Feb. 5, 1935. H. E. SLADE ET AL 1,989,890

ATTACHMENT PLUG RECEPTACLE

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Fig. 1.

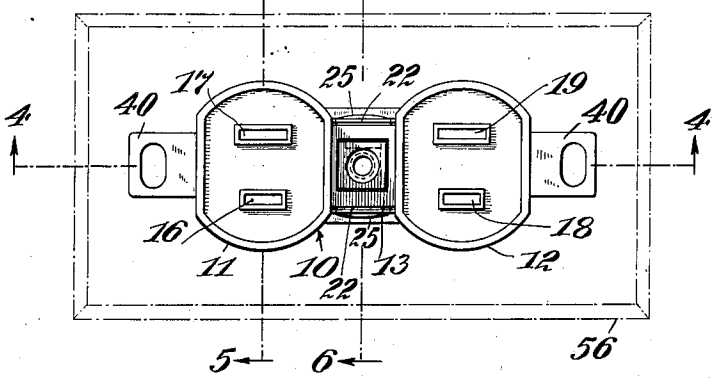


Fig. 2.

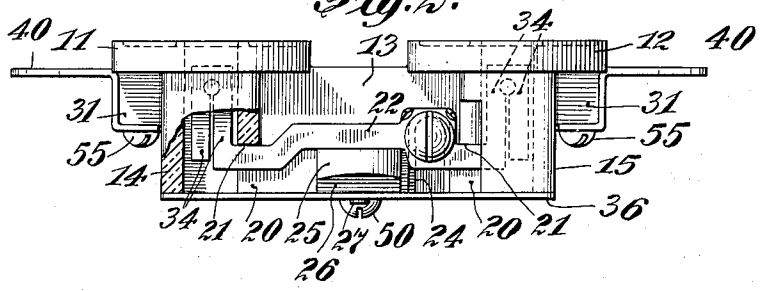


Fig. 3.

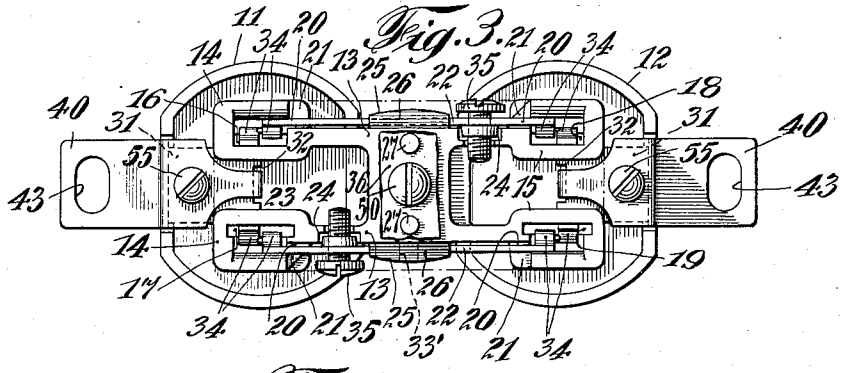
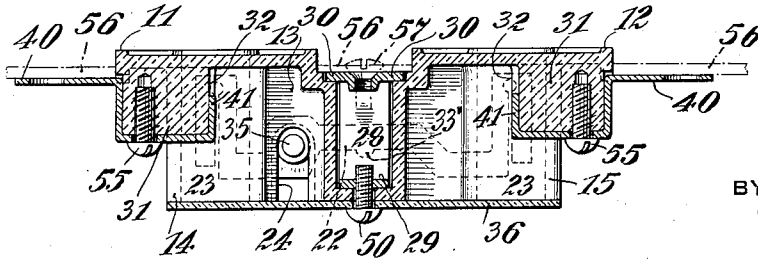


Fig. 4.



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Fig. 5.

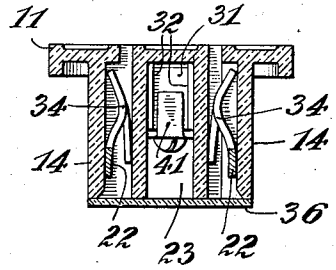


Fig. 6.

