March 16, 1943. L. H. SCOTT 2,313,774

TERMINAL FOR ELECTRICAL CONDUCTORS

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Fig. 1.

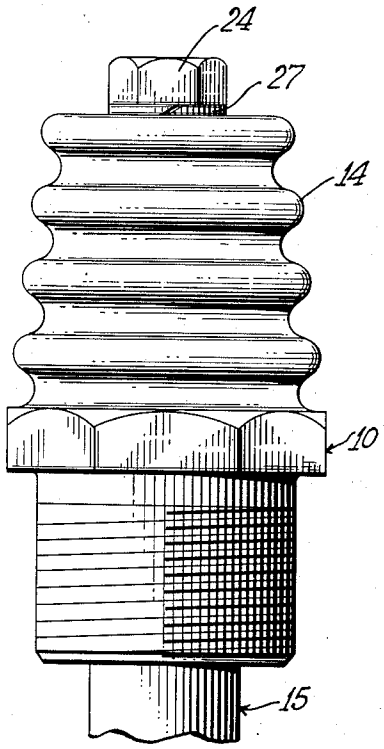


Fig. 3.

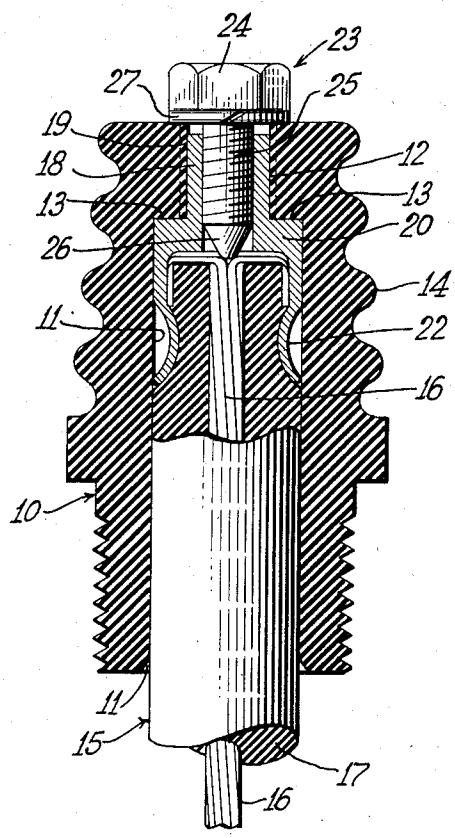
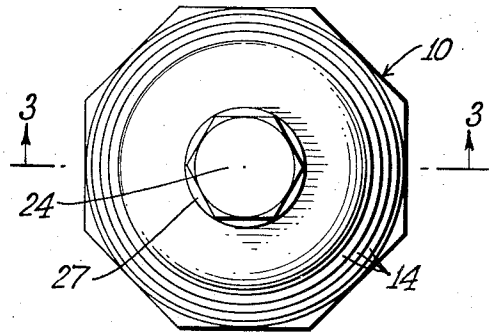


Fig. 2.



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Fig. 4.

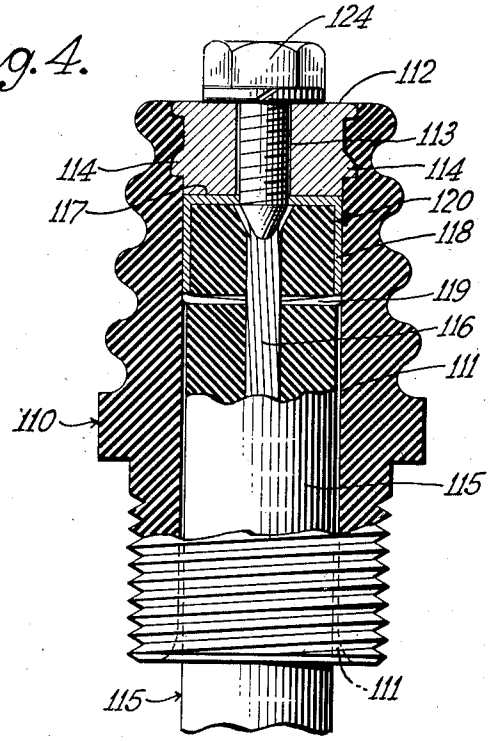


Fig. 5

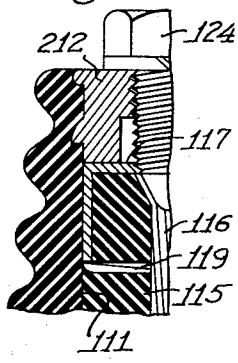


Fig. 6.

