Aug. 15, 1939. A. BROWNSTEIN 2,169,219

ATTACHMENT PLUG

Filed June 1, 1937

Fig. 1

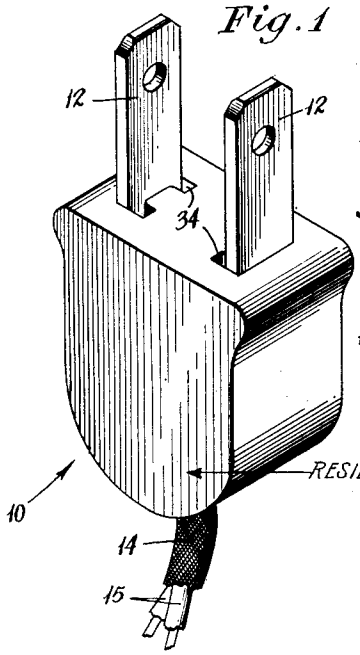


Fig. 2

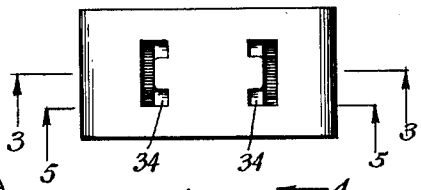


Fig. 3

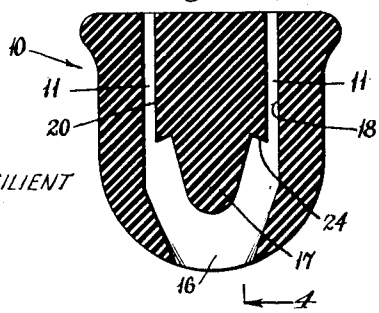


Fig. 4

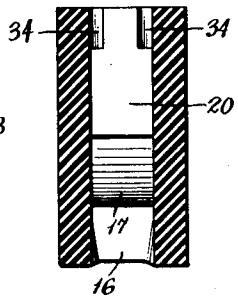


Fig. 5

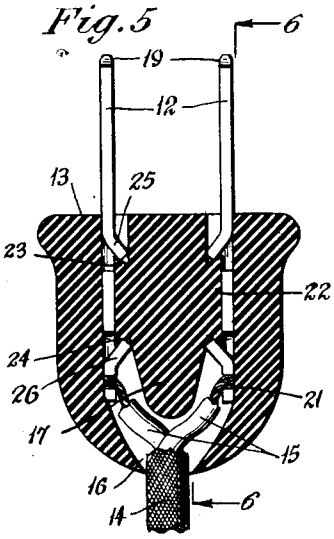


Fig. 6

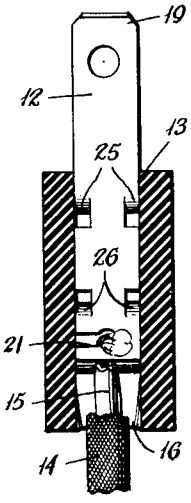


Fig. 7

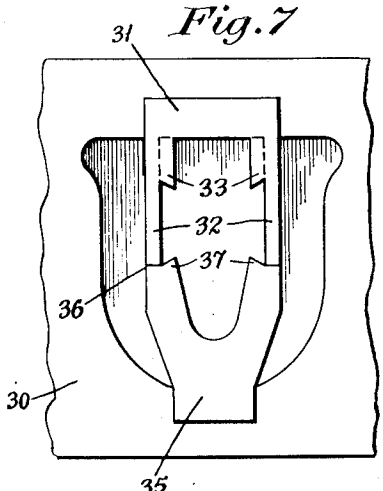
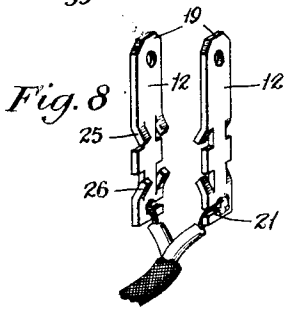


Fig. 8



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UNITED STATES PATENT OFFICE

2,169,219

ATTACHMENT PLUG

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Application June 1, 1937, Serial No. 145,759

6 Claims. (Cl. 173—361)

This invention relates to an electrical contact plug and more particularly to a resilient contact plug having blades therein which are adapted to be readily attached to an electrical conductor to connect the same to an electrical outlet.

