

May 20, 1952

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2,597,262

ELECTRICAL CONNECTION PLUG

Filed May 1, 1948

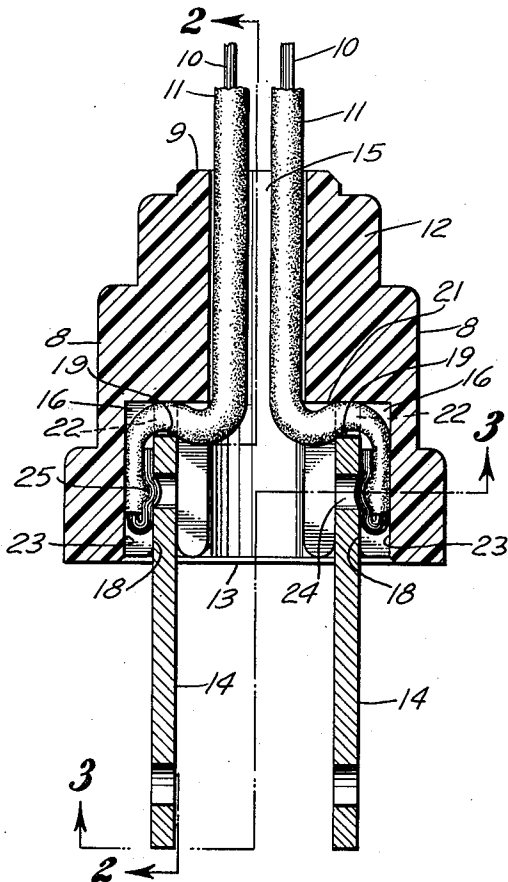


FIG. 1.

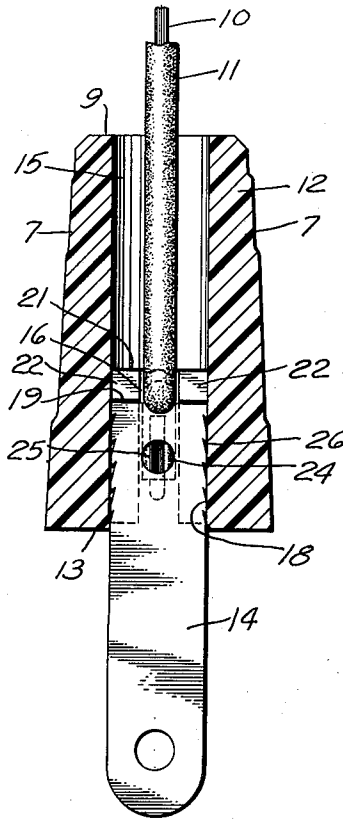


FIG. 2.

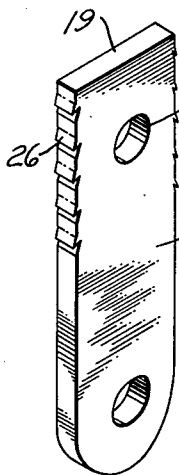


FIG. 4.

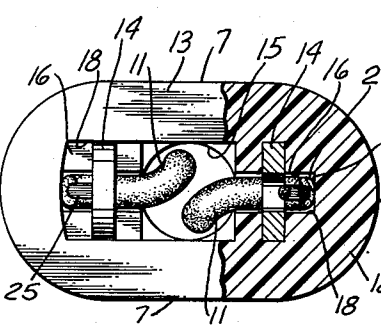


FIG. 3.

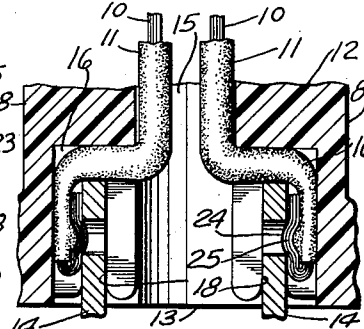


FIG. 5.