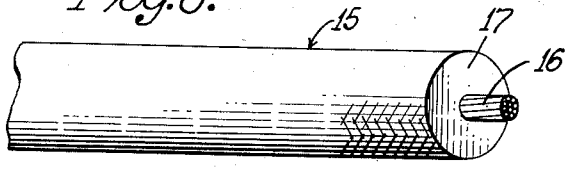


Fig. 8.

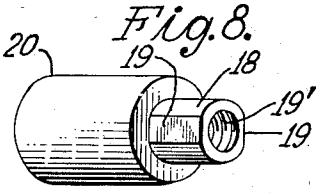


Fig. 7.

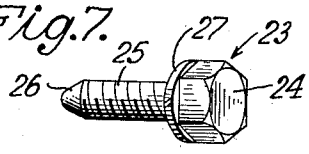


Fig. 9.

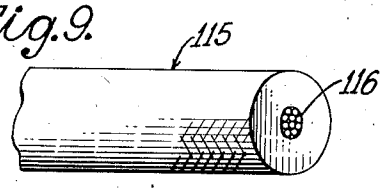


Fig. 11.

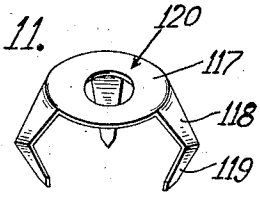
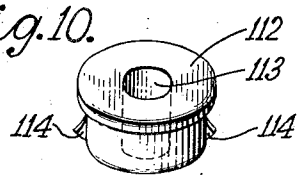


Fig. 10.



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TERMINAL FOR ELECTRICAL CONDUCTORS

Lloyd H. Scott, Garden City, N. Y.

Application April 2, 1941, Serial No. 386,421

6 Claims. (Cl. 173—269)

This invention relates to terminals for electrical conductors and more particularly to terminals adapted for both anchoring and terminating cables in electrical devices, such as in the distributor head of a magneto-electric machine.

The invention has for its object generally to provide a terminal structure for electrical conductors by which an improved construction and arrangement of parts is had, the same being sturdy and rigid in its assembly and operating in a manner substantially free from mechanical as well as electrical faults.

More specifically, the invention has for its object the provision of a terminal for electrical conductors in which they may be quickly and readily anchored or detached.

Another object of the invention is to provide a terminal of the character indicated in which contact and electrical continuity of conducting parts is invariably assured.

Another object of the invention is to provide a terminal of the character indicated in which the parts are drawn firmly into contacting and anchored relationship by a terminal electrode, such as a screw electrode.

Another object of the invention is to provide an insulating bushing for receiving a cable in which a conducting part is associated with an insulating portion in such manner as to insure a multiple contact between the conductor and the electrode.

Another object of the invention is to provide an insulating bushing having a bore adapted to serve as a receptacle for a cable end and to provide anchorage for the cable without puncturing the same; such bore or bushing being preferably free of metallic inserts.

Another object of the invention is to provide an insulating bushing of a character which may be molded and of a shape which externally may or may not be corrugated, or provided with baffles or barriers, and internally is adapted to receive a cable having a core or conductor provided with an associated conducting part adapted to cooperate with an electrode that is disposed in the bore of the bushing.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation showing the invention applied to a threaded insulating bushing formed with a corrugated outer surface and having an electrode and anchored conductor;

Fig. 2 is a top plan view of the bushing shown in Fig. 1;

Fig. 3 is a vertical sectional view of the bushing, taken on line 3—3 in Fig. 2, illustrating a form of the invention employing an internally shouldered bushing, and shows a cable, conducting cap and electrode in assembled relation;

Fig. 4 is a vertical sectional view, similar to Fig. 3, showing a modification of the invention illustrated in Fig. 3;

Fig. 5 is a half sectional elevational view with parts broken away of a slightly modified form of the invention shown in Fig. 4; and

Figs. 6 to 11 are perspective views showing details of parts.

