Aug. 13, 1935. M. W. McARDLE ET AL 2,011,066

ELECTRICAL CONNECTER

Filed June 19, 1934

Fig. 1

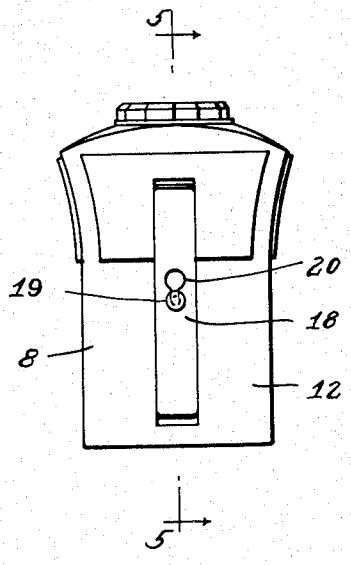


Fig. 2

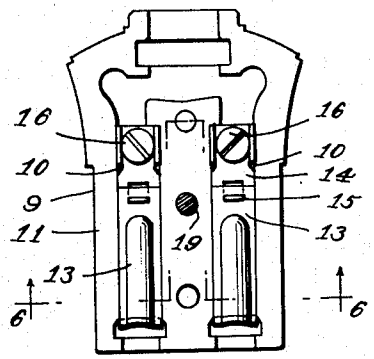


Fig. 3

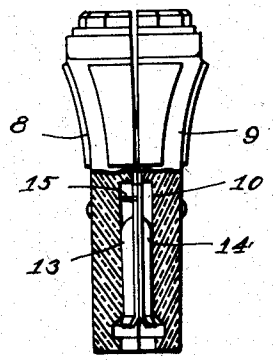


Fig. 4

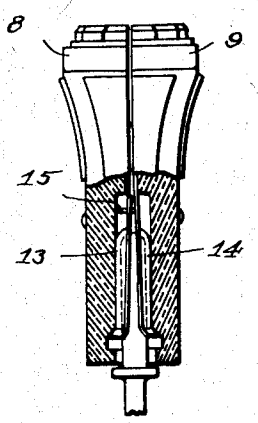


Fig. 5

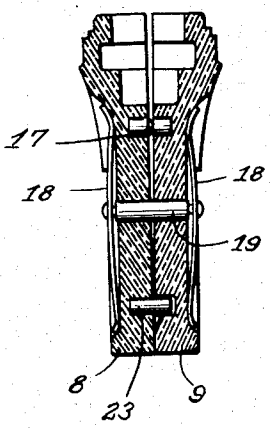
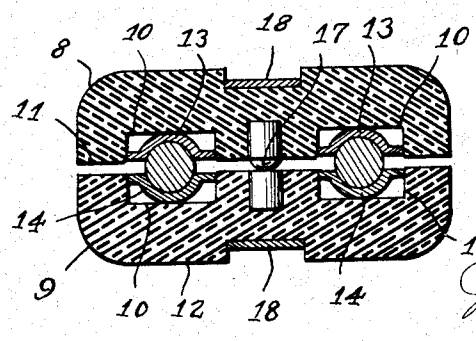


Fig. 6



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ELECTRICAL CONNECTER

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Application June 19, 1934, Serial No. 731,318

11 Claims. (Cl. 173—332)

This invention relates to electrical connecters of the quick detachable type commonly used for connection to electrical appliances. Electrical connecters of this type, known as plug connecters, include plug jacks confined in an insulating body usually consisting of a pair of molded insulating casing sections of identical form held in assembled relation by screws or bolts or by detachable spring elements.

One of the objects of our invention is to provide an improved electrical connecter of the type described, with the view to improving the connection contact between the terminal posts or plugs and the plug jacks so that more effective contact will be made from end to end thereof and the contact pressure will be equally distributed regardless of variations in dimensions of the terminal posts and other parts incidental to manufacture.

More particularly, we have aimed to provide a construction which avoids the undesirable feature of certain prior constructions in which the insulating casing sections which are pressed together by spring devices and serve to urge the jack members into contact with the terminal posts when the latter are inserted, have bearing contact at their upper corners when the terminal posts are inserted, with the result that the casing sections separate only at the lower open end and, consequently, cause the terminal posts to be gripped only at the head end thereof, giving insecure and unsatisfactory electrical contact. In other words, this three-point suspension or contact causes the casing sections to separate on the two upper corners as a fulcrum, with the consequence that the electrical contact is localized at the head end of one or both of the terminal posts. Furthermore, with a suspension arrangement as described the electrical contact is apt to be almost entirely with one of the terminal posts if such post happens to be of slightly larger diameter than the other. These undesirable conditions are avoided by the use of our improvements.

Another object of our invention is to provide an improved means of applying spring pressure to the insulated casing sections and holding them in assembled relation for obtaining more effective electrical contacts.

Another object is to provide an improved assembly of the character described in which the insulated casing sections have pivotal contact substantially on the longitudinal center intermediate the plug jacks for the purpose of equalizing the contact pressure between the two terminal posts when they are inserted.