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UNITED STATES PATENT OFFICE

2,597,262

ELECTRICAL CONNECTION PLUG

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Application May 1, 1948, Serial No. 24,520

1 Claim. (Cl. 173-361)

1

My invention relates to prong type electric plugs used in connecting electric cords to sources of electric current.

The familiar prong type plug on a flexible cord connected with a lamp or electric appliance consists of a body formed of insulating material from which project two metallic prongs to the interior portions of each of which is affixed one of the conductors of the cord. The prongs are adapted to be inserted in an appropriate socket, being detachably retained therein by resilient contact members which engage the prongs and provide an electrical connection therewith, the contact members being attached to other conductors leading to a source of electric current. The plug is manually detached from the socket by pulling the two members apart.

One of the most common causes of failure of such plugs is that persons attempting to disengage the plug from the socket frequently pull the cord instead of the body of the plug, repetition of this practice causing one or both of the conductors to be separated from contact with the prongs and thereby ruining the plug and creating a danger hazard.

One of the objects of my invention is the provision of a plug of such construction that repeated pulling of the cord in order to separate the plug from the socket will not result in separation of the conductors of the cord from the prongs, which result is accomplished by the construction of the body of the plug, the positioning of the prongs, and resiliency of the insulation of the conductors but without in any way injuring the insulation.

Another object of my invention is to provide means for permanent attachment of the conductors to the prongs of the plug without the use of screws, clamps, solder or other extraneous means, the construction of the body member, and the positioning of the conductors and the prongs therein being such as to accomplish this result.

A further object of my invention is to provide a plug consisting of a minimum number of parts which may be rapidly and securely assembled.

Another object of the invention is to provide a one-piece plug body in which the conductors may be positioned and retained so as to positively prevent detachment of the conductors from the prongs when a force is exerted tending to pull the conductors from the plug.

The invention possesses other objects and features of advantage, some of which, with the foregoing will be set forth in the following description of the preferred form of the invention which

2

is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claim.

Referring to the drawings:

Figure 1 is a vertical section.

Figure 2 is a vertical section taken along the line 2-2 of Figure 1.

Figure 3 is a section taken along the line 3-3 of Figure 1.

Figure 4 is a perspective view of a prong.

Figure 5 is a fragmentary sectional view similar to Figure 1, but showing the parts as when a strain is imposed on the cord or conductors anchored in the plug body.

As illustrated in the drawing the plug of my invention comprises a one-piece body member 12 preferably made of a hard material of high dielectric strength, such as Bakelite, and having relatively wide and narrow sides 7 and 8 respectively and an end face or surface 13 formed flat for engagement with the usual flat surface of the conventional socket plate (not shown). In the design of the body as shown in Figures 1 and 2, the sides taper generally inward from the end face 13 to the opposite end 9, and they are otherwise formed to facilitate gripping of the body by the fingers and pulling the body away from engagement with the socket plate.

Extending longitudinally through the body is a central bore 15 in which are received a plurality of electric conductors 10 formed as here shown of fine copper strands and covered with resilient insulation 11 of rubber or rubber-like synthetic material. The conductors 10 are arranged to be electrically connected to metal contact prongs 14 extending from the end face 13 and designed for insertion in holes of the socket plate for engaging and establishing electrical contact with coating contact elements in the socket in the well known manner. An important feature of the present invention is the manner of effecting the connection between the conductors 10 and the prongs 14, and of retaining the prongs in position in the body.

