March 7, 1944. M. G. HEISER ET AL 2,343,664

ATTACHMENT PLUG

Filed April 25, 1941

Fig. 1.

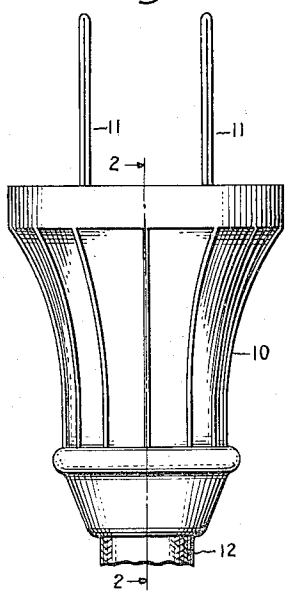


Fig. 2.

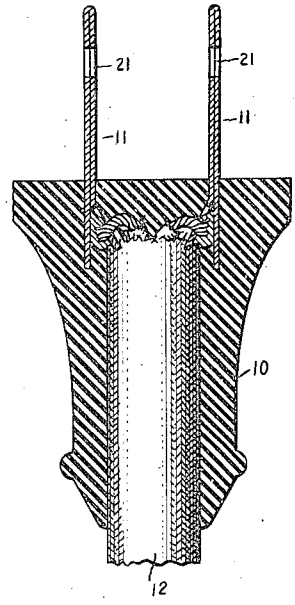


Fig. 3.

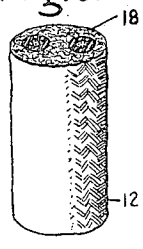


Fig. 4

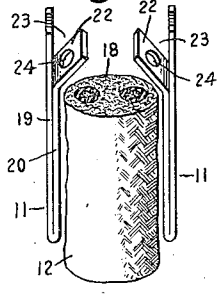


Fig. 5.

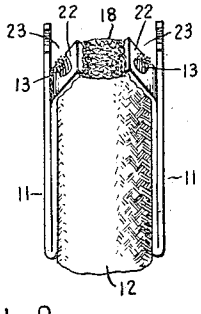


Fig. 7.

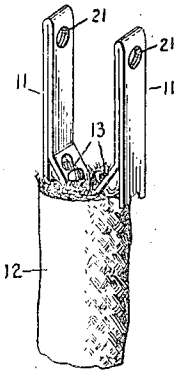


Fig. 6.

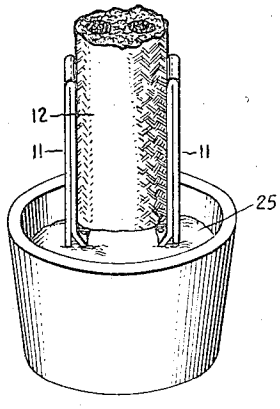
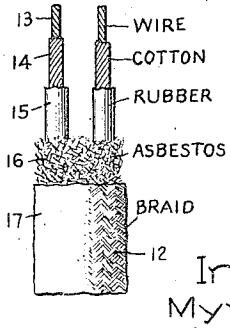


Fig. 8.



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UNITED STATES PATENT OFFICE

2,343,664

ATTACHMENT PLUG

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Application April 25, 1941, Serial No. 390,360

2 Claims. (Cl. 29—155.55)

Our invention relates to an attachment plug for cord sets and more particularly to an attachment plug for heater cord sets and to the method of assembling the plug on the heater cord.

It is an object of our invention to provide an attachment plug of the type described which comprises relatively few parts and which may be quickly and easily assembled in electrical connection with the conductors of a heater cord.

It is another object of our invention to provide an improved method of assembling the plug prongs on the individual conductors of a heater cord without the necessity of stripping the cord.

In the accompanying drawing, Fig. 1 is a view of an attachment plug constructed in accordance with our invention; Fig. 2 is a sectional view through the plug taken along the line 2—2 of Fig. 1; Fig. 3 is an end view of an electrical conductor preparatory to being connected to the attachment plug; Figs. 4, 5, 6 and 7 illustrate the steps in connecting the conductor to the contact prongs of the attachment plug; and Fig. 8 shows the detailed construction of the electrical conductor.

In the manufacture of cord sets for electrical appliances, the length of electrical cord and the attachment plug for connecting the appliance to a wall box are assembled together as a unit at the factory. In most instances the attachment plug is permanently connected to the conducting cord as by a soldered or welded joint; this provides a safe and excellent electrical connection between the conductors of the cord and the contact prongs of the attachment plug and is one which will stand a great deal of abuse incident to the strains and pulls to which such cord sets are ordinarily subjected. Our invention is particularly concerned with an improved construction and method for making a soldered connection in such instances.

In making a soldered connection, it is first necessary to strip the ends of the individual conductors of the cord to expose the bare wire for the soldering operation. In the case of rubber insulated cords, such as ordinary lamp cord, the stripping operation is comparatively easy since the rubber insulation may be simply cut and pulled off the end of the conductor; this may be done by hand or by machine. In the case of cords insulated with relatively bulky material, such as asbestos protected heater cords, the stripping operation is not so easy, since the fluffed up overlying layers of insulating material must first be removed or drawn back to expose the rubber insulated single conductors before they can be stripped. The fluffed up layer of asbestos is hard to handle and cannot be cut as easily as the rubber. In addition, the outer protective braid must be removed. These are time-consuming operations which increase the cost of manufacture. According to our invention, however, it is unnecessary to strip electric cords of this type when making a soldered connection to a contact prong.

