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TERMINAL FOR ELECTRICAL CONDUCTORS

Original Filed April 2, 1941

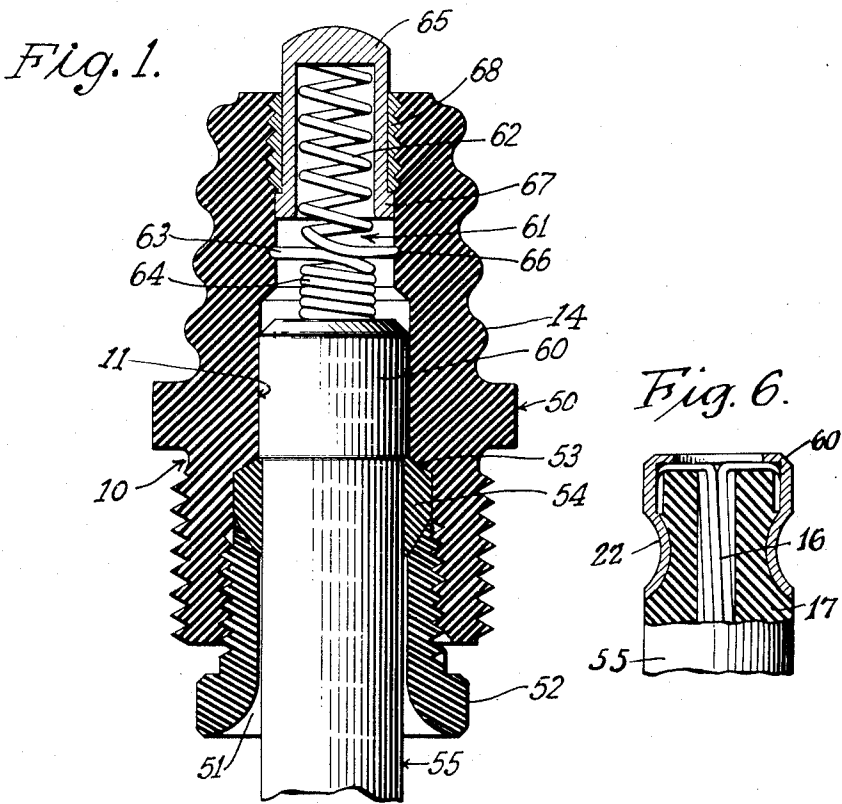


Fig. 2.

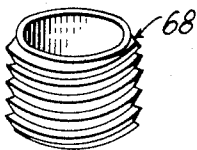


Fig. 3.

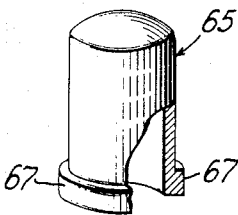


Fig. 4.

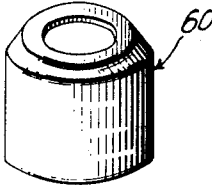
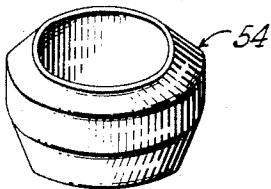


Fig. 5.



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TERMINAL FOR ELECTRICAL CONDUCTORS

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Original application April 2, 1941, Serial No. 386,421. Divided and this application July 30, 1941, Serial No. 404,582

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, and the present application is a division of my prior application Serial No. 386,421, filed April 2, 1941.

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 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.

A further object is the provision of such an electrical conductor terminal characterized by the secure mounting of a cable end in an insulating bushing with an electrically conducting spring secured therein in conducting relation with the cable core and biasing against a stop an electrode or electrical transfer member reciprocally mounted in the bushing, said elements all being readily removable from the bushing by the simple manipulation of a single member.

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 drawing, in which:

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

Figs. 2 to 5 are perspective views showing details of parts; and

Fig. 6 is a sectional view with parts broken away of a cable end showing one method of mounting the cap in position thereon in conducting relation with the cable core.

Referring now to the drawing, like numerals refer to like parts throughout, wherein there is illustrated a terminal device of the type generally disclosed in my copending application, Serial No. 374,324, filed January 14, 1941, 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. 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 55 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. 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 60, preferably in the form of a collar as shown in Fig. 4, is then fitted snugly on the end of the conductor against the conducting strands and over the insulation.

