

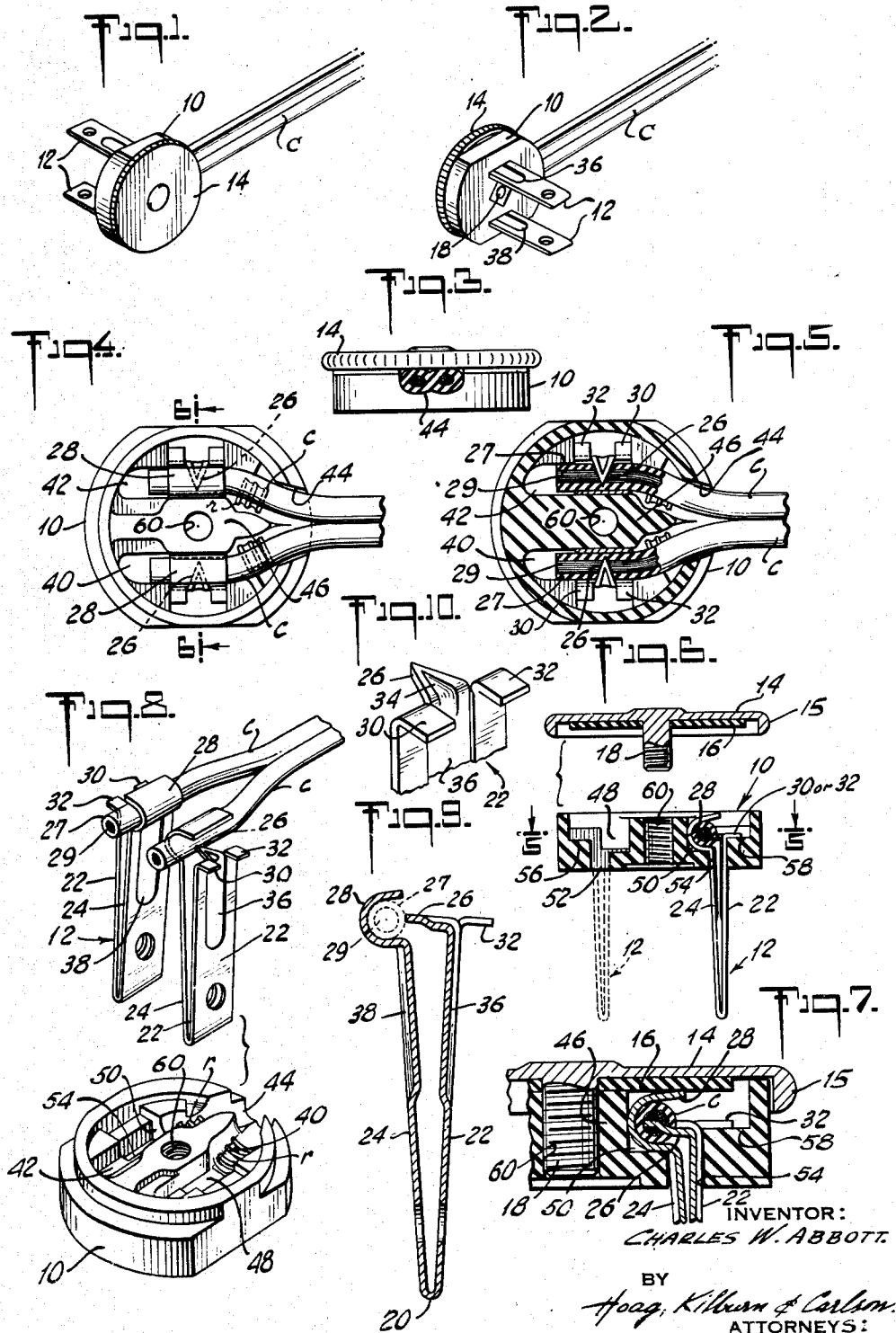
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PLUG ASSEMBLY

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PLUG ASSEMBLY

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This invention relates to plug assemblies, of the type used with lamp cords for insertion in wall receptacles and the like, as for example for connecting lamps, toasters and a wide variety of electrical appliances with a circuit wired to the receptacle.

Heretofore plug assemblies have been unduly bulky, not only protruding from wall surfaces a considerable distance but holding cords connected to them in a manner to cause further protrusion. For this reason plugs are frequently broken, damaged or disconnected by being struck by furniture, vacuum cleaners, brooms, floor mops and the like, or by tripping over their cords adjacent to them. Newer forms of plugs also have bases so narrow that they do not seat firmly against the surface of receptacle hubs into which they are thrust, hence their prongs are easily partly or completely disengaged from receptacle contacts through side movement imparted by strains on cords connected to them.

Furthermore, many plugs require considerable skill and effort to connect up conductors of lamp cords to their terminals, an assembly that makes necessary the use of knives, screw drivers and sometimes pliers. Insulation must be cut or scraped off before conductors are connected and both the strength and electrical carrying capacity of conductors is often impaired by the cutting or breaking off of strands in the process.