Other objects and attendant advantages will be appreciated by those skilled in this art as the invention becomes better understood by reference to the following description when considered in connection with the accompanying drawing, in which—

Figure 1 is a side elevation of an electrical connecter embodying our invention, with the electric cord and the usual guard wire removed;

Fig. 2 is a similar view with the near casing section removed;

Fig. 3 is an end elevation of the plug assembled, with the lower part of the casing sections broken away to show the plug jacks;

Fig. 4 is a similar view with the terminal posts inserted;

Fig. 5 is a section taken substantially on the line 5—5 of Figure 1; and

Fig. 6 is an enlarged section taken substantially on the irregular section line 6—6 of Figure 2.

The plug body is preferably formed of two casing sections 8 and 9 of insulation material, usually molded. These sections may be substantially identical in form, each having complemental recesses 10 shaped to receive the plug jacks, and being further recessed for passage of the terminal conductor wires (not shown) which connect to the plug jacks. When a coiled wire guard is used, the casing sections are further recessed for retaining this guard. For convenience in description the casing sections or members will be referred to as having an inner side 11 and an outer side 12. As will be presently described, means is provided to maintain the casing sections separated at the upper end to allow certain freedom of relative movement between the sections to accommodate both longitudinal and transverse distribution of the spring pressure when the terminal posts are inserted. The casing sections are normally closed at the lower end as shown in Figs. 3 and 5 when the plug is removed from the terminal posts.

The plug jacks may be of any suitable or preferred construction, each comprising a pair of contact members 13 and 14 shaped to form a socket for the reception of a terminal post. In the form shown, one of the members 13 has a loose connection with the other member 14 allowing said member 13 free bodily movement to accommodate itself to an inserted terminal post. In this instance, the member 13 is shorter than the member 14 and the latter has a turned up

lug 15 which passes through a slot in the member 13, this connection serving to retain the member 13 against lengthwise displacement but giving it freedom of movement to seat from end to end against an inserted terminal post. The extended upper end of the member 14 is secured by means of a screw 16 to the casing section in which this jack member is located, this screw also serving as a connecting post for the terminal end of one of the conductor wires. The contact members of each plug jack are thus free to separate relatively from end to end and to seat throughout their length against an inserted terminal post.

The contact members are urged into the closed relation shown in Fig. 3 by the action of the casing sections under the influence of spring tension means which serves also to hold said casing sections in assembled relation. It will be first observed, however, that a pivot or fulcrum point 17 is provided between the casing sections, preferably on the longitudinal center line between the plug jacks and adjacent to the upper end of the plug body. In the present instance this fulcrum is provided by suitable metal inserts in the casing sections so arranged as to maintain slight separation of said sections at the upper end of the plug body and permit relative tilting or rocking movement between the sections both transversely and longitudinally about such fulcrum point. To the outer side of each casing section is applied a spring element 18 bearing against the side thereof. The arched portion of each spring element is connected to the arched portion of the spring element at the opposite side of the plug through means preferably in the form of a pin 19 passing transversely through the casing sections on the longitudinal center line above-referred to and serving to equalize the effective tension of the spring elements and to hold the parts in assembled relation. The pin 19 has a quick detachable connection at one or both ends with the respective spring element to permit assembly and disassembly of the parts. In this instance, each spring element has a keyhole slot 20, the wide end of which permits passage of the pin, and the narrow end is shaped to receive the complemental undercut end portion of the pin for locking the spring element in position. The spring elements are so shaped that either one or both may be slid lengthwise on the outer side of its respective casing section for disengagement from the pin 19, thereby permitting free separation of the casing sections and disassembly of the parts. The parts may be assembled in reverse order, as will be apparent. In this embodiment, the outer side of each casing section is recessed longitudinally at 22 to receive the spring element 18, and the ends of each recess may be curved or suitably shaped to normally retain the spring element against lengthwise displacement. The spring elements are in this way substantially flush with the outer sides of the plug body. A pin 23, secured in the casing section 8 adjacent to the lower end thereof, fits in a complemental socket 24 in the casing section 9 for the purpose of locating and retaining the casing sections against relative displacement at the lower end.

As shown in Figs. 3, 5 and 6, the casing sections are normally separated at the upper end by reason of the fulcrum pin 17, and they are in contact at the lower end. When the terminal posts are inserted into the plug jacks, it will be apparent that the effective pressure of the spring elements on the casing sections will distribute said pressure equally to the two plug jacks by reason of the fulcrum action both transversely and longitudinally about the point 17, causing the contact members of the plug jacks to be urged into electrical contact with the terminal posts throughout the length thereof and uniformly against each post.

We claim:

1. An electrical connecter having separable insulating members and terminal connecters interposed therebetween, said connecters adapted to be plugged onto terminal posts and to separate said members when so plugged, a spring element on the outer side of each insulating member, and means passing transversely through the insulating members and connected at its ends to the spring elements serving to equalize the effective tension of said spring elements against the insulating members and to hold the parts in assembled relation, the tension of said spring elements being exerted against the terminal connecters through the insulating members.