In Fig. 6, 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 60 presses, to establish conducting continuity. The sides of the cap also enhance this effect and are adapted, if desired, to be crimped or clenched to hold the cap in place, as shown at 22.

The terminal conductor here employed is resiliently mounted and adapted to be pressed outwardly to make contact with another conductor (such as that used adjacent the center of the distributor plate shown in the copending appli-

cation, supra). The bushing 10 has the central bore 11, constricted to provide shoulders of three different diameters, the largest being at the lower or threaded end of the bushing, the smallest being at the upper end.

The bore at the lower end is preferably threaded internally for the reception of a gland follower nut 52, having a cable-passing bore 51. The nut 52 presses into place, against a shoulder 53, a gland washer 54 which may be of rubber or other elastic or deformable material thereby obviously, making for a gas-tight assembly. The washer 54, while it may have any convenient shape, is preferably chamfered at both its ends, as shown in Fig. 5, in order that, when under pressure from the gland nut 52, it will grip firmly a cable 55 which it is desired to anchor in the bushing.

The bore 11 has its central portion of such diameter that the cap 60 slides into place; the cable 55 having both the cap 60 and the washer 54 thereon when slipped into the bore for permanent assembly.

The terminal electrode, in the present modification, is adapted to make yielding engagement with a cooperating external electrode (not shown in the interest of clearness of illustration). To this end, a spring pressed outwardly projecting electrode 65 is mounted in the bore portion of least diameter and arranged to be in conducting relation with cap 60. While any convenient arrangement achieving such connection may be employed, an arrangement in which the spring not only presses the electrode 65 outwardly but also provides the conducting connection is a preferred arrangement, as shown in Fig. 1.

The spring here provided for this purpose is as shown generally at 61 a helical spring having upper coils or turns 62, a large center coil or turn 63 and reduced lower coils or turns 64 for pressing on cap 60, or to be received in the hole in the top thereof to engage against cable core 16 to, in either case, be brought into conducting relation with the latter. Coil 63 is preferably made to have a diameter slightly in excess of that of the upper portion of the bore, in order that, when in place in the bore, it may engage with an annular groove 66 cut in the wall of the upper end of the bore.

Coils 62 press upwardly when the spring is thus positioned in the bore and preferably slip into a bore in the terminal electrode 65. This latter, while it also may have any convenient form, is advantageously formed as a hollow plunger-like metallic member closed at its outer or engaging end and expanded at its inner or lower end and rolled over or otherwise provided with a flange or exterior shoulder 67 (see Fig. 3) which is adapted to engage with a stop in the upper end of the bore 11; such stop being provided in order that the electrode 65 may not be pressed outwardly by spring 61 beyond a desired point.

Such stop may also have various forms, but that here shown, by way of example, comprises an annular insert 68 (see Fig. 2) which is preferably of metal and threaded on its exterior for the purpose of making removable engagement with the upper or most reduced portion of bore 11.

By this arrangement it is seen that when cable 55 and electrode 65 are in place, the cable is firmly anchored by nut 52 and maintained in conducting relation with electrode 65 while the

annulus 68 may engage with the shoulder 67 on electrode 65. Hence it is also seen that the outward movement of the electrode 65 is limited but may yield readily to external pressure whereby good contact with an external electrode which presses against it is insured.

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 drawing 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 insulated electrical conductors comprising, in combination, a terminal member, an insulating bushing, a conductor having an insulating sheath, said bushing having a central bore therethrough and being internally constricted in a plurality of regions to provide a corresponding number of shoulders of varying diameters therein, a conducting cap secured on said conductor and having a sliding fit into the space between a pair of intermediate shoulders, a fluid-sealing washer secured on said conductor, means in one end of said bore to force said washer into fluid-sealing engagement with an adjacent shoulder to anchor said conductor in said bore, said terminal member being movably disposed in the other end of said bore and provided with a stop cooperating with one of said shoulders for limiting the outward motion of said terminal member, and spring means mounted in said bore conductively connecting said cap and said terminal member and pressing the latter outwardly, said spring means having a portion of a transverse dimension slightly larger than the portion of the bore adjacent thereto firmly to engage a wall of the latter and anchor said terminal member and spring means in the bore.

