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W. R. FRANCIS

3,015,877

METHOD FOR MAKING AN ANGLE PLUG WITH LOOPED CONDUCTOR

Filed Aug. 1, 1957

FIG. 1.

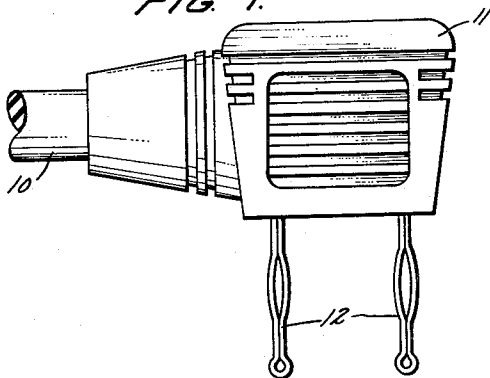


FIG. 2.

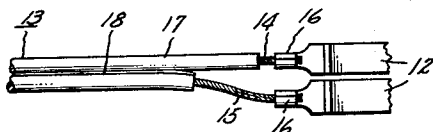


FIG. 3.

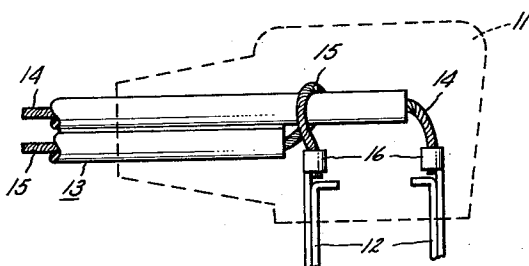
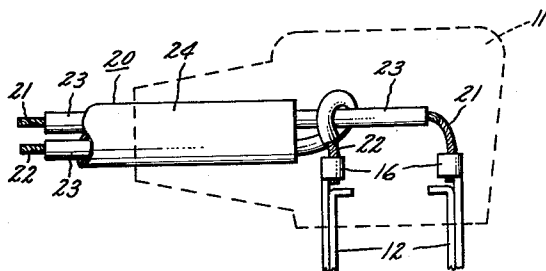


FIG. 4.



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METHOD FOR MAKING AN ANGLE PLUG WITH LOOPED CONDUCTOR

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2 Claims. (Cl. 29—155.55)

The present invention relates to electrical conductors and particularly to a method for manufacturing an angle plug of an electrical cord of the type used for connecting various electrical appliances to a plug receptacle or convenience outlet. The majority of electrical cord sets have a standard attachment plug with contact prongs that are generally parallel with the axis of the cord at the point where the cord enters the plug. A modification of this is an angle plug where the cord enters a side of the plug so that the contact prongs or blades make an angle of 90° with the longitudinal axis of the cord.

This invention was conceived with the idea of designing an angle plug so the plug body will be of miniature size both for appearance and cost reasons. While angle plugs in general are not new in this art, the present invention is an important contribution in the art of making such plugs.

The principal object of this invention is to provide an improved method for manufacturing an angle plug of reduced size where the contact prongs or blades lie within the same plane as the cord, and the conductors of the cord are of such a nature that the contact prongs may be assembled simultaneously thereto.

A further object of this invention is to provide an angle plug of reduced size where the conductors at one end of the cord are cut off to an equal length and the surplus portion of one of the conductors is arranged so that it cannot short circuit the other conductor.

This invention is shown as it is embodied in an angle plug where the electric cord enters one side of the plug body and the parallel contact prongs are arranged in a plane that includes the longitudinal axis of the cord where the cord enters the plug body. It should be understood that this invention is valuable even though the cord might enter one side of the plug body at an angle less than 90°. At the present time there is equipment available for crimping a pair of contact prongs to the bare conductors simultaneously. The present invention was conceived with the intention of using such equipment in order to hold the cost of assembling this plug to a minimum. Accordingly, the cord will be cut to the desired length and one end of the cord will have its insulation removed the desired amount with the bare ends of the conductors cut to the same length. Then an operator will insert the contact prongs into a crimping machine and place the ends of the bare conductors against the terminal ends of the prongs to crimp the prongs firmly on the conductors. The molding operation is next in the order of things and the conductor of one of the prongs is first looped by at least a full turn under and around the other insulated conductor in order to shorten the first-mentioned conductor and position it in such a manner that it will not short circuit the said other insulated conductor. This loop is necessary because the parallel contact prongs are arranged in a plane that includes the axis of the cord and one contact prong is much closer to the cord-entrance side of the plug than the other prong.

My invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

FIGURE 1 is a front elevational view of an angle plug embodying my invention attached to a short length of electric cord.

FIGURE 2 is a plan view of a two-conductor rip cord

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having portions of the insulation removed and a pair of contact prongs crimped to the bare conductors.