2. An electric connecter having separable insulating members and terminal connecters interposed therebetween, said connecters adapted to be plugged onto terminal posts and to separate said members when so plugged, a spring element disposed at the outer side of each insulating member bearing against the side thereof, a pin passing transversely through the insulating members and freely movable in such transverse direction with respect to said members, said pin being connected at its ends to said spring elements and serving to equalize the effective tension of said spring elements against the insulating members tending to urge the latter together and also serving to hold them in assembled relation, the tension of said spring elements being exerted against the terminal connecters through the insulating members.

3. An electrical connecter comprising a plug body having separable insulating members, plug jacks interposed between said members each having contact members adapted to be separated when a terminal post is inserted, means yieldingly urging said members against the interposed contact members of the plug jacks, and means providing a fulcrum point projecting from the inner face of one body member on the longitudinal center thereof located intermediate the plug jacks and bearing against the inner face of the other body member to maintain a spaced relationship between said members and permit relative tilting therebetween longitudinally and transversely upon and about said fulcrum point and whereby the pressure exerted by said yielding means will be equally distributed against the contact members of the respective plug jacks.

4. An electrical connecter comprising a plug body having separable insulating members, plug jacks interposed between said members, said plug jacks adapted to be plugged onto terminal posts and to separate said members when so plugged, a spring element on the outer side of one of said members arched at its center and bearing at its ends against said member, a pin connected to the arched portion of the spring element and passing transversely through said member, and means connecting said pin with the other member, the spring serving to yieldingly urge said members against the interposed plug jacks to yieldingly urge the latter into contact with the terminal posts.

5. An electrical connecter comprising a pair of separable insulating members, a pair of com-

bined contact and wiring terminal units interposed between said members, said units each having a pair of contact members arranged in socket forming relation, each insulating member having complemental recesses in its inner side for the reception of said units, a spring element disposed against the outer side of each insulating member, and a pin passing transversely through said insulating members and connected at its ends to said spring elements, said pin serving to hold the spring elements under tension against the outer sides of the insulating members and holding said members in assembled relation.

6. An electrical connection as set forth in claim 5, in which the pin has a detachable connection between one of its ends and the adjacent spring element normally holding the parts in assembled relation and being detachable to permit disassembly of the parts.

7. An electrical connecter comprising a pair of separable insulating members having plug jacks interposed therebetween for the reception of terminal connecters, a spring element disposed against the outer side of one of said insulating members, and means passing transversely through the said insulating member and connected to said spring element, said means being connected with the other insulating member, the tension of said spring element acting through said means to yieldingly urge the insulating members against the plug jacks, and a fulcrum point between the insulating members at a point intermediate the plug jacks for equalizing the tension effect of the spring element against the plug jacks.

8. An electrical connecter comprising a pair of insulating members, a pair of combined contact and wiring terminal units interposed between said insulating members, said units each having a pair of contact members arranged in socket forming relation, each insulating member having complemental recesses in its inner sides for the reception of said units in laterally spaced parallel relation, means yieldingly urging the insulating members against said contact arms, and a projecting fulcrum on one of the insulating members located between said units and bearing against the other insulating member to maintain the insulating members in slightly spaced relation and permitting either unit to tilt transversely on the fulcrum to accommodate variations in size of terminal plugs inserted between said contact members.

9. An electrical connecter comprising a plug body having separable insulating members, terminal connecters interposed therebetween, a pin passing loosely transversely through the insulating members, and a pair of flat type springs each disposed at the outer side of one of the insulating members bearing at its ends against said member and being normally flexed outwardly at its center, said pin being connected at its ends to the flexed portions of the springs and serving to hold them under tension with the insulating members in assembled relation.

10. An electrical connecter comprising a pair of insulating casing sections, a pair of plug jacks interposed between said casing sections each having contact members in socket forming relation adapted to receive a terminal post, said casing sections being normally held in separated relation at the upper end by means of a projecting fulcrum point located intermediate the plug jacks to allow tilting of one casing section upon and with respect to the other both transversely and longitudinally upon and about said fulcrum point, and means yieldingly pressing the casing sections together and holding them in assembled relation, the casing sections being separated at the lower end against the pressure of said yielding means by separation of the contact members of the plug jacks when terminal posts are inserted, the effective pressure of said yielding means being equalized against the plug jacks through the relative transverse tilting action of the casing sections upon said fulcrum point.

11. An electrical plug connecter comprising a pair of separable insulating casing sections, a pair of plug jacks interposed between said casing sections each having contact members in socket forming relation adapted to receive a terminal post from one end of the plug connecter, terminal conductor wires entering between said casing sections from the end thereof opposite from said sockets and connected to said plug jacks, means yieldingly urging said casing sections against the interposed plug jacks, and fulcrum means located between said casing sections approximately on the longitudinal center line thereof intermediate the plug jacks adjacent to the inner end thereof, said fulcrum means normally maintaining the terminal conductor end of the casing sections in spaced relation and allowing said casing sections to tilt transversely and longitudinally relatively to each other upon and about said fulcrum means.

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