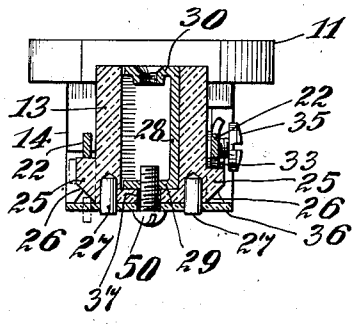
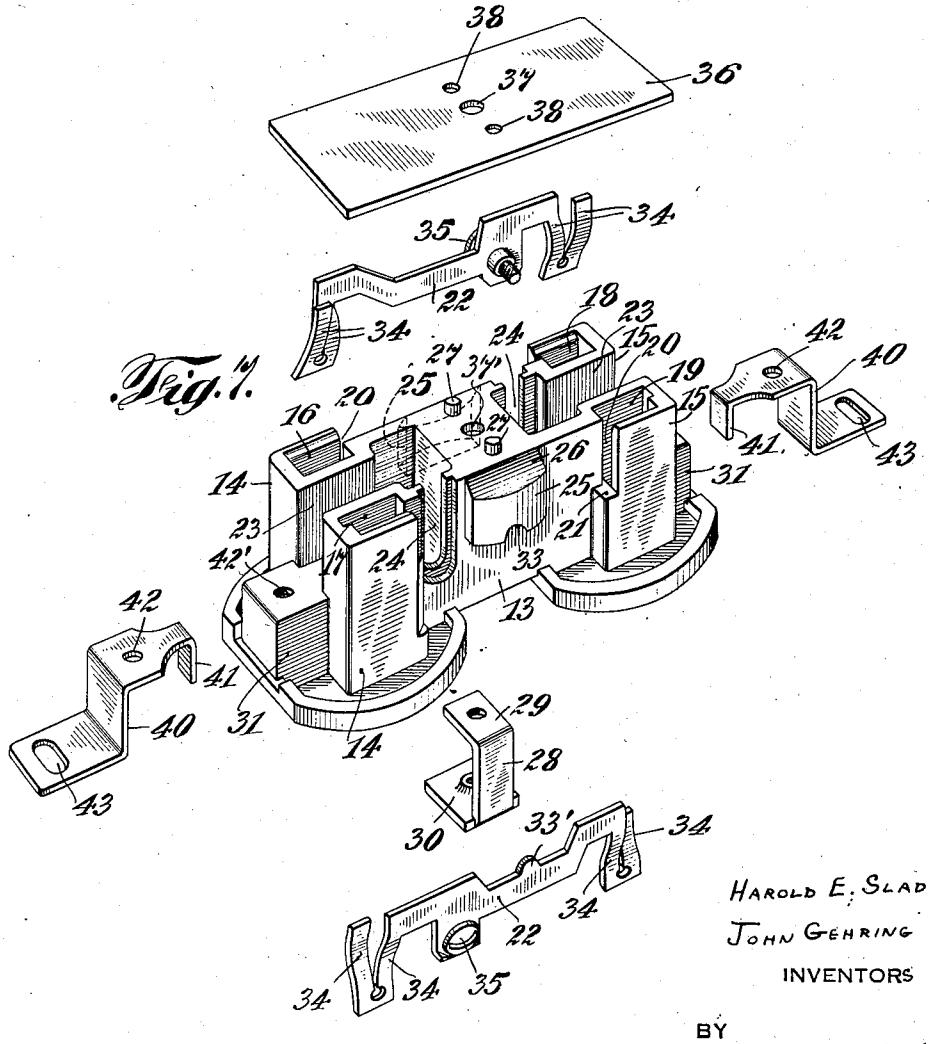


Fig. 7.



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Fig. 8.