Referring now to the drawings, and particularly to Figs. 1 to 3, there is illustrated a terminal device of the type generally disclosed in my copending application, Serial No. 374,324, filed January 14, 1941, issued as Patent 2,286,232, on June 16, 1942, and adapted to be secured by its outside thread in an insulating plate or distributor head of a magneto or the like. Here the device comprises an insulating bushing 10 which has a central bore 11 constricted in its upper portion 12 to form a shoulder 13. In order to avoid or resist arc-over and to increase leakage paths, the outside surface of the bushing is preferably corrugated, as shown at 14. An insulated conductor or cable, which is to be terminated in the bushing, is shown generally at 15 and comprises a stranded conducting core 16 encased in a sheath 17, of suitable insulating material, for example, rubber. This insulated conductor is made ready for anchorage by peeling or cutting off "square" the insulation from one end a desired distance to expose the stranded core, as shown in Fig. 6. The strands of the exposed portion of the core 16 are then separated and folded or bent back flatly against the square end of the insulation. A conducting part or cap 20, such as shown in Fig. 8, is then fitted snugly on the end of the conductor against the conducting strands and over the insulation. The cap itself has at its otherwise closed end an extension or nipple 18 of reduced diameter which is preferably provided with one or

more "flats" 19 on the exterior, and a thread, as shown at 19', on the interior.

In Fig. 3, it is seen that the exposed conducting strands, when bent back and spread against the end of the insulation, provide a conducting layer against which the conducting cap 20 presses, to establish conducting continuity. The sides of the cap also enhance this effect and are adapted to be crimping or clenching to hold the cap in place, as shown at 22. When the assembled cap and cable is slipped into the bore of the bushing, the constricted portion 12 of the bore 11 will snugly receive the extension 18 on the cap 20 and its shoulder will seat squarely against the bushing shoulder at 13.

A suitable electrode or terminal conductor, such as shown at 23, is then introduced through the top of the bushing 10 into engagement with threads 19' in cap 20. While the electrode may have various shapes, that shown in Fig. 7 is convenient and comprises an hexagonal head 24, a threaded shank 25, a pointed tip 26; such is preferably equipped with lock washers 27 in order to lock the electrode in a desired position, when screwed into place, drawing the assembled cable and cap firmly into anchored position. By this arrangement, a good contact is invariably secured, because the point 26 of the threaded shank of the electrode is forced to penetrate into the center of the stranded core in addition to the contact already made between the inner portion of the conducting cap and the spread-out portion of the stranded core. The term "electrode" is used herein in a well recognized sense, i. e., for identification of that particular type of terminal conductor by which electrical current enters or leaves a fluid, such as may be employed for transfer of high tension current across a gas-filled or air gap to another terminal conductor.

Referring now to the modified form of the invention depicted in Fig. 4, there is an insulating bushing 110, which may be similar externally to that shown in Figs. 1 to 3, but differs internally by the provision of a straight cylindrical bore 111. The upper end of this bore is closed by a perforated conducting member 112, which may be solid or hollow, as desired. This conducting member, as shown in Fig. 10, preferably has its perforation formed with a smooth interior, as shown at 113, although it may be threaded as disclosed in Fig. 5 which conducting member is therein identified by the numeral 212. On its outer or cylindrical surface, means, such as one or more tabs 114, is preferably provided, in order that the member may be anchored in the insulation of the bushing 110.

The insulated conductor, which is to be terminated in the bushing 110, is shown generally at 115 (see also Fig. 9), and is preferably similar to that depicted in Fig. 6. The insulated conductor 115, while cut off "square," does not have an end portion of its strands 116 exposed and is not peeled or cut back, as shown in Fig. 6. The insulated conductor in either case has an outside diameter which is adapted for slidably engaging the central bore of the bushing.

