

Feb. 12, 1929.

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L. VAN GALE
ELECTRIC WIRE TERMINAL

Filed Feb. 8, 1924

FIG. I.

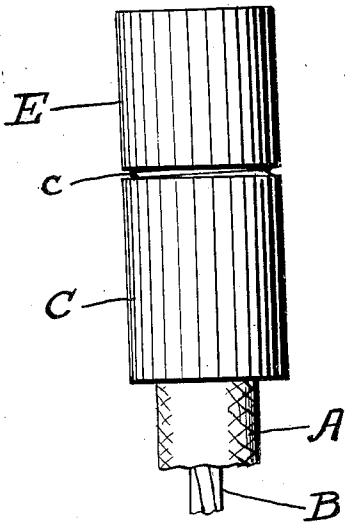


FIG. II.

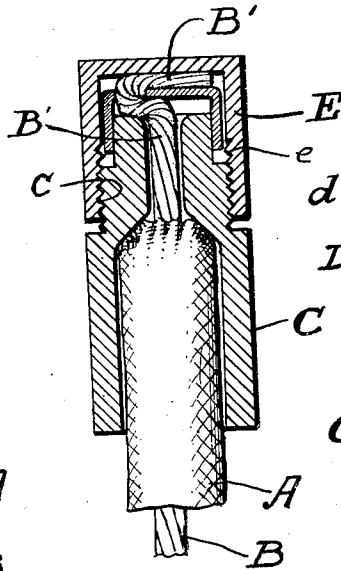


FIG. III.

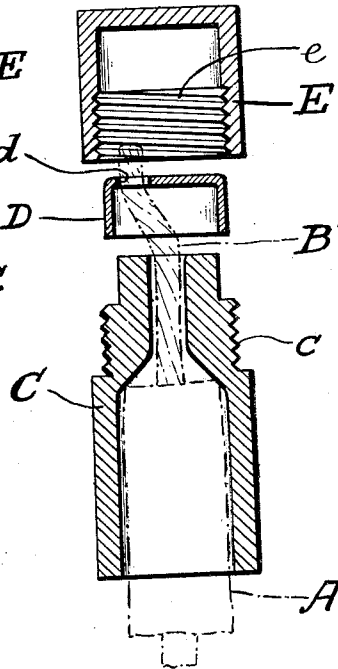


FIG. IV.

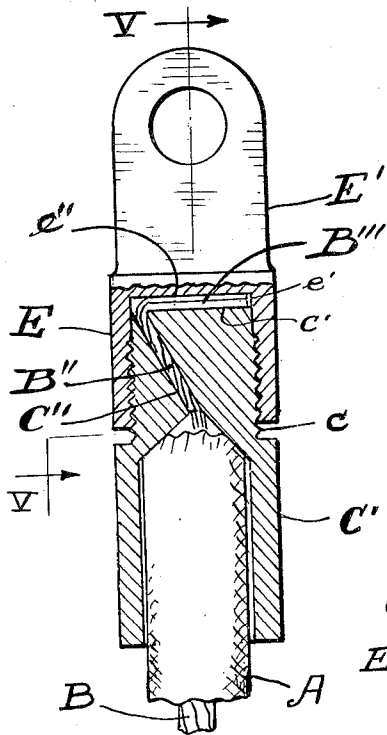


FIG. V.

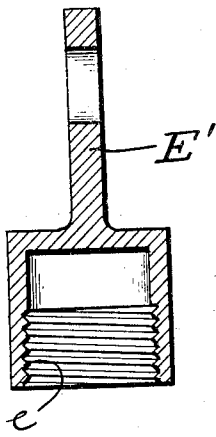


FIG. VI.

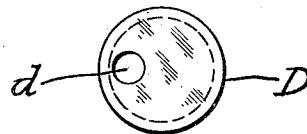


FIG. VII.

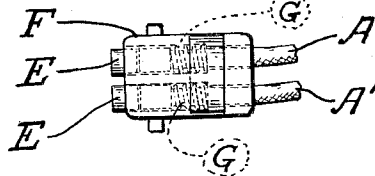


FIG. VIII.



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LOUIS VAN GALE, OF ASTORIA, NEW YORK.

ELECTRIC-WIRE TERMINAL.

Application filed February 8, 1924. Serial No. 691,351.

This invention relates to terminals for electric conductor wires such as are applied to the end of wires in order to provide a secure terminal device which will hold fast and also provide means to establish a sure electrical contact between the end of the wire and cooperating connections.