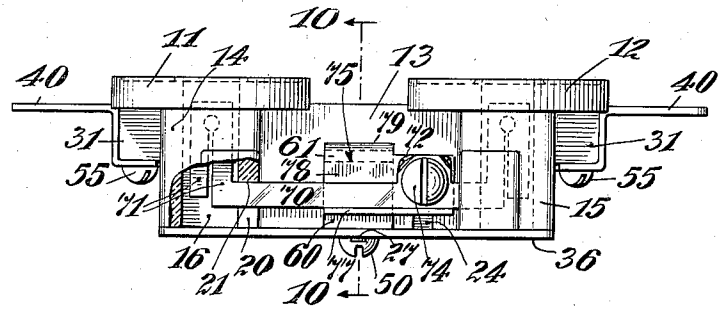


Fig. 9.

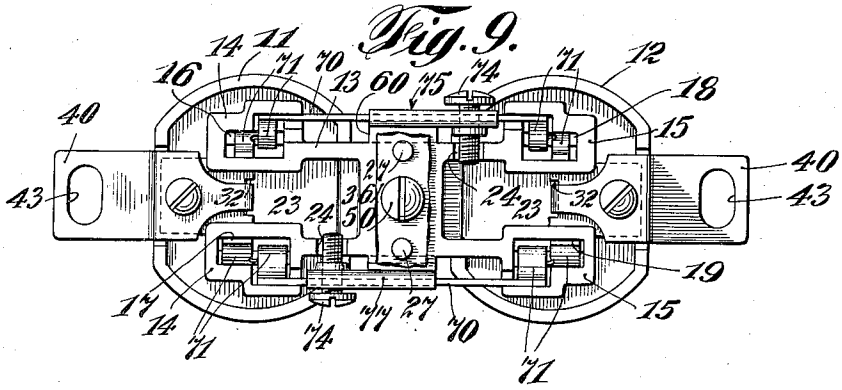


Fig. 11.

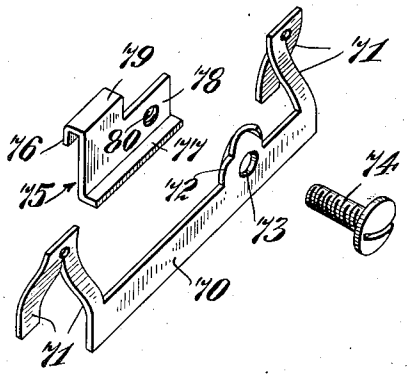
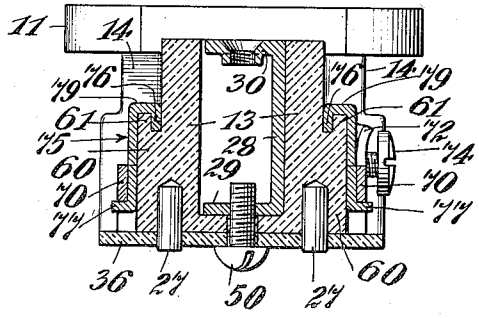


Fig. 10.



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Fig. 12.

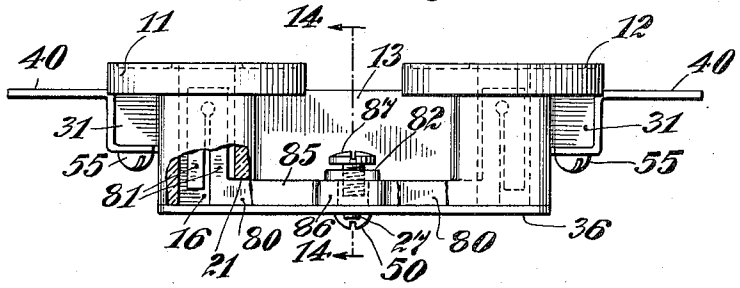


Fig. 13.