In order to terminate the insulated conductor 115 in the bushing 110, its end is suitably prepared for engagement with an electrode. To this end, a suitably shaped conducting cap or part 120 is provided; details of the part 120 are here shown in Fig. 11. Here the part 120 is seen to comprise a perforated or bored disk portion 117 which has two or more legs composed of members 118 and 119, which are angularly associated for purposes hereinafter explained. The part 120 is fitted on the end of the squared end of the insulated conductor 115 so that its disk portion 117 lies snugly over the circular cross-section of the insulated conductor. This is secured in place by causing portions 119 to dig into the sides of the insulation of the conductor at a point distant from the circular section approximately equal to the length of the members 118. As the disk 117 is forced home against the end of the cable, the members 119 penetrate substantially radially into the insulation of the conductor or cable until they engage with the conducting core 116 in the center thereof. The members 119 now assume a horizontal position while the members 118 lie snugly at the side of the cable, all as depicted in detail in Fig. 4.

The central bore of the disk 117 is threaded, while the bore 113 in the plug or member 112 is preferably unthreaded. The cap 120 is hence adapted to engage with and be held by the shank portion of a terminal screw or electrode 124, which is preferably identical in form with that illustrated in Fig. 7. Such electrode is passed down through the bore of member 112 and then through that in the disk 117, engaging the threads thereof, and thence into the conducting core 116 to engage with the metallic strands thereof. By so doing, such strands are forced into conducting relation with the electrode and also with disk 117. Thus, as in the first form of the invention, a contact is invariably secured since the electrode will have conducting continuity with the conducting core 116 in at least one of three ways, as follows: (1) through direct engagement of the shank of electrode 124 with the core 116; (2) through engagement of the shank with disk 117 which engages directly with the core 116 at the outer end; and (3) through engagement of the shank with the disk 117 when the latter is conductively connected to the core 116 through the members 118 and 119.

The insulated conductor or cable is thus seen to be securely anchored in the bushing and the lock washer serves to maintain the parts in the desired position.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A terminal for support and anchorage of an end of an insulated electrical conductor in a high tension ignition system comprising, in combination, an insulating bushing adapted to be detachably mounted on a member of a high tension ignition device and having a through bore provided with an internal shoulder, an electrode demountably positioned in one end of the bore, means limiting inward movement of said electrode into the bore, a cable having an end demountably positioned into the other end of the bore, said cable being of circular cross-section and having a core comprising separable conducting strands and a sheath of insulation cut off to expose the core at said end, and a conducting cap in conductive relation with said core at the mentioned end and provided with a part extending over the sides of said cable and engaging with its sheath to secure the same thereon, said cap

having a centrally threaded bore and a portion in engagement with said shoulder, and said electrode having a correspondingly threaded shank in engagement with said threaded bore whereby the assembled cap and cable are drawn into fixed position against said shoulder in said bushing bore with said electrode in direct electrical contact with said core strands.

2. A terminal for support and anchorage of an end of an insulated electrical conductor in a high tension ignition system comprising, in combination, an insulating bushing adapted to be detachably mounted on a member of a high tension ignition device and having a through bore provided with an internal shoulder, an electrode demountably positioned into one end of the bore, means limiting inward movement of said electrode into the bore, a cable having an end demountably positioned into the other end of the bore, said cable being of circular cross-section and having a core comprising separable conducting strands and a sheath of insulation cut off to expose the core at said end, and a conducting cap in conductive relation with said core at the mentioned end and provided with a depending skirt extending over the sides of the cable sheath and crimped into engagement therewith, said cap having a portion in engagement with said shoulder and a centrally disposed reduced extension extending into said bushing bore beyond said shoulder and provided with an internally threaded bore, and said electrode having a correspondingly threaded shank in engagement with said threaded bore whereby the assembled cable and cap are drawn into said bushing bore and held in fixed position against said shoulder with said electrode in direct electrical contact with said core strands.