FIGURE 3 is a view similar to that of FIGURE 1 except the plug body is merely shown in dotted lines to illustrate the present invention of looping a conductor of one of the contact prongs by at least a full turn under and around the other insulated conductor.

FIGURE 4 is a view of a modification of FIGURE 3 where an electric cord of round cross-section is being used.

Referring in detail to the drawing, and in particular to FIGURE 1, there is shown an electric cord 10 and an angle plug 11 having a pair of contact prongs or blades 12 for making engagement with the contacts of a convenience outlet (not shown). The term "angle plug" is derived from the fact that the cord extends out of the plug body at an angle to the contact prongs. As mentioned before, the standard type of attachment plug has contact prongs which are generally parallel with the axis of the cord, as the cord enters the plug body. The subject plug 11 is a special type of angle plug where the contact prongs 12 lie in a plane that includes the axis of the cord 10 as the cord enters the side of the plug body. In the majority of angle plugs the axis of the cord is generally perpendicular to the plane that includes the parallel contact prongs. The present angle plug 11 represents a design of reduced size and improved appearance that is also lower in cost.

FIGURE 2 shows a two-conductor rip cord 13 where the electrical conductors 14 and 15 are cut to the same length, so the contact prongs 12 may have their terminal ends 16 crimped to the bare conductors simultaneously. The rip cord 13 is of standard construction, namely, two stranded conductors 14 and 15 with an oval shaped extruded rubber or vinyl insulating jacket 17 having upper and lower ripping grooves 18 between the conductors to separate the conductors at the ends for connection with an attachment plug or other electrical connector. It will be noted in FIGURE 2 that the insulation of the conductor 15 has been cut back a greater distance than on the conductor 14. The reason for this will be understood after a study of FIGURE 3 wherein the contact prongs or blades 12 have been arranged in a parallel manner with their flat sides facing each other.

The rip cord 13 enters the body of the angle plug 11 (shown in dotted lines) from the left side and the parallel prongs 12 lie generally within a plane that includes the longitudinal axis of the rip cord 13 where it enters the plug body. Consequently, the left-hand contact prong 12 of FIGURE 3 is closer to the cord-entrance side of the plug 11 than is the other contact prong. Accordingly, the conductor 15 is longer than need be and something must be done with the surplus amount of conductor so it will not engage the other bare conductor 14 and create a short circuit. The present invention features the arrangement whereby the conductor 15 is looped by at least a full turn under and around the insulated portion of the other conductor 14 thereby using up the surplus portion of the conductor 15 to prevent possible short circuiting between the bare conductors. It should be understood that although the rip cord 13 is shown entering the side of the angle plug 11 in a generally vertical position with the conductors 14 and 15 in the vertical plane, the cord could also be turned flatwise so that the conductors would lie in a horizontal plane.

FIGURE 4 is a modification of the arrangement of FIGURE 3 in that a round cord 20 has been substituted for the oval shaped rip cord 13 of FIGURE 3. The round cord 20 has a pair of stranded conductors 21 and 22 each of which are separately insulated as by the insulating layer 23 of extruded rubber or vinyl. In the final step of manufacturing this cord a rubber or vinyl jacket 24 is formed over the insulated conductors. Since the insulation 23 on the looped conductor 22 is somewhat

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smaller in diameter than the insulation on the conductor 15 of FIGURE 3, it is possible to leave the insulation 23 intact and loop the insulated conductor 22 under and around the other insulated conductor 21.

Having described above my invention of a novel angle plug of reduced size, it will be readily apparent to those skilled in this art that the contact prongs may be assembled in pairs on the cords without danger that the conductors will short circuit across each other. Modifications of this invention will occur to those skilled in this art and it is to be understood, therefore, that this invention is not limited to the particular embodiments disclosed but that it is intended to cover all modifications which are within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A method for forming a solid angle plug on an integral two-conductor electric cord comprising the steps of cutting each conductor of said two conductor electric cord to substantially the same length, crimping a contact prong to each of said conductors simultaneously, looping the conductor of one prong at least a full turn under and around the conductor of the other prong, arranging said prongs parallel and opposite to each other and at substantially right angles to the axis of the cord, and molding an insulating plug body around the area of the cord which is crimped to the prongs.

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2. A method for forming a solid angle plug on an integral two-conductor electric cord comprising the steps of cutting each conductor of said two-conductor electric cord to substantially the same length, removing insulation from one end of each of said conductors at one end of said cord, crimping a contact prong to each of said conductors simultaneously, looping the conductor of one prong at least a full turn under and around the conductor of the other prong, arranging said prongs in parallel and opposite to each other and at substantially right angles to the axis of the cord in a plane that includes the longitudinal axis of the cord, and molding an insulating plug body around the area of the cord which is crimped to the prongs.

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