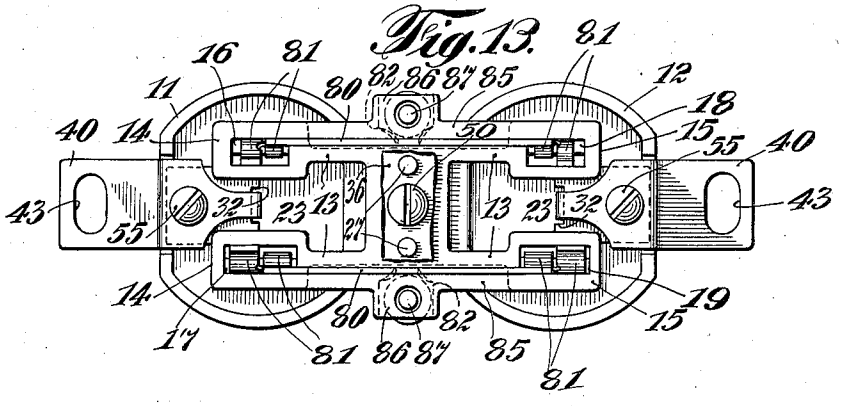


Fig. 14.

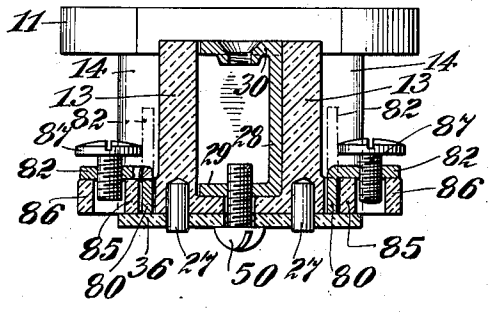
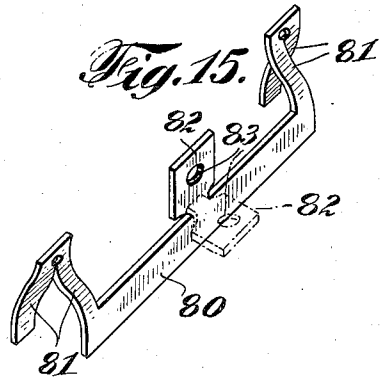


Fig. 15.



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Patented Feb. 5, 1935 1,989,890

UNITED STATES PATENT OFFICE

1,989,890

ATTACHMENT PLUG RECEPTACLE

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Application December 12, 1930, Serial No. 501,772

11 Claims. (Cl. 173—330)

This invention relates to attachment plug receptacles and more particularly to receptacles of the flush type.

Heretofore, receptacles of the character set forth have been constructed along various lines, all of which however possess some inherent disadvantages, such as the use of a separate member for holding the contact bars in place, etc.

An object of the present invention is to provide an improved attachment receptacle of the flush type, simple and inexpensive to manufacture and mechanically efficient in structure.

According to the present invention, the faults heretofore found in receptacles of the type hereinbefore described are overcome by forming the body structure of the receptacle in such manner that integral parts thereof serve to hold the contact members in place within the contact chambers without requiring additional elements. Furthermore, the receptacle made up in accordance with the present invention provides refinements such as simple indications as to polarity of the contact and simplicity of structure.

Other features, objects and advantages of the invention will become apparent by reference to the following detail description taken in connection with the accompanying drawings, wherein:

Figure 1 is a plan view of an attachment receptacle of the flush type;

Figure 2 is a side elevation partly in section of the device illustrated in Figure 1;

Figure 3 is a bottom plan view with parts broken away to show the construction of the device shown in Figures 1 and 2;

Figure 4 is a section taken substantially on the lines 4—4 of Figure 1;

Figure 5 is a section taken substantially on the lines 5—5 of Figure 1;

Figure 6 is a section taken substantially on the lines 6—6 of Figure 1;

Figure 7 is a perspective view of the component parts of the device before assembly;

Figure 8 is a view similar to Figure 2 of a modified form of the invention;

Figure 9 is a view similar to Figure 3 of the device shown in Figure 8;

Figure 10 is a section taken substantially on the lines 10—10 of Figure 8 and shown in enlarged scale;

Figure 11 is a perspective view of the parts constituting the contact members used in modification of Figures 8 to 10 inclusive;

Figure 12 is a view similar to Figures 2 and 8 of a still further modification of the invention;

Figure 13 is a view similar to Figures 3 and 9 of the device shown in Figure 12;

Figure 14 is a section taken substantially on the lines 14—14 of Figure 12;

Figure 15 is a perspective view of one of the contact members employed in the modification shown in Figures 12 and 14 inclusive.

