Feb. 5, 1929. 1,700,899

F. C. KROEGER

TERMINAL CLIP

Filed July 28, 1924

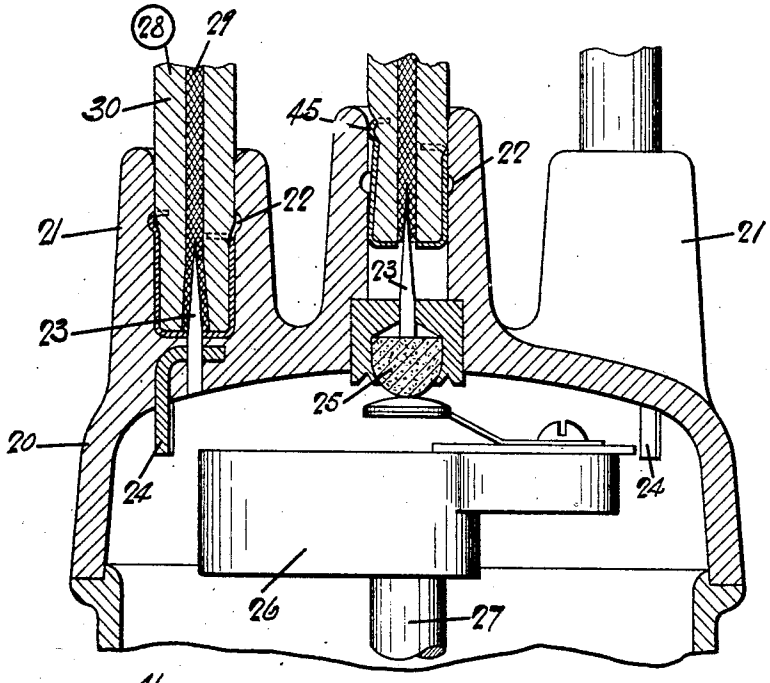


Fig. 1.

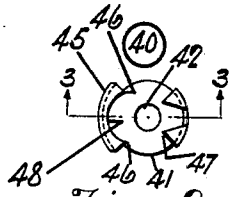


Fig. 2.

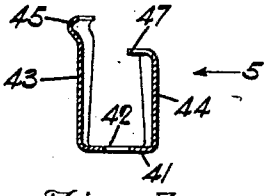


Fig. 3.

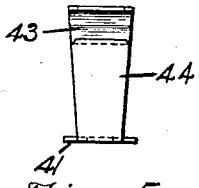


Fig. 5.

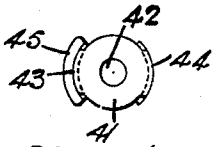


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TERMINAL CLIP.

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This invention relates to connectors for electrical circuits and includes among its objects the provision of means for detachably securing an insulated wire conductor to a terminal block, and for making electrical connections between said wire conductor and a conductor on the terminal block.

These objects are accomplished in the present invention by providing the terminal block with a socket for receiving a ferrule which embraces the end of an insulated wire conductor, the socket and ferrule being constructed so that the ferrule is readily removable with the conductor from the socket, and readily removable from the conductor after the conductor and ferrule have been removed from the socket. The present invention aims to prevent separation of the ferrule from the conductor while the conductor is being removed from the socket.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of one form of the present invention is clearly shown.

Fig. 1 of the drawings shows in section, a terminal block such as a distributor head for ignition apparatus, constructed to cooperate with the connecting ferrule included in the present invention. Fig. 2 is a top-plan view of the ferrule shown in section in Fig. 1. Fig. 3 is a sectional view on the line 3—3 of Fig. 2. Fig. 4 is a bottom-plan view of the ferrule. Fig. 5 is a side view looking in the direction of arrow 5 in Fig. 3.

Referring to the drawings: 20 designates a terminal block or distributor head for ignition apparatus provided with a plurality of sockets 21, each having an annular groove 22. Each socket receives a pointed conductor 23 attached to conductors 24 and 25 which cooperate in a well-known manner with a distributor rotor 26 driven by an engine-operated shaft 27.

In order to connect each pointed conductor 23 with the stranded or braided wire portion 29 of a flexible conductor 28 having rubber or other flexible insulation 30, there is provided a ferrule or terminal clip designated as a whole by numeral 40. The clip 40 includes a circular base 41 provided with a hole 42. The base 41 provides a yoke connecting two branches 43 and 44 which engage the insulation 30 of the conductor 28. The branch 43 is provided with an arcuate rib 45 adapted to be received by the groove 22 and with inwardly extending prongs 46 for biting into the insulation 30. The branch 44 is shorter than branch 43 and is provided with prongs 47 for engaging the insulation 30 at portions nearer the end of the cable than the portions of the cable which are engaged by the prongs 46.

To attach an insulated wire 28 to one of the pointed conductors 23, the wire is cut off square at one end and that end is inserted between the branches 43 and 44 of the ferrule 40. The ferrule 40 is moved relative to the conductor 28 so that the end of the conductor bears against the base 41. The conductor and the attached ferrule are inserted in the socket 21 and are moved until the rib 45 is engaged by the socket groove 22. This movement will cause the prongs 46 and 47 to engage the insulation 30 of the wire. The conductor 23 will extend through the hole 42 and will wedge apart the strands of the conducting wire 29. This spreading of the strands of wire 29 causes the insulation to be firmly pressed against the ferrule branches 43 and 44.