Unskilled bending of the wires around screw terminals results in failure to properly confine short or stray strands of the conductor which sometimes result in short circuiting, burning fingers of installers or setting the cord insulation afire, when plugs so wired are inserted in receptacles and current imposed on the conductors.

These difficulties in wiring of plugs, are to some degree lessened by newer types of attachment plugs in which cord insulation is not removed but is pierced by pointed contacts which supposedly make contact with conductors in the cords under external squeezing applied by various mechanical means. However, the plugs of this type heretofore available have still been difficult to assemble and are unsatisfactory because frequently the pointed contacts engage only a few strands of the many composing the conductor and often fail to establish the low resistance contact required to provide passage of permitted amperage without overheating and loss of electrical efficiency.

By the plug design, and assembly of component parts provided herein, bulkiness and protrusion

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of plug and connected cord is reduced to a minimum heretofore thought impossible, and the task of assembly or disassembly has been so simplified that it may be quickly and very easily done by unskilled persons without tools, and with complete and dependable safety. The tedious procedure of stripping off insulation and properly assembling bare conductor ends beneath terminal screws is eliminated, and conductors may be assembled in the head of contact blades by slightly separating the two arms of the blade, inserting the conductors in the yokes opposite spikes disposed to deeply penetrate into the strands of conductors, pushing the prongs of the contact blades into the accurately dimensioned slots in the plug body, and screwing the cover of the plug in place to firmly lock the conductor assembly in place.

An object of the invention is to provide a simple, practical and durable plug assembly.

Another object of the invention is to provide in a plug assembly contact blades of improved structure adapted to receive and provide good contact with new or worn cords.

Another object of the invention is to provide a plug occupying a minimum of space, which may be assembled or disassembled without tools, and in which a pointed contact is moved into accurate, low resistance contact with the conductive core of a cord by the simple act of inserting a contact prong in a plug body.

Other objects of the invention will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be pointed out in the following description, and the scope of the application of which will be indicated in the following claims.

The invention will best be understood if the following description is read in connection with the drawings, in which,

Figure 1 is a perspective view of a plug assembly embodying my invention, looking at the top of the cap;

Figure 2 is a perspective view of the assembly shown in Figure 1, looking at the face of the plug which in use is against the receptacle, and which is referred to herein as the under face;

Figure 3 is a side elevational view of the assembly shown in Figures 1 and 2;

Figure 4 is a top plan view of the plug body with contact blades and conductor ends posi-

tioned in the channels and recesses provided in the face of the plug which is adjacent the cap and which is referred to herein as the inner face;

Figure 5 is a view similar to Figure 4 but partly in cross section;

Figure 6 is a cross sectional view, showing the cap in exploded relation to the plug body with one contact blade seated in the plug body and engaging a conductor end therein, the section of the plug body being taken on the line 6-6 of Figure 4;

Figure 7 is a detail view on a large scale similar to Figure 6 but showing the cap assembled to the plug body and clamping the head of a contact blade between itself and the plug body;

Figure 8 is a perspective view showing the contact blades in exploded relation to the plug body, with conductor ends in place in the conductor engaging portions of the contact blades, but prior to insertion of the spikes 26 through the covering of the conductor ends, which is accomplished as the contact blades are inserted in the openings of the plug body;

Figure 9 is a side elevational view in cross section of one of the contact blades showing a conductor end in place in the conductor receiving portion or yoke of the contact blade; and

Figure 10 is a detail perspective view of the free end of contact blade arm 22 showing the spike 26 and the lugs 30, 32 and the ribbed structure of the spike and of the contact blade arm.

The assembly described herein comprises only four parts, namely, a plug body 10, two separate and removable contact blades 12 which are identical, and a cap 14. If the cap is made of metal, instead of insulating material, and a layer of insulating material 16 is supplied on the inner surface of the cap, as shown herein, the total number of different parts employed for the whole assembly are five in number, and if the cap screw 18 is formed initially separate from the cap, and later joined to the cap, the total number of parts required may be said to be six.

Essentially there are only three parts, the plug body, the contact blades, and the cap, and these may be readily assembled or disassembled at any time. No separate screws or binding posts are employed. The contact blades 12 are not molded into the plug body 10; the insulation need not be removed from the conductor ends, and no effort is required for effecting electrical contact between a blade and a conductor other than to position the conductor end in a conductor receiving portion of the blade and insert the blade in the opening in the plug body provided for this purpose.

The contact blades 12 are formed of a length of conductive metal folded along the line of fold 20 forming two arms 22 and 24 which initially diverge somewhat from said line of fold toward their free ends. At the free end of arm 22 a spike 26 is provided extending substantially at right angles to said arm 22 toward the center of a conductor receiving portion, angle, or yoke 28 provided adjacent the free end of arm 24. Said conductor receiving portion 28 may be formed by bending said arm 24 first outwardly and then inwardly adjacent its upper end. It is shown herein as substantially U-shaped, providing a channel in which a conductor end may be rested and positioned, said channel being open in the direction of the spike 26, adjacent the free end of arm 22; so that when the arms 22 and 24 are pressed together the spike will penetrate through the covering 27 of a conductor C positioned within the conductor

receiving portion 28 and establish electrical contact with the core 29 of the conductor.