Referring now to the drawings and particularly to Figures 1 to 7 inclusive, 10 indicates a duplex receptacle incorporating therein two sets of contacts arranged in contact chambers substantially parallel with respect to each other and in straight alignments. The receptacle 10 as shown constitutes a pair of bays 11 and 12 connected by a web 13 of the same material as the bays 11 and 12 and formed integrally therewith. As shown in Figure 2, the web 13 is depressed below the top surfaces of the bays 11 and 12, while these bays themselves are provided with depending portions 14 and 15 respectively of cross-sectional area, smaller than cross-sectional area of the tops thereof.

Contact chambers 16 and 17 are provided in the bay 11, while similar chambers 18 and 19 are provided in the bay 12. Each of the bays 16 to 19 inclusive is provided with a slot 20 terminating at a shoulder 21, which slots permit the introduction of contact members 22 into the respective chambers from the under side of the receptacle. As shown clearly in Figure 7, a space 23 is provided between the inner walls of each pair of the receptacle chambers for the purpose of reducing the amount of material required in the construction of the device. Furthermore, the walls of the web 13 are provided with slots 24 shown in staggered relation for a purpose to be described hereinafter.

Extending from the sides of the web 13 are oppositely disposed shoulders 25 having chamfered surfaces 26. Embedded in the underside of the web 13 are a pair of pins 27. The body of web 13 is hollowed out for the reception of a perpendicular bar 28 having horizontal flanges 29 and 30. Each of the flanges 29 and 30 has a threaded opening therein.

Extending beyond the end of the walls of the contact chambers are a pair of bosses 31 provided with openings therein. As shown in Figure 4, the inner edge of each boss 31 terminates substantially midway of the receptacle chambers, as indicated at 32, thereby providing shoulders. One of the shoulders 25 is provided with a recess 33, the purpose of which will be described hereinafter.

The contact members 22 are made from flat

pieces of material, die-stamped into the form shown in the drawings. The extremities of the strips constituting the contact members are bent into the shape shown in Figure 7, wherein forked prongs 34 are produced. The material of the members 22 is some good electrical conducting material possessing a slight amount of resiliency. Each member 22 has a portion thereof of such size as to permit drilling and tapping therein for the reception of contact screws 35.

The remaining parts of the receptacle consist of a strip 36 of some good insulating material, provided with a central opening 37, and a pair of openings 38 of such size as to receive the pins 27; together with a pair of supporting members 40 which are utilized for fastening the finished receptacle within its box. Each supporting member 40 is in the shape of a Z bar with a tongue 41 bent downwardly from the top of the bar. An opening 42 is provided in each bar in position to correspond to the openings in bosses 31 when the device is assembled and, furthermore, each bar 40 is provided with an opening 43 of substantial length, whereby the finished receptacle can be adjusted in its box.

As will be noted from the drawings, the respective bays, the web connecting the same, the shoulders 25 and the bosses 31 are molded of some suitable insulated material as a unitary structure. After this structure has been molded the various parts are assembled in the following manner: The two contact members 22 are introduced into the proper contact chambers by slightly flexing the bar 22 and sliding it in such a manner that the prongs 34 enter the proper chambers with the divergent parts thereof pointing toward the bottom of the chamber. Since, as before pointed out, the material of these contact members possesses some resiliency, it is possible to force the members 22 into proper place, sliding them over the shoulders 25, which are chamfered as shown at 26 to facilitate this movement. As soon as the members 22 have reached their proper position, relative to the contact chambers, the part of the member 22 in contact with the surface of each shoulder 25 will clear this shoulder and assume its original position (a flat condition) lying flush against the side of web 13. In this position the member 22 is restrained from outward movement by the edge of shoulder 25. As shown in Figure 7, one of the contact members may be provided with a nub 33' adapted to fit within the recess 33. The purpose of these cooperating parts will be described later.