Among the particular objects of the invention are to provide a terminal which will be simple and inexpensive to manufacture, and a terminal that can be more readily attached to the wire end both quicker in operation in the attachment and to more securely anchor the wire end and assure a perfect electrical connection, than devices heretofore known. Furthermore, the invention aims to provide a terminal having these and other advantages, as will hereinafter appear and which may have any, desired form of attaching or connection clip used in cooperation therewith, and which will readily cooperate in a terminal plug for quick electrical connection and disconnection with sockets. It furthermore aims to provide a terminal in which the stripped conductor end may be with great facility inserted and anchored, while, at the same time providing for the suitable holding of the adjacent insulated portion of the wire in order to prevent the chance of breaking or rupture of the conductor by vibration or twisting of the wire adjacent to the terminal.

The terminal or terminals and sockets may be made in various forms still containing this invention, while I have illustrated particular embodiments in the accompanying drawings forming a part hereof, in which;

Fig. I is a side elevation of an assembled terminal.

Fig. II is an axial cross section of Fig. I.

Fig. III is a cross section on the axis of the parts of the terminal, with the parts shown separated in position ready for assembling.

Fig. IV is a cross section on the axis of a modified form of the terminal.

Fig. V is a cross section of the cap in Fig. IV, at right angles to the section in Fig. IV.

Fig. VI is a top view of the crimping cap shown in Fig. III.

Fig. VII is a side view of a plug with two contact terminals, assembled, on much smaller scale than the previous figures.

Fig. VIII is a side view of a clip terminal

assembled on the wire end, of similar scale to Fig. VII.

The wire A, consists of the usual insulation surrounding the conductor B usually stranded. Such a wire has a short portion of the end stripped of insulation leaving the bare conductor B'. A ferrule C has a recess at one end adapted to receive the wire with its insulation, and the recess is restricted and extends in the form of a small hole to the opposite end accommodating the stripped conductor B' and fitting it free but close, which small hole may be more or less inclined to the axis but preferably joining the main cavity in the centre. Beyond this end of the ferrule a cap D fits over the end but has a hole offset to one side and just large enough to receive the stripped conductor end of the wire. A locking cap E has a closed end while at the skirt it is internally threaded at *e* in order to engage the thread portion *c* on the outside of the ferrule C.

As shown in the modified construction Fig. IV, the ferrule C' is counterbored at the wire end, as in the other form, but at the contact end an oblique hole C'' leads from the side, that is offset from the center of the end, into the body of the ferrule and joins the larger counterbore at the center or substantially so. The locking cap in this case is internally threaded to engage the outside threads *c* of the ferrule, and the inside bore of this cap is of a size at *e'* which closely fits the cylindrical outside surface of the contact end of the ferrule, the relative size being such as to prevent the strands of wire from being forced between the cap and the sides of the ferrule, while the inside of the cap end is formed flat as at *e''* and opposes a parallel flat end of the ferrule, in order that these two flat surfaces may cooperate to squash the conductor strands and form a good contact both with the ferrule end and the side of the cap, when the cap is screwed home on to the ferrule, and surrounding its end. In this form the cap has an extension E' forming an eye connection for screwing the wire end to terminal binding posts or the like, while any form of clip or hook member may be embodied or attached to the terminal to provide the various ways of connecting the wire and its terminal to binding posts, spark plug stems, or for any other of its usual adaptations.

In Fig. VII the wires A and A', are shown to lead into an insulation plug F, such as hard rubber, through holes freely fitting the outside of the wire insulation, while at the opposite end of the plug F the holes in it are counterbored larger and of the required size for a free fit with the terminals EE. Thus the wires are threaded through the holes in the plug F, then a small spring G is inserted over the wire insulation, but having an outside diameter substantially equal to the terminal ferrule, then the terminal is attached to the stripped end of the wire, with its cap screwed down tight, whereupon the wires are pulled back carrying the spring with the terminal into the counterbore of the hole, thereby leaving the wire terminal slightly protruding from the plug insulation and spring resisted against pressure from the outside of the terminal when the plug is placed in position for the terminal to connect contacts with the desired conductor member on a lamp or like article.