Attachment plugs are sometimes made of rubber or similar material which in addition to being a good electrical insulator is not subject to fracture as is the usual molded resins, hard rubber and the like. The rubber being pliable and resilient, the blades can have a slight play to accommodate outlets having slight variance between the sockets adapted to receive the blades without injury to the plug.

Such resilient plugs can be molded at low cost and the blades readily assembled therein after the conductors have been attached to them without the use of any screws, rivets or like parts which might work loose. The blades in being assembled are caused to interlock with body of the plug to hold the same therein.

Heretofore resilient plugs have been made, but they are objectionable in that they depended upon distortion of the material of the plug to hold the blades in operative position. In this condition of distortion of the plug body, the blades were usually unsteady due to insufficient frictional contact with the plug body.

In the device of the present invention, the blades may be inserted into the small end of the plug and into the blade slots and held therein by gripping or locking action between a block on the body of the plug and the blade, and frictional contact of the slot without any distortion of the plug when the blades are in assembled position. The blades are very solidly anchored in the resilient body and due to the lack of distortion of the body of the plug are very stable in use. Also, when a conductor is connected to the blades, the stability of the blades in the body reduces the tendency of movement at the connection which might inevitably result in breaks in the wire. Also, the bottom opening of the plug will protect the ends of the conductor and insulate the same.

In the plug of the present invention, the blades have a plurality of oppositely positioned tangs projecting from one face thereof to grip oppositely undercut portions of a block in the blade slot. Because of this structure of the blade, only a small amount of distortion results in the body when the blades are being inserted into the body and this distortion disappears entirely when the blades are in final operative position.

The method of assembling the blades is a feature of the present invention, since it provides for a simple operation by which the blades, after being connected to the conductor, can be placed in final operative position in the plug through the small end of the plug with a minimum of effort and distortion to the body of the plug and which readily holds the blades against longitudinal movement.

Because of the manner in which the plug and blades are assembled, the plug can be readily molded in one piece. This is advantageous since multi-part plugs may become separated at the time when least desired and are obviously more expensive to manufacture.

Another feature of the invention resides in the simple manner in which the resilient plugs can be molded. The cores for blade slots and other passages can be readily positioned in the mold and can be easily removed from the resilient body of the plug after the same has been completely molded.

Other features and advantages of this invention will appear from the drawing and the description.

In the drawing—

Figure 1 is a perspective of the plug with the blades inserted.

Fig. 2 is a plan view of the plug.

Fig. 3 is a section along line 3—3 of Fig. 2.

Fig. 4 is a section taken along line 4—4 of Fig. 3.

Fig. 5 is a section taken along line 5—5 of Fig. 2 with the blades inserted.

Fig. 6 is a section taken along line 6—6 of Fig. 5.

Fig. 7 is a view showing one-half of the mold with the core members in place.

Fig. 8 is a perspective view of the blades as they are positioned in the plug.

In my copending application, Serial No. 129,235, filed March 5, 1937, there is provided a resilient attachment plug having blades held therein without distortion of the plug. These blades are provided with notches on the side edges which interfitted with projections on the sides of the slot. Since the projections extended a substantial distance into the slot, the plug was considerably distorted when the blades were inserted.

The present invention is an improvement on this construction and provides blades which may be inserted with a minimum amount of distortion to the plug and which when inserted are held against longitudinal movement by gripping action between the blade and the plug, without any distortion of the plug.