Projecting from arm 22 on either side of spike 26 lugs 30 and 32 are provided bent substantially at right angles to said arm 22 but in a direction substantially opposite to the spike 26.

Preferably spike 26 is ribbed along its median line, as at 34; arm 22 is ribbed intermediate its ends, as at 36; and arm 24 is ribbed, as at 38, to give greater strength and accurate spacing to said members.

In the plug body 10 channels 40 and 42 are provided, preferably by molding them in the outer face of the plug. These channels have their beginning in a common opening 44 provided in the marginal wall of the plug body 10 and of a size to receive two conductors side by side.

These channels first diverge to opposite sides of the partition or dividing wall 46, and then extend in substantially parallel relation on opposite sides of said dividing wall, to the rim of the plug body at the far side of the outer face of the plug body from said common opening 44. Projecting upwardly at intervals from the surface defining the channels 40 and 42 are ribs *r* adapted to grip the conductor ends and the insulation covering thereof when the plug parts are assembled. As illustrated here in Figure 8, the ribs *r* extend upwardly .010" above the face of said channels and are undercut between them .030". The tops of the ribs are shown slightly rounded.

In the parallel portions of channels 40 and 42 recesses 48 and 50 are provided which receive the conductor receiving portions 28 of the contact blades 12, referred to herein also as angle or bracket portions, and in said recesses the openings 52 and 54 are provided which extend through the wall of the plug, and through which the prongs of the contact blades are inserted in assembling the blades and the plug body.

Along the outer margins of said openings 52 and 54 respectively, shoulders 56 and 58 are provided, rising above said channels 40 and 42, by an amount substantially equal to one half the height of said conductor receiving portions 28. Said shoulders coast with said recesses respectively to position the heads of the contact blades respectively including the conductor receiving portions 28 thereof, and also serve as seats, on which rest said lugs 30 and 32, which in turn aid in holding the contact blade arms 22 level and firmly seated in the plug base. Lugs 30 and 32 coast with said shoulders and said recesses to provide stops limiting the insertion of the blades through the openings 52 and 54 and in providing surfaces between which and the cap the heads of the blades are firmly held when the cap 14 is secured on and over the plug body.

The openings 52 and 54 are preferably just large enough to receive the blades 12 with their arms 22 and 24 substantially parallel. Consequently when a blade is inserted in one of said openings the bent or folded end will enter the opening readily and the sides of the opening will force the arms 22 and 24 to approach one another with the result that by the time the conductor receiving portion or bracket 28 is seated in recess 48 or 50 the spike 26 will have penetrated through the covering of, and into contact with the core 29 of a conductor positioned in said bracket.

The plug body has the internally threaded bore 60, shown located centrally of the plug body in the partition 42, and extending from the inner face of the plug body toward the rear face of the plug body, and cap 14 has projecting from the

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center of its inner surface the screw 18, which as stated above, is integral with cap 14, and is adapted to be received in and threadedly engaged in the said bore 60 of the body. Since the cap 14 may be easily grasped by hand and turned it may be readily assembled to or disassembled from the plug body, without the use of tools of any kind. For convenience the down turned peripheral flange 15 of the cap may be knurled as shown in Figure 3.

When the cap is secured on and over the plug body its insulated inner surface 16 coacts with the inner face of the plug body in holding the contact blades seated in the plug assembly with their prong portions projecting the desired distance externally of the plug body.

The assembly of the plug body and cap has a thickness of only approximately one-fourth of an inch. When inserted in a wall assembly it lies close to the wall and is not likely to be dislodged inadvertently as by being struck by floor mops, polishers, or by furniture which is being moved. If desired the plug assembly may be quickly and easily disassembled and detached from one set of conductors and attached to another set of conductors and reassembled, without the use of any tools and the conductor ends are held at all times so as to make short circuiting practically impossible.

It will thus be seen that there has been provided by this invention an article in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

What I claim is:

1. A contact blade for use in a lamp cord plug

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comprising a length of conductive metal folded to provide two slightly diverging arms one of said arms comprising adjacent its free end a U-shaped channel having its axis substantially perpendicular to said arm and being open in the direction of the other arm but extending around a conductor therein through at least 180° said other arm comprising adjacent its free end a spike projecting toward the center of said U-shaped channel.

2. A contact blade for use in a lamp cord plug comprising a length of conductive metal folded to provide two slightly diverging arms one of said arms being bent adjacent its free end into a U-shaped channel having its axis substantially perpendicular to said arm and open in the direction of the other arm to receive and retain a conductor therein, said other arm having its end terminating in a spike bent over at right angles to said arm and projecting toward the center of said U-shaped channel.

3. The device as claimed in claim 2 in which said blade is embossed throughout a portion of its length to provide a strengthening rib including at least the portion of said blade comprising said spike.

4. The device claimed in claim 2 including lug means projecting substantially at right angles from said other arm adjacent its free end, and having a bearing surface extending from the arm in a direction opposite to said spike.

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