It will thus be seen that in the forms illustrated, in Figures II and III, the stripped wire end automatically slides to and through the restricted hole in the end of the ferrule and the wire end with insulation can be pushed into the large counterbore of that end of the ferrule with ease, thereupon the crimping cap D with its hole d can be easily threaded on to the stripped conductor end even by feel and without requiring the accuracy of visual inspection. Then holding the ferrule and wire tight together, the crimping cap can be pressed down forming a bend in the short projecting end of the stripped conductor, which bend will include a little longer part of the stripped wire in case the small hole is inclined as in Fig. IV, in which case the cap D can be conveniently threaded while held on the end of the ferrule and then raised slightly and given a half turn to insure starting an anchoring kink in the wire. Then the locking cap E can be readily screwed over the top or end to force the projecting end of the conductor between the outside of the crimping cap and the inside of the cavity of the locking cap. In this way the conductor end is securely locked or anchored, and the pressure of the cap forces the end into a perfect contact with the end of the ferrule by squashing the strands against it and also squashing the strands between the crimping cap and the end of the ferrule, and in this assembled condition the outer end of the locking cap is assured of perfect electrical contact because of its threaded connection provided by a liberal outside contact around the entire ferrule end in addition to the contact of the inner side of the end of the locking cap directly with the conductor strands.

When the stripped end of the wire has been threaded through the ferrule, any excess length may be snipped off readily; furthermore when the locking cap has been screwed down it can be removed and the certainty of good contact and anchorage can be inspected with great facility without changing the condition of anchorage and contact through repeated removals of the cap.

It will also be seen that in the form shown in Fig. IV the same facility is provided for threading the stripped end of the wire into the ferrule, whereas the oblique position of the restricted hole for the conductor automatically deflects the conductor end one side of the ferrule end where it passes free to be bent over on to the square end surface of the ferrule and can then be clipped off to assure its proper length although the usual stripping of the wire ends will provide for the exact length of free conductor required. It has been found however that the economy of safe and certain attachment of these terminals, can be effected still more economically by the fact that the locking cap E may be screwed down over the ferrule without previously bending down the projecting conductor end because the proper fit of the cap with the ferrule end does its own bending of the projecting conductor end and with the turning when screwing on the cap, the projecting strands are twisted and squashed down into a mat forming a perfect contact between the ends of the ferrule and the side of the cap, besides forming a sure anchorage or locking of the wire and thereby preventing its being pulled out or jarred loose from the terminal.

In all, the screwing down of the locking and enclosing cap on to the end of the ferrule, provides a squashing of the strands between two smooth surfaces, and thereby avoids any chance of cutting the strands when working the conductor, which latter defects are inherent in many of the terminals heretofore used. Furthermore, the terminal herein described provides for the proper contact of all of the strands at the end of the wire besides assuring as secure an anchorage of the wire end as is necessary to meet all of the practical requirements of use.

Such terminals provide very simple and inexpensive parts for manufacture, and above all, provide economy in the assembling or fixing of the terminals to the wire end and still with certainty of proper anchorage and contact. When used as illustrated in Fig. VII they provide a very simple, safe and cheap terminal plug and contacts either single or double, to be inserted as by a bayonet joint in the end of an electric light socket tube, with a spring contact forcing the terminal against the

terminal on the bulb base inserted on the other end of the lamp socket, so that contact is provided quickly and maintained perfectly. The sockets for their various uses and the terminals may be made for them and for other purposes such as the ends of lead wires for batteries, or the ignition wires to be clipped to the stem of spark plugs and other uses on motor cars, as well as many applications for any kind of an electric wire terminal connection where security and safety are demanded with economy of parts and assembling.

While many variations in size or in arrangement and details may be made, without departing from the spirit in my invention what I claim and desire to secure by Letters Patent is:

An electric wire terminal including a ferrule having at one end a recess parallel to the axis to surround the wire insulation, a sloping bottom to said recess converging to the center, a smaller hole extending from

the center of the bottom of said recess and laterally inclined to the axis and of a size to closely fit a stripped end of the conductor wire, and an outlet for said small hole at the opposite end of the ferrule offset from the centre, a screw cap to fit and completely enclose the outside of the small hole end of the ferrule interengaging threads of sufficient length to engage the cap and ferrule with the stripped end of the conductor projecting, and when screwed home to squash the projecting end between the inside of the cap and the substantially parallel end of the ferrule, with a shoulder on the ferrule so positioned that when locking the wire end the cap will not reach the shoulder whereby security of hold is always indicated.

In testimony whereof, I have signed my name to this application this 7th day of February, 1924.

LOUIS VAN GALE.