Referring to the drawing, our plug connector comprises a body of insulating material 10 and spaced contact prongs 11 connected to an electric cord 12, preferably a heater cord of the type provided with relatively fluffy heat-resistant insulation, such as asbestos, and an outer protective covering of braid. In the connector illustrated the body 10 is formed of insulating material, such as rubber, molded around the ends of the electric cord and contact prongs and the connections between these elements; in some instances, however, it may be desirable to preform the body of the connector and assemble the contact prongs and cord within the body.

The cord 12 comprises a heater cord of conventional type, such as an asbestos heater cord. As shown by Fig. 8, such a cord is provided with two stranded copper conductors 13 insulated individually with a cotton wrap 14 and an outer covering of rubber 15. The cotton wrap prevents the rubber insulation from adhering to the stranded wire thereby insuring free stripping of the rubber. The individual insulated conductors are encased in a wrap of asbestos 16 which is applied in a relatively bulky and fluffy mass, as by a carding machine, the assembly being protected by an outer braid 17 of cotton or rayon. The asbestos layer protects the individual conductors from the heat of the appliance with which the cord set is used. According to former practices, it has been necessary to strip the heater cord, in much the manner shown by Fig. 8, in order to make a soldered joint to an associated contact; at least, it has been necessary to remove a portion of the asbestos and braid to expose the individual conductors.

According to our invention, however, the cord is prepared for connection to the attachment plug prongs, not by stripping off the individual layers of insulation, as in the showing of Fig. 3, but by simply severing the end of the cord at the proper length. Preferably, the severed joint is made clean and sharp, as at 18 in the showing of Fig. 3. No further preparation of the cord is necessary. The contact prongs of the

attachment cap are constructed in a particular manner to cooperate with the severed end of the cord.

Each contact prong 11 comprises an elongated strip of sheet metal bent back upon itself to form parallel arms 19 and 20 which lie flat against each other to provide a contact prong of proper length and thickness to engage a wall receptacle, or the like. The outer ends of the contact prongs are provided with openings 21 for cooperation with the receptacle contacts to hold the plug in engagement therewith. The inner end of the arm 19 extends in a straight line while the inner end of the arm 20 is flared outwardly at an angle away from the arm 19, as shown at 22, to form a well or recess 23. The angularly bent extension 22 is provided with an opening 24 for a purpose to be described later.

In assembling the contact prongs upon the cord 12, the workman takes one of the prongs and places it alongside the cord with the outwardly flared extension 22 overlying the flat severed end 18 of the cord and with the opening 24 in alignment with one of the conducting wires 13. This position is shown by Fig. 4. The contact prong is then moved downwardly to force the insulation away from the end of the conductor so that the bared end of the wire extends through the opening 24 into the well or recess 23, as shown by Fig. 5. This can be readily accomplished because the relatively fluffy asbestos insulation and braid can be easily compressed and the cotton wrap 14 permits the resilient rubber covering to be also slightly compressed exposing the bared end of the wire. A second contact prong is similarly assembled on the other conductor. As is apparent from Figs. 4 and 5, in assembling the contact prongs with the cord the prongs are placed in inverted positions against diametrically opposite portions of the cord 12 so that the centers of the opening 24 are in a plane through the axes of the conductors 13 and may be moved in the direction of the axis against the respective conductors. From another viewpoint, the center of the opening 24 is spaced from the outer surface of the leg 20 a distance approximately equal to the spacing of the center of the conductor 13 from the outer surface of the portions to be engaged by the respective prong during assembly. The openings 24 have sharp edges and are of a size sufficient to accommodate the conductors. Preferably these openings are somewhat larger than the cross-sectional area of the conductors.

After bared end portions of the conductors have been forced into the openings or welds 24, the workman then inverts the prongs and the end of the wire and dips the assembly into a pot of molten solder 25, as shown by Fig. 6. The solder enters the well or recess 23 and clings to the walls of the recess and bared ends of the conductors securing the conductors in position. To a certain extent, the V-shaped walls of the recess aid in surrounding the bared end of the conductor with solder by capillary action. The assembly is quickly removed from the solder pot and the contact prongs are then twisted about to extend outwardly from the cord, as shown by Fig. 7, so that the housing 10 may be molded in position around the assembly.

The cord set thus formed is one in which the contact prongs are securely attached to the conductors. In final position, as shown by Figs. 2 and 7, the bared ends of the conductors are looped through the openings 24 greatly strengthening the connection against pulls and strains incident to use of the cord.

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

1. The method of manufacturing an attachment cap comprising severing the end of an electric cord having two axially spaced insulated conductors to provide a flat surface exposing the end faces of the conductors, forming a contact prong at one end with an angularly offset portion having an opening therein, placing two such contact prongs in inverted position alongside diametrically opposite portions of the severed end of the cord with the angularly extending portion of the contact prongs facing each other and each overlying the flat severed end of a conductor, moving the angularly extending portion of the contact prongs into engagement with the flat severed end of the cord and compressing the insulation to force bared end portions of the conductors upwardly through the respective openings, and then soldering the bared end portions of the conductors to the respective contact prongs.

2. The method of manufacturing an attachment cap having two prongs comprising severing the end of an electric cord having two spaced individually and collectively insulated conductors to provide a flat surface exposing the end faces of the conductors, forming a contact prong at one end with an angularly offset portion having an opening therein, assembling the contact prong in inverted position alongside the severed end of the cord with the angularly extending portion of the contact prong overlying the flat severed end and the opening in alignment with a conductor, moving the angularly extending portion of the contact prong downwardly into engagement with the flat severed end of the cord and axially compressing the insulation to force a bared end portion of the conductor upwardly through the opening, soldering the bared end portion of the conductor to the contact prong, twisting the contact prong to a position extending outwardly from the end of the electric cord, and then surrounding the connection between the contact prong and conductor with a body of insulating material.

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