Extending inwardly from the end face 13 are a pair of cavities 16 which are offset relative to the bore 15 in the direction of the greater width of the body. The cavities 16 are arranged to receive the inner end portions of the conductors 10 and the prongs 14, and as will be clear from Figure 1 each of the said inner ends of the conductors is formed with reverse bends so that the conductor

may extend from the bore 15 into the cavity 16. As a means of positioning the prongs 14 in the cavities 16, opposing side walls of or adjacent the cavities are formed with grooves 18 in which the inner portions of the prongs are inserted and firmly held. The prongs 14 are preferably inserted sufficiently inward to bring the inner ends 19 of the prongs in contact or close proximity to the portions of the conductors 10 extending along the upper surfaces 21 of the cavities 16 and the prongs are restrained from further inward movement by stops 22 at the inner ends of grooves 18. It will be noted that the inner ends 19 of the prongs bear against the insulation 11 of conductors 10 but do not cut or otherwise damage same and further that the insulation 11 is held between ends 19 and surface 21 so as to restrain withdrawal of conductors 10 from the plug when a pull is exerted on them. Thus in the event of any pull on the conductors tending to withdraw them outwardly from the bore 15, the prongs 14 will also keep the inner end portions of the conductors in bent condition so as to impede withdrawal of the conductors. It will further be noted that the greater the force applied by the conductors against the prongs, the more firmly will the prongs be held in the grooves. Upon a pull being exerted on conductors 10, the bent portions thereof tend to straighten as shown in Figure 5, but the conductors cannot be pulled out of the plug.

A novel and effective means is provided for locking the prongs in the body and for securing and electrically connecting the conductors to the prongs. As will be clear from Figure 1, the portion of the conductor within the cavity 16 is positioned between a side of the prong and the opposing side wall 23 of the cavity, and such portion has a terminus 25 from which the insulation has been removed. As will be understood, the prong is preferably inserted in position after the conductor has been extended into the cavity, and the bare terminus is thereby folded back against the insulation of the conductor and compressed between the insulation and the prong. Desirably an aperture 24 is provided in the inner end portion of each prong and such aperture is so positioned in the prong that a portion of the bare terminus between the insulation and the prong will be pressed into the aperture to thereby key the inter-engaged parts together. As the insulated and bare portions of the conductor in the cavity are compressed between the prong 14 and the opposing side wall 23 of the cavity a tight electrical connection is established between the conductor and the prong and at the same time the conductor and prong will be firmly held in position. The prongs besides being secured in position as aforesaid are firmly locked against withdrawal by means of teeth or spurs 26 which are formed in the side edges of the prongs and arranged to grip the opposing side walls of the grooves 18. The spurs are pointed outwardly toward the exposed portion of the prongs and the distance between the points of the spurs across the prongs is such

that the spurs will dig into the side walls of the grooves should an attempt be made to withdraw the prongs from the grooves. It will thus be seen that while the prongs may be inserted with comparative ease, their removal or dislodgement will be effectively prevented.

I claim:

In an electric plug constituting a terminus for a pair of conductors and having a pair of prongs in electrical contact with said conductors, said prongs having spurs on opposite edges thereof and apertures adjacent the inner ends thereof, said conductors having a covering of resilient insulation, the ends of said conductors being bared of insulation and folded back upon the ends of said insulation, a body having a central aperture for receiving said conductors and a pair of laterally offset cavities extending from said aperture, said cavities having top and side walls along portions of which said conductors are arranged to be extended in a plurality of substantially right angle bends, a groove in each of said cavities receiving and positioning each of said prongs in said body at a distance from said side walls less than the combined thickness of the bared and insulated portions of said conductors, whereby said prongs contact said bared portion and compress said folded back portions of said conductors against said side walls for firm electrical contact between said prongs and said bared ends of said conductors and restrain withdrawal of said conductors from said plug when a pulling force is exerted on said conductors, and portions of said bared ends of said conductors extend into said prong apertures to augment the extent of electrical contact between said prongs and said conductors and whereby the inner ends of said prongs bear against said resilient insulation adjacent said top walls and in cooperation with said top walls grip said insulation and restrain withdrawal of said conductors from said plug when a pulling force is exerted on said conductors, the width of said grooves being such that said spurs on said prongs dig into surfaces of said grooves and restrain withdrawal of said prongs from said plug, and stops at the inner ends of said grooves limiting inward movement of said prongs.

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