As soon as the two contact strips 22 have properly been positioned with their prongs within the contact chambers, the strip 36 of insulating material may be placed on the bottom of the molded article with the pins 27 engaging the openings 38. This plate 36 is secured in place simultaneously with the securing in place of the bar 28 positioned in the opening in the web 13 by means of a screw 50, which passes through opening 37 in plate 36, opening 37' in web 13, into threaded engagement with the hole in flange 29. When this screw has been tightened the member 28 is firmly held within the web 13 and also the insulating plate 36 is firmly held against the bottom of the molded article, effectively closing the bottoms of the contact chambers to prevent outside articles coming into contact with the prongs 34 therewithin, in this manner removing the possibility of shorting the contacts.

The final operation of assembly consists of attaching the supporting members 40 to the molded form, such members being positioned to cause matching of openings 42 and 42' and engagement of tongues 41 with shoulders 32. With these members 40 properly positioned they may be locked in place by means of screws 55 which are of well-known construction, being capable of being driven into unthreaded openings within the molded insulating material. By utilizing special screws of this type, it is possible to eliminate the step of threading the walls of openings 42'. By providing the slots 24 it is possible to assemble the parts with the contact screws 35 in place since the ends thereof may travel down these slots during such assemble.

With the device assembled in the manner previously described, it will be noted that the invention provides a receptacle in which the contact members are held in place with the prongs thereof in the contact chambers by means of portions of the molded article itself and without the use of outside members. The strip 36 is provided solely for minimizing the possibility of shorting the various contacts by extraneous objects. The use of the separate members 40 permit a substantial reduction in the quantity of material used without losing any strength, rigidity, etc.

For purposes of convenience the top of openings leading into contact chambers 17 and 19 are shown as being longer than the openings leading into chambers 16 and 18. The utility of this construction resides in the fact that the contact members may be connected with an electrical circuit in well-known manner and polarity of the contacts may be indicated by the difference in length of chamber opening. For example, it may be said that the longer openings indicate the negative terminals of the circuit. To aid in this distinction the matched nub 33' and recess 33 are provided, so that the party connecting the receptacle may connect the proper contact with the proper terminal. The customary cover plate 56 may be used to fit around the bays 11 and 12, such plate being secured to the receptacle by means of screw 57 passing through the plate 56 into threaded engagement with the opening in flange 30.

Referring now to Figures 8 to 11 inclusive, the device illustrated therein is constructed for the greater part in substantially the same manner as that shown in Figures 1 to 7 inclusive. For this reason corresponding parts have been designated by corresponding reference characters. As before, the device consists of two bays 11 and 12 connected by a web 13, the respective bays having contact chambers 16, 17, 18 and 19, the chambers 17 and 19 being longer than chambers 16 and 18, to indicate polarity, as before explained. The web 13 is hollowed out as before for the reception of the bar 28 having flanges 29 and 30. Instead of chamfered shoulders 25, the present molded article is provided with oppositely disposed enlargements 60, each enlargement having an upstanding rib 61 spaced from the outer walls of the web 13. These enlargements plus rib 61 serve in conjunction with other members to hold contact strips 70 in place with their prongs 71 positioned within the respective contact chambers. As shown clearly in Figure 11, contact member 70 is for the most part a flat bar, the ends of which are formed into the prongs 71 situated in offset relation to the main part of the bar. An enlargement 72 is provided so that the member 70 can be apertured at 73 for the passage of a bolt 74. In conjunction with the member 70, use is made of an auxiliary retaining member 75, shaped

somewhat in the nature of a Z bar, having an extra flange 76. The main parts of the Z bar are indicated at flange 77, flat portion 78 and angular portion 79. The flat portion 78 is provided with an aperture 80 internally threaded for the reception of bolt 74.