The attachment plug of the present invention, includes a body 10 made of resilient moldable material and preferably is made in one piece. It is provided with a pair of blade slots 11 for receiving and supporting contact blades 12. When the blades 12 are inserted in the body, the operative portions thereof project from an end 13 of the body, while a cable 14, the wires 15 of which are connected to the blades, projects from the other end of the body through a cavity 16. The cavity 16 merges with the blade slots 11 and forms the entrance passage from the blades when they are to be received in the blade slots. A suitably shaped lug 17 projects into the cavity 16 and acts to space the wires in the cavity and serves as a guide when the blade is inserted into the blade slot.

According to the present invention, the outer walls 18 of the blade slots are smooth and uninterrupted so that when the blade enters the slot the free end 19 of the blade may slide along this wall without obstruction. As shown in Fig. 3, the inner wall 20 of the blade slot is also substantially continuous, and the space between the walls of each slot is substantially the thickness of the blade.

Each blade is provided with some anchoring means 21, in the form of an aperture in the embodiment of the invention herein disclosed, and serving to hold the end of the wire 15 to the blade so that it may conveniently be soldered thereto.

In assembling the cable and plug, the wires are secured to the blades and then the blades are inserted through the passage 16 and into their respective blade slots 11 until they take the final position shown in Fig. 5 with the free ends projecting for the engagement of contacts in a suitable receptacle.

To anchor the blades in the blade slots, the present invention provides a form of interconnection between each blade and the body which does not require that the body, which is of resilient material, be maintained under distortion after the blades are inserted.

For this purpose, the inner wall 20 of each blade slot is formed in part by a block 22 having spaced edges 23 and 24 which are undercut toward each other, and each blade is provided with tangs 25 and 26 spaced longitudinally of the blade and directed toward each other and respectively fitting into the undercut edges 23 and 24. The spacing between the edges 23 and 24 and the tangs 25 and 26 is substantially the same so that when the blade is located in the slot the portion of the block 22 between the edges 23 and 24 will not be under appreciable compression or distortion and yet the blade will be held in the slot firmly against unintentional longitudinal movement in either direction.

It will be seen that due to the interlocking engagement of the spaced oppositely extending tangs 25 and 26 with the respective undercut edges or notches 23 and 24 and the walls of the slots, the blades are permanently held in their respective slots against removal therefrom except by actual destruction of the plug. The slight movement incidental to the insertion of the blades into a socket is insufficient to cause a disengagement of the tangs relative to the undercut notches. In fact, longitudinal movement of the blade in either direction increases the union between the blades and the plug body as this movement causes the tangs 25 or 26 as the same are directed toward each other and respectively fitting into the undercut notches 23 and 24 to bite into either one or the other of the notches dependent upon the direction of the movement imparted to the blades.

Preferably, the tangs 25 and 26 are each made by lancing and striking down longitudinal marginal portions of the blade, having the longitudinal central portion of the blade continuous.

To assemble the cable contacts and plug body, the contact blade to which the wire ends have been secured is inserted into the cavity 16 with the free end of the blade first. Then the blade is pushed into the slot 11, the free end riding on the smooth outer wall 18. When the tangs 25 reach the block 22, the portion of the body between the outer wall 18 and the exterior of the body will yield outwardly, permitting the tangs 25 to pass the block 22 until the tangs 26 enter the undercut edges 24 of the block 22. At this time, the tangs 25 will not have passed the undercut edges 23, and to cause this to occur the projecting end of the blade is pulled outwardly distorting the material of the block 22 until the tangs 25 may enter the undercut edges 23. Upon release of the pulling force on the blade, the material of the block will resume its natural position, and there will not be any appreciable distortion of any portion of the body. To permit this additional movement of the blade, the body is open from the undercut edges 23 to the end 13 of the body.

