrapping the lead wires around a binding post screw or similar means which needs additional manipulation to effect the connection, and also which has the liability of working loose in operation.

Having thus set forth the nature of my invention, I claim:

1. In an electrical connector, an insulating body member provided with longitudinally extending sockets opening through one end of the body and provided with contact blade inlet openings leading to the other ends of said sockets, opposite side walls of the sockets having inwardly facing longitudinal recesses extending inwardly from said open ends, receptacle contacts in said sockets each comprising resilient side pieces arranged side by side in position to receive contact blades inserted in said openings between them, a transverse rivet extending through the side pieces securing them together and having end portions projecting from the side pieces seated in said recesses to position the receptacle contacts in the sockets, and means to connect conductor wires to said receptacle contacts.

2. In an electrical connector, a body member of insulating material provided with longitudinal sockets opening through one end and cap contact entrance slots leading from the other end to said sockets, opposite side walls of a socket having longitudinal open-sided recesses extending inwardly from said open end, receptacle contacts in said sockets comprising a pair of members arranged side by side to receive a cap contact between them and secured together by a transverse rivet having flat end portions projecting outwardly from said members and seated in said recesses to position the contact in its socket, and means to connect conductor wires with said contacts.

3. In an electrical connector, a body member of insulating material provided with longitudinal sockets opening through one end and cap contact entrance slots leading from the other end to said sockets, opposite side walls of a socket having longitudinal open-sided recesses extending inwardly from said open end, receptacle contacts in said sockets comprising a pair of substantially L-shaped members including side members arranged side by side to receive a cap contact between them and oppositely extending end portions at the open end of the socket, a transverse rivet extending through and connecting the side members and including flat ends projecting outwardly from said members and seated in said recesses to position the contact in its socket, and means for connecting a conductor with at least one of said end portions.

4. In an electrical connector, body and end members of insulating material, said body member provided with longitudinal sockets opening through one end of the body and cap contact entrance slots leading to said sockets from the other end of the body, opposite side walls of a socket having longitudinal open-sided recesses extending inwardly from the open end thereof, receptacle contacts in said sockets comprising a pair of side members arranged side by side and oppositely extending end portions, means connecting the side members comprising a transverse rivet having end portions projecting from the side members and seated in said recesses to position the contact in its socket with the end portions of the contact at the end of the body, said end member having an inner surface provided with recesses facing the adjacent end of the body and in alignment with the end portions of the contacts, said recesses adapted to receive the bared ends of lead wire conductors over said end portions, and screws connecting the body and end members arranged to draw them together and clamp the ends of the conductors between the end portions of the contacts and the bottoms of the recesses in the end member to form electrical connections between the conductors and the contacts.

5. In an electrical connector, body and end members of insulating material, said body member provided with longitudinal sockets opening through one end of the body and cap contact entrance openings leading to said sockets from the other end of the body, receptacle contacts in said sockets comprising side members secured together side by side to receive cap contacts between them and provided with oppositely extending end portions resting against and supported on the end wall of the body at the open ends of the sockets, means connecting the side members comprising a transverse rivet including opposite end portions projecting outwardly of the side members, means in the sockets cooperating with the projecting ends

of the rivets to position said contacts in the sockets, said end member having an inner surface facing the adjacent end of the body and provided with inwardly facing radial recesses in alignment with the end portions of the contacts, said recesses adapted to receive the stripped ends of lead wire conductors over said end portions, and screws connecting the body and end members to draw them together and clamp the ends of the conductors between the end portions of the contacts and the bottoms of the recesses in the end member to form electrical connections between the conductors and said contacts.

6. In an electrical connector, a receptacle contact comprising a pair of resilient side members arranged side by side adapted for insertion of a cap contact between them from one end and provided with opposite laterally extending end portions at their other ends, means connecting the side portions adjacent the end members comprising a rivet extending transversely through the side members and provided with substantially flat end portions extending outwardly from the side members in a plane extending longitudinally thereof adapted to seat in

recesses in the opposite sides of a socket in an insulating body member to position the contact in said socket, and said laterally extending end portions adapted to rest against and be supported by an end wall of the body with a conductor clamped against at least one of them to form an electrical connection from the conductor to the contact.

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