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W. A. FRANTZ

CORD TERMINAL

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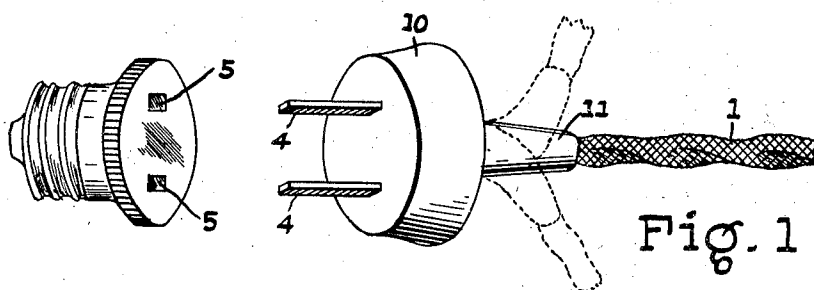


Fig. 1

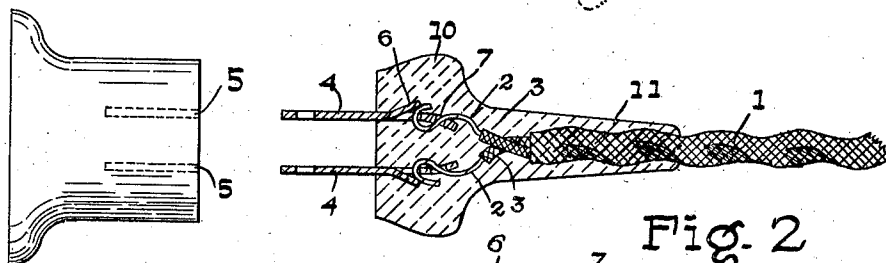


Fig. 2



Fig. 3

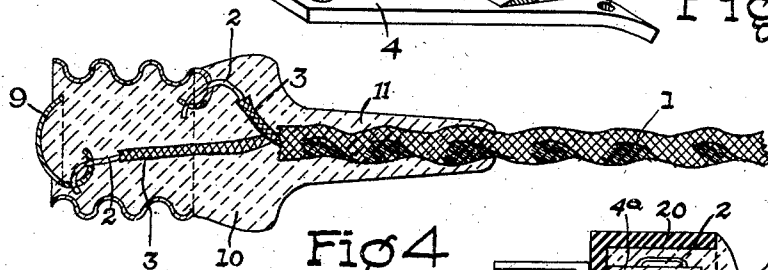


Fig. 4

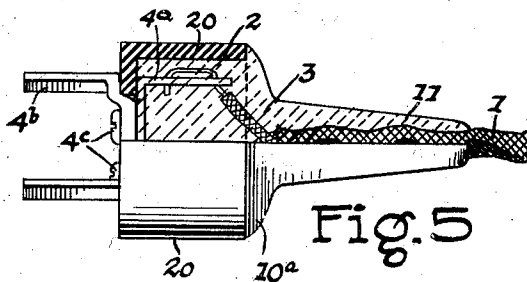


Fig. 5

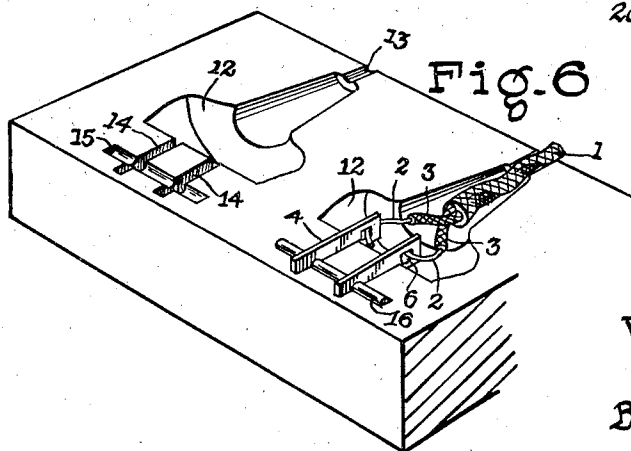


Fig. 6

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CORD TERMINAL.

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This invention relates to electric connections and has for its main object the provision of an improved cord terminal which shall be cheap to make, easy to assemble, lasting in use, and protecting to the cord. Electric cords generally terminate in fittings of insulating material carrying metallic contact members for detachably engaging companion members or fittings. This insulating material has generally been made of a rigid material which will support screws, and the conductors have been fastened to the contact members with screws. Such insulating members are often brittle and subject to breakage by falling on the floor, the attachment of the conductors requires twisting the wires about and manipulating small screws, the raw ends of the insulating sheath tend to fray and unravel unless carefully wound or taped, and any repeated bending of the wire over the edge of the hard insulator is likely to break the conductor and perforate the insulation.

According to my invention the terminal is made of a soft, flexible, elastic material, molded about the end of the cord and itself carrying the contact members which are permanently embedded therein. This terminal may take any known form, such as a screw plug, pull-plug, etc. and it may be made either wholly or partly of this soft substance. The contact members may be detachable if desired, but the wires are themselves permanently embedded in the composition, and while screws may be used to hold them to the contact members, I prefer pinching them in suitable grips, or soldering. The composition is preferably rubber, vulcanized with a comparatively small amount of sulphur and for such a time and temperature as shall produce a mass of about the consistency, hardness, and degree of rigidity of a pneumatic tire casing. I do not limit myself to rubber, however, as certain vulcanized oils can be used. Preferably the terminal is so shaped as to afford a support for the tube for a little distance to distribute the bending.