3. A terminal for support and anchorage of an end of an insulated electrical conductor in a high tension ignition system comprising, in combination, an insulating bushing adapted to be detachably mounted on a member of a high tension ignition device and having a through bore provided with an internal shoulder, an electrode demountably positioned into one end of the bore, means limiting inward movement of said electrode into the bore, a cable having an end demountably positioned into the other end of the bore, said cable being of circular cross-section and having a core comprising separable conducting strands and a sheath of insulation cut off to expose the core at said end, a conducting cap in conducting relation with said core at the mentioned end and provided with a plurality of legs extending for a desired distance along the sides of said cable with their ends penetrating through the sheath of insulation into conducting engagement with the core, said cap having a portion in engagement with said shoulder and a centrally disposed threaded opening and said electrode having a correspondingly threaded shank in engagement therewith holding the assembled cable and cap in fixed position in said bushing bore against said shoulder, and a conducting perforated member anchored in said bushing providing said shoulder on one side and the means limiting inward movement of said electrode on the other side with the perforation therethrough forming a part of the through bushing bore.

4. A terminal for support and anchorage of an end of an insulated electrical conductor in a high tension ignition system comprising, in combination, an insulating bushing adapted to be detachably mounted in a member of a high tension ignition device and having a through bore internally constricted at one end to form a shoulder therein, an electrode demountably positioned into the constricted end of the bore and having an exposed current transfer head seated on said bushing to limit inward movement, a cable having a core serving as an electrical conductor and an end demountably positioned into the other end of the bore, a conducting cap mounted on said cable in conducting relation with the core thereof provided with an externally constricted extended portion received within the constricted portion of the bore and having a shoulder corresponding to said first-mentioned shoulder and seated thereagainst, said extended portion having an internally threaded bore open to the cable core, and said electrode being in threaded engagement with said internally threaded bore causing said conducting cap to fit shoulder to shoulder in said bushing bore when drawn into anchored position by said electrode with the latter in direct electrical contact with said cable core.

5. A terminal for support and anchorage of an end of an insulated electrical conductor in a high tension ignition system comprising, in combination, an insulating bushing adapted to be detachably mounted on a member of a high tension ignition device and having a through bore provided with an internal shoulder, a cable having a sheath of insulation surrounding a core serving as an electrical conductor and an end demountably positioned into the bore from one side of said shoulder, an exposed electrode demountably positioned a limited distance into the bore from the other side of said shoulder, and a cable connector in the bore for disengageably connecting electrically and mechanically said cable to said electrode comprising a conductive member mounted on the end of said cable in conducting relation with the core thereof and including means extending over the sides of said sheath into secure anchoring engagement therewith, said member being seated against said shoulder and having an opening exposing the cable core and demountably engaging said electrode with the latter in direct electrical contact with the cable core whereby said electrode upon manipulation thereof enables said cable with said member thereon selectively to be drawn longitudinally along the bore into and anchored in mechanical and electrical connection with said electrode and to be disengaged therefrom.

6. A terminal for support and anchorage of an end of an insulated electrical conductor in a high tension ignition system comprising, in combination, an insulating bushing adapted to be detachably mounted in a member of a high tension ignition device and having a through bore provided with an internal shoulder, a cable having a sheath of insulation surrounding a core serving as an electrical conductor and an end demountably positioned into the bore from one side of said shoulder, an electrode screw having an exposed current transfer head seated on said bushing and a threaded shank demountably positioned into the bore from the other side of said shoulder, and a cable connector in the bore for disengageably connecting electrically and mechanically said cable to said electrode comprising a conductive member adapted for reception and retention of the end of said cable seated against said shoulder and mounted on said cable end in conducting relation with

the core thereof, said member including means extending over the sides of said sheath into secure anchoring engagement therewith and having a screw-threaded opening exposing the cable core and threadably engaging said electrode screw shank with the latter in direct electrical contact with the cable core whereby such threaded engagement enables said cable with said member selectively to be drawn longitudinally along the bore into and anchored in mechanical and electrical connection with said electrode and to be disengaged therefrom.

LLOYD H. SCOTT