

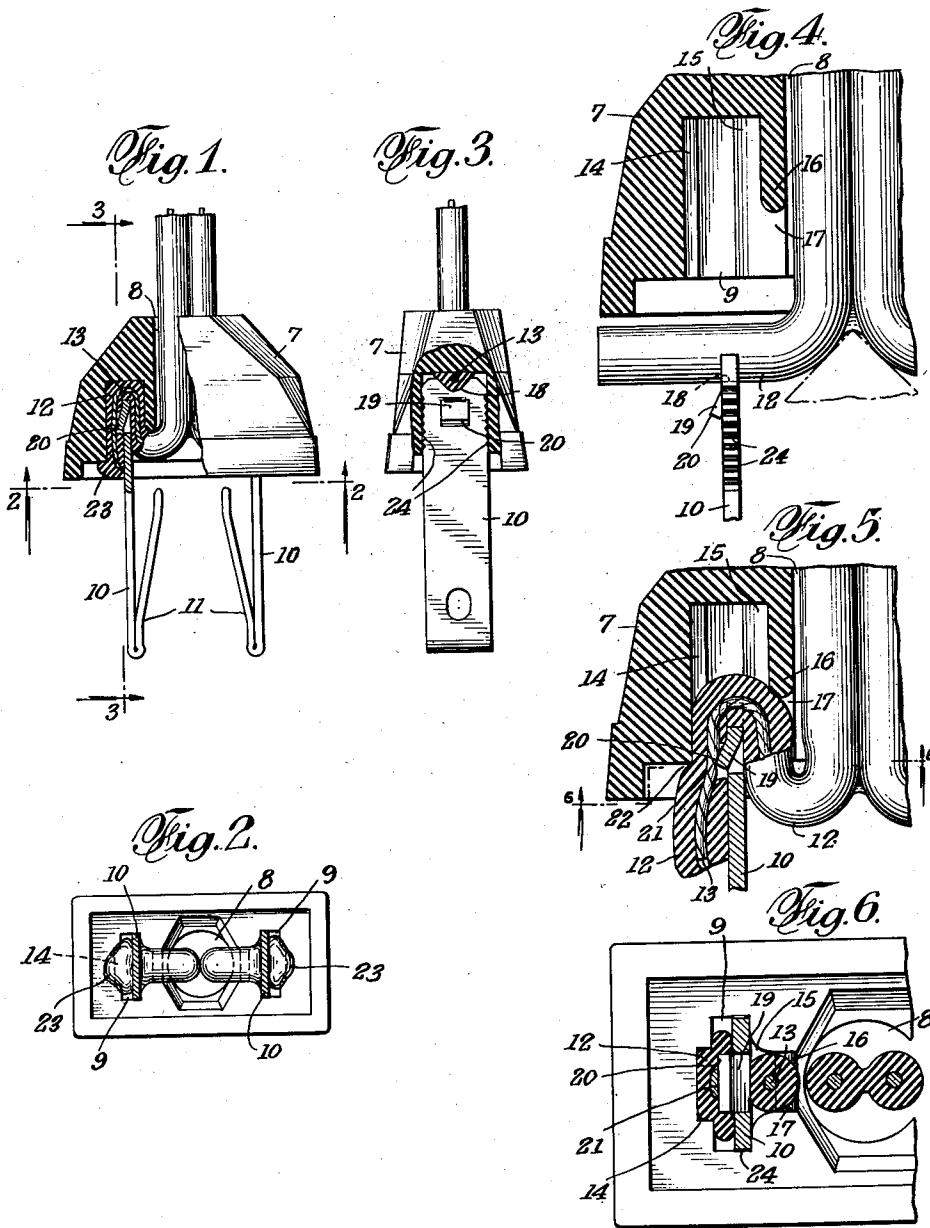
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ATTACHMENT PLUG

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ATTACHMENT PLUG

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2 Claims. (Cl. 173—381)

The invention here disclosed relates to electrical attachment plugs.

Special objects of the invention are to provide a construction in which positive and secure mechanical and electrical connection between the constituent elements of the plug can be automatically and instantly effected by the simple act of assembling the parts.