Such a terminal as I have shown and described cannot be removed and replaced. It can be installed only at the factory and cannot be shifted or repaired. Repairs, however, are rarely needed as the only possible injuries are cutting and burning, both of which are avoidable. It cannot be broken, bent, or torn. The insulation cannot ravel

or fray, the conductor cannot be broken as it is not subject to any sharp bending, and the cord cannot be pulled loose. Considering the omission of all screws, threading, and hand assembling it can be made more cheaply than other plugs. It is waterproof, and requires no paint or enamel.

I do not limit myself to making the entire terminal of soft material. Part of it may be made of hard material, such as fiber or vulcanite and the soft material molded there-to the same way it is to the cord. I do not limit myself always to make the terminal block with a projecting sheath. I do not restrict myself to the forms, designs, or elements herein illustrated nor in any other way except as recited in my several claims.

In the drawings Fig. 1 is a perspective view of one form of my invention as applied to a separable plug; Fig. 2 is a sectional view of the same terminal as used with a wall socket; Fig. 3 is a perspective view of a preferred form of contact member; Fig. 4 is a sectional view showing my improvements as used in a screw plug; Fig. 5 is a view half in elevation and half in section of a modified form of terminal; and Fig. 6 is a perspective view of one end of a half mold with which my improved terminal can be made.

Describing the parts by reference characters, 1 represents a flexible cord having thereon the usual conducting strands 2, 2 which may be either solid or stranded, enclosed in independent sheaths 3, 3. These may or may not be surrounded by a common outer sheath although I have so shown them. These sheaths are cut back a short distance to expose the strands which are connected electrically to the metal contact members, after which a soft, flexible, elastic, rubber-like substance is molded around the end of the cord so as to submerge the naked ends of the strands and overlap the sheaths in adhesive relation and adhere to the metal contact members, preferably leaving only their working portions exposed. These contact members may take any known or desired form and may be fastened to the conducting strands in any desired manner. In Figs. 1 and 2 these contact members are mere strips of brass 4, 4, adapted to enter the receiving apertures 5, 5 of the companion members, and one of the simplest modes of fastening the strands thereto is to form integral tongues, 6, thereon adapted to be pinched down upon the strands.

In Figs. 2 and 3, I have also shown these members as apertured at 7 for the strands, thus increasing the security of contact and holding the parts in line, while in Fig. 6 I have omitted the apertures. Solder may be used to increase the security, and I do not exclude the use of other means such as screws.

In Fig. 4, I have shown my improvements as applied to a screw plug, one strand being joined to a helically corrugated sheet metal shell 8 and the other to a sheet metal end contact 9.

The body of the plug is indicated at 10 and I prefer to make it of ordinary soft rubber, using any of the numberless compositions known to all rubber workers, yielding a consistency common in vehicle tires, clothes-wringers, bumpers, rubber-stoppers, etc. The shape of the plug body is not important, provided it be such as can easily be grasped, although I strongly advocate making it with an integral, flexible, extension 11 at the side opposite the contact members to support the cord and prevent too abrupt bending of the same at the point where experience has shown most cord failures to occur. By tapering this extension it can be given a progressively increasing flexibility.

One convenient way of making the device is to use the mold one-half of which is shown in Fig. 6, and comprises a block of metal having cavities 12 shaped to conform to the body part of the terminal, with a notch 13 at one side for the cord and suitable provision for the contact members. When these members are strips, as shown, these provisions are slots 14, 14 preferably traversed by a perpendicular groove 15 for the reception of a pin 16 which traverses apertures in the strips and holds them accurately in place during the curing operation. Any suitable number of these cavities can be formed in each block and their shape depends upon the shape of terminal desired. Similar mold blocks are used in pairs and the method of making, filling, and curing will be familiar to any rubber manufacturer.

In Fig. 5, I have shown a modified form of terminal wherein a previously formed collar 20 of suitable insulating material such as hard rubber, bakelite, fiber, redmanol, or

other substance is filled with the soft flexible composition shown at 10^a, the conducting strands 2 being joined as before to suitable metallic terminals 4^a to which in turn the projecting contact members 4^b are detachably connected as by the screws 4^c.

Many other modifications are available and will occur to those skilled in the art, all of which I intend to claim and secure. Owing to the flexibility and elasticity of the material no breakage is possible; owing to the absence of all small parts and the omission of threads and screws, assembling is rendered very cheap. Owing to the embracing effect of the composition the sheath of the cable cannot pull out or unravel, and when a flexible extension is used the strands are held against breakage. But even if the extension be omitted there is no such abrupt bending as where the terminal is made of hard substance.

Having thus described my invention, what I claim is:

1. A male terminal for electric cords having its body made of a soft, flexible, elastic, rubber-like substance molded lengthwise around the end of the cord, the contact members projecting outside of such substance and the junction of the conductor strands and contact members being submerged in such substance.

2. A terminal for insulated, flexible, electric cords comprising a body portion of soft, flexible, elastic, insulating material molded around the end of the cord and submerging the ends of the conductor strands, and contact members electrically connected to such strands and extending to a point where they can be contacted, there being a portion of progressively increasing flexibility connecting said body portion and cord.

3. A flexible insulated electric cord having a soft, flexible, elastic, rubber-like sleeve molded thereon adjacent to its end, the terminal portion of said sleeve being largest and merging with a tapering portion, and contact members molded in said sleeve and connected to the conducting strands.

In testimony whereof, I hereunto affix my signature.

WALTER A. FRANTZ.