In the assembly of the elements, the respective Z bars 75 are first positioned as shown in Figure 10 with the flange 76 lying in the space between rib 61 and wall of web 13; with portion 79 resting on top of rib 61 and with the flat part 78 flush against the outer wall of extension 60, the aperture 80 being positioned in register with slot 24 in the web wall. With these two parts in place the contact member 70 may then be inserted with the prongs thereof in the proper chambers by slightly flexing the flat expanse of the member, so that it rides over the edge of the flange 77. As soon as the member 70 has been moved upwardly toward the top of the bays an amount sufficient for the lower edge thereof to clear the flange 77, resilience of the contact member causes it to straighten out into normal flat form, in which position it is restrained from movement by means of the flange 77. When so properly positioned, the bolt 74 may be passed through aperture 73 into engagement with aperture 80 and tightened to the desired extent, subsequent to which this same bolt 74 serves as a terminal to which an electrical conductor can be connected. The remainder of the assembly of the parts is similar to that heretofore described and will be readily apparent by inspection of the figures in the drawings relative thereto. It should be noted however in this modification that the prongs 71 fitting within the chambers 17 and 19 are larger than the prongs fitting in the chambers 16 and 18. This structure is merely for the purpose of aiding in the selection and determination of the polarity of the various contacts.

In Figures 12 to 15 there is illustrated a still further modification of the invention, embodying for the most part elements similar to those described and illustrated hereinbefore. The principal difference resides in the construction of the contact member with its integral prongs and the manner in which it is held in place by an integral part of the molded article of insulating material. As shown in Figure 15, the contact member consists of a flat bar 80 having prongs 81 at each end thereof in somewhat offset position. The bar 80 is also provided with a flat tongue 82 normally lying in the same plane therewith and threadedly apertured as at 83.

Extending between the walls of the contact chambers 16 and 18 respectively and 17 and 19 respectively, are a pair of flat ribs 85 of a height corresponding to the width of bar 80 and composed of the same material as that making up the molded article. These ribs 85 are spaced, however, from the outer walls of the web 13 by a slot of a width slightly greater than the thickness of bar 80. Each rib 85 is provided at its mid part with an enlargement 86 apertured for the reception of screw 87.

In the assembly of this structure the contact members composed of bar 80 and prongs 81 are introduced into the molded article so that the prongs 81 extend into the proper contact chambers, while the tongue 82 passes between rib 85 and wall of web 13. As soon as the contact members have been positioned with the prongs extending into the chambers to the maximum amount, the two contact members may be locked against retraction by bending the respective tongues 82 outwardly over the top edge of ribs 85. When so bent the tongues 82 register with the enlargements 86, so that when the screw 87 is tightened within the apertures 83, the ends of the screws will extend into the apertures in enlargements 86, thereby furnishing a terminal to which one end of an electrical conductor can be connected. The insulating plate 36 and the remaining parts are assembled as described in connection with the first modification.

As in the preceding form of the invention, the contact chambers 17 and 19 are shown as being a slight bit longer than chambers 16 and 18, while the prongs fitting within the former chambers are likewise larger than those fitting within the latter chambers. This structure, as before explained, is for aiding in determining the polarity of the various contacts.

From the foregoing, it will be seen that the present invention in each of the forms illustrated and described provides an arrangement wherein the contact members used in a duplex attachment receptacle are held in place against retraction solely by co-action with a member formed as a component part of the molded article forming the skeleton of the device. By so constructing the receptacle it is possible to eliminate a number of unnecessary parts, thereby reducing the cost of manufacture and likewise eliminating the possibility of the contact members becoming inadvertently retracted or withdrawn from their proper position.

It will be readily apparent that the invention is capable of modification beyond that set forth hereinbefore, in view of which it is to be understood that the invention is not to be limited by the incorporated embodiments but is to be limited only by the scope of the following claims:

We claim:

1. An attachment plug receptacle comprising a molded body of insulating material recessed to form a plurality of pairs of contact chambers separated by a web having a hollowed out portion; the walls of said chambers being recessed for the introduction of contact members into the chambers, a pair of spaced connected plates within the hollowed out portion of the web, each plate being threadedly apertured, a sheet of insulating material on the back of said body and secured thereto by a member threaded into the aperture of one of said plates, and members formed as integral parts of said body for aiding in retaining said contact members within the chambers.

2. An attachment plug receptacle comprising a molded body of insulating material recessed to form a plurality of pairs of contact chambers separated by a web having a hollowed out portion; the walls of said chambers being recessed for the introduction of contact members into the chambers, a pair of spaced connected plates within the hollowed out portion of the web, each plate being threadedly apertured, a sheet of insulating material on the back of said body and secured thereto by a member threaded into the aperture of one of said plates, members formed as integral parts of said body for aiding in retaining said contact members within the chambers, and separate supporting members secured to the ends of said body.