Particularly it is an object to accomplish full and complete electrical connection between the wires and contact blades without previously removing insulation from the wire ends and to secure this result without piercing or cutting into or otherwise injuring or weakening the wire.

Also it is an object to partially strip the insulation in the assembling operation for making contact between the blades and wire and to utilize this stripped insulation as a sealing medium in situ, holding and sealing the wire in place.

Further objects and novel features of the invention will appear as the specification proceeds.

The drawing accompanying and forming part of the following specification illustrates a practical, commercial embodiment of the invention, but it is to be considered that changes and modifications may be made all within the true intent and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 is a broken part sectional side view of one of the assembled plug structures.

Fig. 2 is an end view with the contact blades in section as on line 2—2 of Fig. 1.

Fig. 3 is a broken part sectional view as on line 3—3 of Fig. 1.

Figs. 4 and 5 are broken enlarged sectional details illustrating assemblage and automatic mechanical and electrical connection of the parts.

Fig. 6 is an enlarged broken cross-sectional detail as on line 6—6 of Fig. 5.

In the several views, the plug or cap body is designated 7. Ordinarily this is a single molded piece of relatively hard rigid material having a central cord passage 8, with relatively deep contact blade receiving seats 9, at opposite sides of the same.

The contact blades 10, usually and preferably are of relatively thin, nonrigid flexible material, doubled as at 11, Fig. 1, to provide spring terminals yieldably engageable with the socket terminals of an electrical outlet.

In Figs. 4, 5 and 6, the blades are indicated as of appreciably less thickness than the width of the blade receiving seats 9, thus to leave room at opposite sides of the blades for the usually more or less elastic insulating covering 12, of the elec-

tric wires 13. Further to locate and accommodate such flexible and more or less elastic insulation, the seats 9 are shown as having narrower insulation receiving grooves 14, 15, at opposite sides of the same. These grooves are shown as located on the central transverse axes of the blade seats, Figs. 2 and 6, and the intervening walls 16, between grooves 15 and cord passage 8, are of reduced extent as shown at 17 to accommodate the insulated wires and formed with rounded edges to provide strain reliefs.

At their entering ends, the contact blades are shown as having notches 18 for receiving and centering the insulated wires as in Fig. 4. In back of these notches and in line therewith, lugs 19, are struck out of the blades on inclines which will enable them to act as wedges in driving the blades into their seats. The severed ends of these lugs are left with relatively sharp projecting edges 20, the function of which is to cut through the insulation at the adjoining side of the wire with a pressing and squeezing action and to then flatten and scrape, without actually cutting into the wire.

Figs. 4, 5 and 6 illustrate the successive stages. In the first of these views, the two insulated strands of the cord are shown spread apart and located over the seats in the cap body. In this relation, the blades are advanced to engage the spread ends of the wires in the notches. Then, as the blades advance into the seats 9, Fig. 5, they will squeeze and stretch the rubber insulation. The attenuation of the rubber then taking place makes it possible for the outwardly projecting corner edges 20, of the lugs 19, to cut through the thinned walls of insulation and to press directly against the adjoining sides of the wires, dragging and scraping over the wire, thus to more or less flatten them as shown at 21, Fig. 6 at the areas of final physical contact between the lugs and bared sides of the wires. The corner edges 20, thus perform the several functions of cutting through the insulation, scraping the near side of the wires clean and finally coming to rest pressing firmly against the bared and more or less flattened sides of the wires.

The insulation after being cut at one side, Fig. 5, is squeezed and held at the opposite side by the relatively sharp corner edge 22, of the blade seat, so that as the action progresses, the insulation is stretched outward over the end of the wire, "balling" up as indicated at 23 in Figs. 1 and 2, as a more or less complete seal over the end terminus of the wire. Thus the area of contact be-

tween the blade and the wire is substantially sealed and kept in good electrical conductivity.

The insulation compressed about the end and both sides of the entered blade forms an elastic mounting for the blade, yieldable as may be required to permit the blade to accommodate itself to a socket contact and such yielding may take place without disturbing the electrical contact between the blade and the wire, since the surrounding mass of insulation is in a relatively high state of compression. The physical and electrical contact between blades and wires will therefore be maintained indefinitely.