As shown in Fig. 7, the mold 30 has formed therein a cavity of the desired external contour of the plug. A similar mold section (not shown) is provided to close the mold. Positioned in an aperture in the mold at the top of the plug is an element 31 carrying a pair of core members 32 which are the length of the blade slots. Secured to the edge of these blade slot core members, as shown in Fig. 7, are a pair of ribs having tapered ends 33, which produce the undercut portion 23. The ribs produce a pair of slots 34 adjacent the upper end of the blade slots. Positioned in the other end of the mold is a core member 35 for making the common opening. The end of this core member engages the end of the blade slot as at 36 to make a complete opening through the plug. A portion 37 of the core member when in position is designed to form the undercut portion 24. After the core members have been inserted in the lower half of the mold, as shown in Fig. 7, the upper shell or half of the mold is locked thereto and molding material inserted therein. When the molding operation is completed, the mold is opened and the plug removed and the cores then withdrawn from the ends of the plug requiring minimum number of operations and minimum amount of effort.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. In an attachment plug, a resilient body having a blade slot therein provided with notches undercut towards each other forming a yielding block as a part of one wall of the blade slot; a single thickness uniplanar blade adapted to be inserted into the slot; and means on the blade and projecting from one face thereof for interlocking engagement with said notches for permanently locking the blade in the slot when the same is in the proper assembled position therein, said yielding block being compressible to allow the projecting means on the blade to be positioned in the undercut notches.

2. In an attachment plug, a resilient body having a blade slot therein; a blade adapted to be inserted into the slot, one wall of said slot having spaced transversely extending notches which are undercut toward each other; and tangs spaced longitudinally of the blade projecting toward said wall and fitting in said undercut notches of the wall of the slot for locking the blade therein when the blade is in the proper assembled position in the body, the resilient material of the wall between the notches being compressible to allow the tangs on the blade to be positioned in the undercut notches.

3. In an attachment plug, a resilient body having a blade slot therein; a blade adapted to be inserted into the slot, one wall of the slot having spaced transversely extending notches which are undercut toward each other; and tangs spaced longitudinally of the blade projecting toward said wall and fitting in said undercut notches of the wall of the slot for locking the blade therein when the blade is in assembled position in the body, the blade being of such size and shape as to engage the opposite wall of the slot, the last-named wall being uninterrupted for the smooth guidance of the free end of the blade into the slot, the resilient material of the wall between the notches being compressible to allow the tangs on the blade to be positioned in the undercut notches.

4. In an attachment plug, a resilient body having a blade slot therein; a blade adapted to be inserted into the slot, one wall of the slot having spaced transversely extending notches which are undercut toward each other; and tangs spaced longitudinally of the blade projecting toward said notched wall and fitting in said undercut notches for locking the blade in the slot when the blade is in assembled position on the body, said tangs being spaced apart a distance substantially equal to the distance between the undercut notches of the one wall of the slot so that the walls of the same are substantially free from distortion when the blade is in assembled position in the body, the opposite wall of the slot being uninterrupted for the smooth guidance of the free end of the blade into the slot, said resilient body yielding to permit the tangs to be positioned in the undercut notches.

5. An attachment plug comprising a resilient body having a plurality of blade slots therein formed with a plurality of notches in a wall of each slot; and a uniplanar blade adapted to be positioned in each blade slot and having tangs in pairs intermediate the ends thereof, said tangs being located adjacent the margins of the blade and projecting from the face thereof for engaging the notches and permanently anchoring the blades in place in the slots when assembled therein.

6. A terminal fitting for an electrical conductor comprising a one-piece molded resilient rubber body having a pair of spaced contact blade-positioning slots in one side of said body; a single conductor-receiving passage in another side of said body communicating with the inner ends of said slots; a pair of contact blades each having an insulated electric conductor secured thereto, said contact blades being simultaneously insertable through the passage into said slots after said wires are connected to the respective blades, each blade having spaced oppositely extending barbs formed thereon projecting outwardly of one face thereof; and notches undercut towards each other on one wall of each slot, the barbs being of such size and shape relative to the size and shape of such slots as to necessitate distortion of the body to permit insertion of the blades whereby, after the blades have emerged into said slots and are in the assembled position, the resiliency of the body is effective to cause the distorted body to return to normal conditions so that the barbs are moved into the undercut notches to interlock with one wall of each slot, said interlocking engagement permanently anchoring each blade in its respective slot.

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