3. An attachment plug receptacle comprising a molded body of insulating material recessed to form a plurality of pairs of contact chambers separated by a web, the walls of said chambers being recessed for the introduction of contact

prongs on the ends of substantially flat bars from the under side of said body, shoulders on said web integral therewith and extending outwardly from the web in the space between the pairs of contact chambers for contact with said bars to retain said prongs in said chambers.

4. An attachment plug receptacle comprising a molded body of insulating material recessed to form a plurality of pairs of contact chambers separated by a web, substantially flat bars having contact prongs on the ends thereof, said contact prongs being inserted in said chambers, said chambers being open at the underside of said body for the introduction of said contact prongs, and external shoulders on said web integral therewith, said bars resting against said web behind said shoulders with longitudinal edges of the bars engaging the shoulders to retain said prongs in said chambers.

5. An attachment plug receptacle comprising a molded body of insulating material formed into end portions separated by a web, each end portion being provided with contact chambers, substantially flat contact bars having prongs at the ends thereof inserted in contact chambers in each end portion, and external retaining members intermediate the ends of the body on each side thereof formed integrally therewith, said retaining members being engaged by parts of said contact bars when the prongs are in the contact chambers to retain said prongs in said chambers.

6. An attachment plug receptacle comprising a molded body of insulating material formed into end portions separated by a web, each end portion being provided with contact chambers, substantially flat contact bars having prongs at the ends thereof inserted in contact chambers in each end portion, and external retaining shoulders on each side of the body formed integrally with said web, said retaining shoulders being engaged by parts of said contact bars when the prongs are in the contact chambers to retain said prongs in said chambers.

7. An attachment plug receptacle comprising a a molded body of insulating material formed into end portions separated by a web, each end portion being provided with contact chambers, substantially flat contact bars having prongs at the ends thereof inserted in contact chambers in each end portion, external retaining shoulders on each side of the body formed integrally with said web, each retaining shoulder being provided with a rib spaced from the outer wall of the web, and members secured to each contact bar and having hook portions fitting into the spaces between the ribs and the outer walls of the web to retain the prongs in the chambers.

8. An attachment plug receptacle comprising a molded body of insulating material formed into end portions separated by a web, each end portion being provided with contact chambers, contact bars having members at the ends thereof inserted in contact chambers in each end portion, retaining ribs intermediate the ends of the body on each side thereof, and having parts thereof spaced from said web, said bars being positioned in the spaces between said ribs and said web and being provided with parts bent over said ribs to retain said contacts in said chambers.

9. An attachment plug receptacle comprising a molded body of insulating material formed into end portions separated by a web, each end portion being provided with contact chambers having slotted walls, substantially flat contact bars having prongs at the ends thereof inserted in contact chambers in each end portion through said slots, and external retaining members intermediate the ends of the body on each side thereof formed integrally therewith, said retaining members being engaged by parts of said contact bars when the prongs are in the contact chambers to retain said prongs in said chambers.

10. An attachment plug receptacle comprising a molded body of insulating material formed into end portions separated by a web, each end portion being provided with contact chambers having slotted walls, contact bars having prongs at the ends thereof inserted in contact chambers in each end portion through said slots, retaining shoulders on each side of the body formed integrally with said web, each retaining shoulder being provided with a rib spaced from the outer wall of the web, and members secured to each contact bar and having hook portions fitting into the spaces between the ribs and the outer walls of the web to retain the prongs in the chambers.

11. An attachment plug receptacle comprising a molded body of insulating material formed into end portions separated by a web, each end portion being provided with contact chambers having slotted walls, contact bars having members at the ends thereof inserted in contact chambers in each end portion through said slots, retaining ribs intermediate the ends of the body on each side thereof, and having parts thereof spaced from said web, said bars being positioned in the spaces between said ribs and said web and being provided with parts bent over said ribs to retain said contacts in said chambers.

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