This insertion of the cable and socket will cause the prongs 47 to pierce the insulation 30 at two points on the same side of the strands 29 and to a depth sufficient to prevent separation of the cable from the ferrule while the ferrule is in the socket. The ridge 45 will first engage the cylindrical inner surface of the socket 21, and will cause the prongs 46 to pinch the insulation 30 to a substantial degree so that the ridge 45 will be firmly pressed into the groove 22 by the release of the insulation when the ferrule is moved against the ends of the socket. Most of the pinching of the insulation 30 by branch 43 of the ferrule takes place at a zone which is at a different distance from end of the cable 28 than the zone pierced by the prongs 47. The pinching prongs 46 are further apart than prongs 47 and are shaped so as to exert a pinching pressure acting closer to the surface of the insulation 30 than the pinching pressure exerted by the prongs 47 which act substantially radially of the cable. The pinch-

ing pressure exerted by branch 43 is not all concentrated at the points of prongs 46 but is distributed along the arcuate surface 48 between these points. Therefore, the branch 43 is provided with insulation-engaging portions which pinch the insulation firmly by engaging the insulation for about one-half its circumference but do not pierce the insulation to a substantial amount. Therefore, when the cable 28 is removed from the terminal block 20, there is very little liability of the cable insulation being stripped by the ferrule and the ferrule remaining in the socket, because the cable insulation is not pierced at diametrically opposite points in the same plane.

In other words, the prongs 47 are relied on to prevent separation of the ferrule from the cable while the cable is withdrawn from the socket, and the prongs 46 and surface 48 are relied on to pinch the insulation so that the ridge 45 will be firmly retained by the groove 22.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A terminal ferrule for an insulated cable insertable in a socket comprising, in combination, an apertured base portion adapted to engage with the end of the conducting element of the cable; two branch portions extending angularly from said base portion and adapted to embrace the cable, one of said portions being shorter than the other; means on the shorter portion for piercing the insulation so as to be embedded therein; and means provided on the other portion for encircling and pinching a portion of the insulation of the cable to hold it in position on the piercing means of the shorter branch portion, when the ferrule and cable are inserted together in a socket.

2. A terminal ferrule for an insulated cable insertable in a socket comprising, in combination, an apertured base portion adapted to engage with the end of the conducting element of the cable; two branch portions extending angularly from said base portion and adapted to embrace the cable, one of said portions being shorter than the other; means on the shorter portion for piercing the insulation so as to be embedded therein; and an arcuate, ribbed means provided on the other portion for encircling and pinching a portion of the insulation of the cable to hold it in position on the piercing means of the shorter branch portion, when the ferrule and cable are inserted together in a socket.

3. A terminal ferrule for an insulated cable insertable in a socket provided with an annular groove comprising, in combination, an apertured base portion adapted to engage the conducting portion of the cable; two branch portions extending angularly from said base portion and adapted to embrace the cable, one of said portions being shorter than the other; prongs on the shorter branch portion for piercing the insulation of the cable so as to be embedded therein; and an arcuate, ribbed prong on the other branch portion for pinching the cable and engaging with the annular groove when the ferrule is in the socket.

4. A terminal ferrule for an insulated cable insertable in a socket provided with an annular groove comprising, in combination, an apertured base portion adapted to engage the conducting portion of the cable; two branch portions extending angularly from said base portion and adapted to embrace the cable, one of said portions being shorter than the other; prongs on the shorter branch portion for piercing the insulation of the cable so as to be embedded therein; and a ribbed prong, arcuated to conform substantially to the contour of the insulation of the conductor, provided on the other branch portion, for pinching the insulation when in engagement with the annular groove of the socket.

5. A terminal ferrule for an insulated cable insertable in a socket comprising, in combination, an apertured base portion adapted to engage with the end of the conducting element of the cable; two branch portions extending angularly from said base portion and adapted to embrace the cable, one of said portions being shorter than the other; means on one portion for piercing the insulation so as to be embedded therein; and means provided on the other portion for encircling and pinching a portion of the insulation of the cable to hold it in position on the piercing means of the first branch portion, when the ferrule and cable are inserted together in a socket, or removed therefrom.

6. A terminal ferrule for an insulated cable insertable in a socket comprising, in combination, an apertured base portion adapted to engage with the end of the conducting element of the cable; two branch portions extending angularly from said base portion and adapted to embrace the cable, one of said portions being shorter than the other; means on one portion for piercing the insulation so as to be embedded therein; and an arcuate, ribbed means provided on the other portion for encircling and pinching a portion of the insulation of the cable to hold it in position on the piercing means of the first branch portion, when the ferrule and cable are inserted together in a socket, or removed therefrom.

7. A terminal ferrule for an insulated cable insertable in a socket comprising, in combination, an apertured base portion adapted to engage with the end of the conducting element of the cable; a plurality of branch portions extending angularly from said base portion and adapted to embrace the cable, at

least one of said portions being shorter than the other or others; means on the shorter portion or portions for piercing the insulation so as to be embedded therein; and means provided on at least one of the remaining portions for encircling and pinching a portion of the insulation of the cable to hold it in position on the piercing means of the shorter branch portions, when the ferrule and cable are inserted together in a socket, or removed therefrom.

In testimony whereof I hereto affix my signature.

FREDERICK C. KROEGER.