2. A terminal device for insulated electrical conductors comprising, in combination, an insulating bushing adapted to be mounted on a support and having a bore extending therethrough, an electrically conducting terminal member reciprocally mounted in the bore, stop means in one end of the bore to limit outward movement of said terminal member, a conductive member slidably received; in the bore adapted to be fixedly mounted on an insulated electrical conductor in conducting relation to the core thereof and provided with a shoulder, a biasing spring of electrically conducting material between said conductive member and said terminal member to bias the latter against said stop, a shoulder in said bore, a fluid-sealing washer adapted to be engaged about such insulated electrical conductor against said conductive member shoulder and to seat against said bore shoulder to hold said conductive member in the bore, and readily removable means for engagement with said bushing to hold said washer against said bore shoulder in fluid-sealing engagement therewith.

3. A terminal device for insulated electrical conductors comprising, in combination, an insulating bushing adapted to be mounted on a support and having a bore extending therethrough, an electrically conducting terminal member reciprocally mounted in the bore, stop means in one end of the bore to limit outward movement of said terminal member, a conductive member in the bore adapted to be

mounted on an insulated electrical conductor in conducting relation to the core thereof, a helical biasing spring of electrically conducting material between said conductive member and said terminal member to bias the latter against said stop, said spring having at least one turn of a diameter slightly larger than the bore firmly to engage a wall thereof and anchor said terminal member and spring in the bore, a shoulder in said bore, and means adapted to seat against said shoulder to anchor all of said parts in position with an insulated electrical conductor secured to said conductive member.

4. A terminal device for insulated electrical conductors comprising, in combination, an insulating bushing adapted to be mounted on a support and having a bore extending therethrough, an electrically conducting terminal member reciprocally mounted in the bore, stop means in one end of the bore to limit outward movement of said terminal member, a cap member in the bore adapted to be mounted on an insulated electrical conductor in conducting relation to the core thereof, said cap having a hole in the end thereof to expose the conductor core, a helical biasing spring of electrically conducting material between said cap member and said terminal member to bias the latter against said stop and having one end thereof adapted to be received in the hole in said cap member, said bore having a groove therein and said spring having a turn thereof seated in the groove to anchor said spring in position, a shoulder in said bore, and means adapted to seat against said shoulder to anchor all of said parts in position with an insulated electrical conductor secured to said cap member.

5. The combination with an insulated electrical conductor having a conducting core, of a terminal device comprising an insulating bushing adapted to be mounted on a support and having a bore extending therethrough, a shoulder in said bore towards the terminal end thereof, an electrically conducting terminal member reciprocally mounted in the bore with a portion thereof engaged against said shoulder to limit outward movement, a collar of electrically

conducting material secured on the end of the insulated conductor in conducting relation to the core thereof and slidably received in the bore, a fluid-sealing gland washer of resilient material snugly engaged about the insulated conductor behind said collar and in engagement with an edge thereof, a second shoulder in the bore against which said washer is seated, a helical spring of electrical conducting material between the end of the conductor and said terminal member in conducting relation with the conductor core and biasing said terminal member against said first mentioned shoulder, and a sleeve around the electrical conductor removably engaging said bushing and forcing said washer against the second-mentioned shoulder in fluid-sealing engagement therewith.

6. The combination with an insulated electrical conductor having a conducting core, of a terminal device comprising an insulating bushing adapted to be mounted on a support and having a bore extending therethrough, a shoulder in said bore towards the terminal end thereof, an electrically conducting terminal member reciprocally mounted in the bore with a portion thereof engaged against said shoulder to limit outward movement, a skirted cap of electrically conducting material secured on the end of the insulated conductor in conducting relation to the core thereof and slidably received in the bore, a fluid-sealing gland washer of resilient material snugly engaged about the insulated conductor behind the skirt of said cap and in engagement with an edge thereof, a second shoulder in the bore against which said washer is seated, a helical spring of electrical conducting material between the end of the conductor and said terminal member in conducting relation with the conductor core and biasing said terminal member against said first-mentioned shoulder, and an externally threaded sleeve threadably engaged in an internally threaded inner portion of the bore engaging said washer and firmly holding it in fluid-sealing engagement against said second-mentioned shoulder with the parts in assembled positions.

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