While the frictional holding effect may ordinarily be sufficient, the edges of the blades may be roughened, toothed or burred as indicated at 24, to more or less bite into the adjoining walls of the blade sockets.

As the contact blades are not required to pierce or cut through the insulation by direct impingement, these blades need not be of heavy rigid stock, but can be made of light flexible stock suited to the formation of the spring contacts shown. The only cutting action is that effected by the sharp corner edges of the contact lugs and these only come into action as the rubber is stretched and to that extent weakened for easy, squeezing, cutting pressure. Furthermore, this cutting of the insulation continues for an appreciable period while the blade is being driven into place, thus making certain that the insulation will actually be cut through and in time for the lug to meet and to flatten and scrape the adjoining side of the wire. As considerable force is required to effect this assembly and actual physical joining of the parts, a machine is usually employed which locates and holds the cap body and which has a slide or carrier for the blades, operating to thrust the blades against the spread ends of the wire and to then double and force the wire ends around the ends of the blades, fully into the seats. The cutting or tearing of the insulation at one side of the wire may take place while the wire is being pinched over toward the shoulder 22, Fig. 5. Then as the insulation is further compressed, the wire will be flattened and the lug may yield somewhat, thus to further increase the area of contact, as a result of such additional pressure in the socket.

What is claimed is:

1. An electrical plug of the character disclosed, comprising a rigid plug body having a cord passage with blade receiving seats at opposite sides of the same, said blade receiving seats being separated from the cord passage by walls having rounded edges and said plug body having narrower wire locating grooves at the outer sides of said blade receiving seats with sharply angled corner edges at the outer ends of the same opposed to said rounded edges at the inner sides of the blade receiving seats, insulated wires in said cord passage and having doubled portions disposed in said blade receiving seats and with the outer end portions of the same lying in said wire locating grooves and with the insulation of the wires looped over said rounded edges at the

inner sides of the seats and squeezed by said sharply angled edges at the outer sides of the seats, contact blades of substantially the same width throughout driven in said seats over said doubled portions of the insulated wires, said blades having notched inner ends engaged over the doubled portions of the wires and having narrower integral lugs located wholly between the side edges of the blades, said lugs being partially severed from the blades and struck outward toward said sharply angled corner edges at the outer ends of the wire locating grooves, said outwardly struck portions of said narrow lugs having sharply angled corner edges opposed to said sharply angled corner edges of the plug base to scrape the insulation away from the adjoining sides of the thus located wires when the blades are driven into the plug body, said insulation scraping edges of said narrow lugs lying in mechanical and electrical engagement with the scraped sides of the wires.

2. An electrical plug of the character disclosed, comprising a rigid plug body having a cord passage with blade receiving seats at opposite sides of the same, said blade receiving seats being separated from the cord passage by walls having rounded edges and said plug body having narrower wire locating grooves at the outer sides of said blade receiving seats with sharply angled corner edges at the outer ends of the same opposed to said rounded edges at the inner sides of the blade receiving seats, insulated wires in said cord passage and having doubled portions disposed in said blade receiving seats and with the outer end portions of the same lying in said wire locating grooves and with the insulation of the wires looped over said rounded edges at the inner sides of the seats and squeezed by said sharply angled edges at the outer sides of the seats, contact blades of substantially the same width throughout driven in said seats over said doubled portions of the insulated wires, said blades having notched inner ends engaged over the doubled portions of the wires and having narrower integral lugs located wholly between the side edges of the blades, said lugs being partially severed from the blades and struck outward toward said sharply angled corner edges at the outer ends of the wire locating grooves, said outwardly struck portions of said narrow lugs having sharply angled corner edges opposed to said sharply angled corner edges of the plug base to scrape the insulation away from the adjoining sides of the thus located wires when the blades are driven into the plug body, said insulation scraping edges of said narrow lugs lying in mechanical and electrical engagement with the scraped sides of the wires, said contact blades having opposing inwardly turned doubled spring ends at the inner faces of the blades on the opposite sides from said outwardly struck bared wire contacting lugs, to thereby apply outward pressure on said lugs when compressed by engagement in an electrical blade receiving receptacle provided for the same.

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