

July 3, 1934.

R. S. MUELLER

1,965,151

INSULATOR FOR CONNECTING CLIPS

Filed March 25, 1932

FIG. 1 -

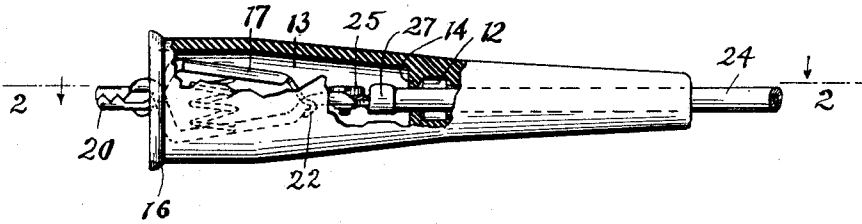


FIG. 2 -

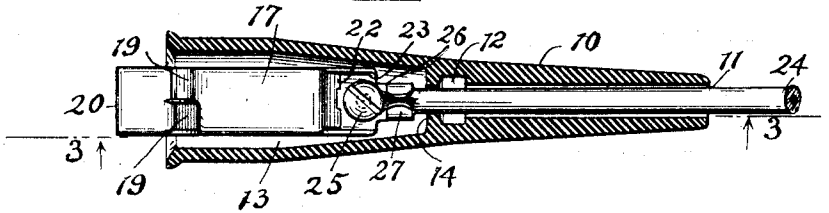


FIG. 3 -

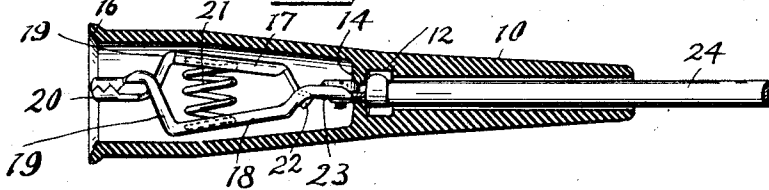


FIG. 4 -

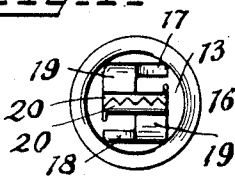


FIG. 5 -

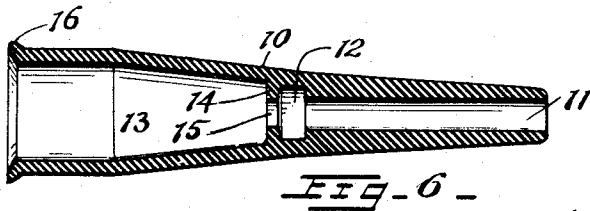
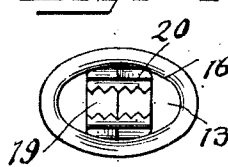


FIG. 6 -

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UNITED STATES PATENT OFFICE

1,965,151

INSULATOR FOR CONNECTING CLIPS

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Application March 25, 1932, Serial No. 601,189

6 Claims. (Cl. 173-28)

This invention relates to an insulator and more particularly to an insulator for an electrical connecting clip such as is used to connect an electrical conductor to a terminal.

5 An object of the invention is to provide an insulator for an electrical connecting clip which is so constructed that the insulator will not slip down on the wire or cord when the clip is applied to a terminal.

10 A further object is to provide an insulator for an electrical connecting clip which is so constructed that the clip may be arranged within the insulator either with its nose exposed or with its nose substantially flush with the outer opening of the insulator.

15 A still further object is to provide an insulator for an electrical connecting clip which is so constructed that the insulator will not slip down on the wire or cord, either when the clip is arranged therein with its nose exposed or with its nose substantially flush with the end of the insulator.

20 An additional object is to provide an insulator for an electrical connecting clip which is so constructed that a clip arranged therein will be completely protected and there will be small likelihood of the clip contacting with other objects and short-circuiting when lying around on the test floor, bench, or table, or other places.

25 An important object of the invention is to provide an insulator for an electrical connecting clip having a rearwardly extending elongated tubular portion receiving the conductor that is connected to the clip and so formed as to be bendable only on a relatively large arc, thus reducing the likelihood of breaking the conductor and especially the breaking of the same at the point where it is secured to the clip.

30 Additional and further objects of the invention will become apparent hereinafter during the detailed description of an embodiment of the invention that is to follow:

Referring to the accompanying drawing illustrating such embodiment of the invention:

35 Figure 1 is an elevational view partly in section of the insulator with a connecting clip and an electrical conductor or cord arranged therein;

40 Fig. 2 is a longitudinal sectional view through the insulator, clip and conductor and is taken substantially on irregular line 2-2 of Fig. 1 looking in the direction of the arrows;

45 Fig. 3 is a longitudinal sectional view taken substantially on irregular line 3-3 of Fig. 2 looking in the direction of the arrows, the clip being shown in this view in a different position from that illustrated in Fig. 2 and with its nose

substantially flush with the end of the insulator;

Figs. 4 and 5 are end elevational views of the insulators and clips illustrated in Figs. 1, 2 and 3 and disclose, respectively, the clip with its jaws closed and the clip with its jaws open, and

Fig. 6 is a detailed longitudinal sectional view of the insulator illustrated in Figs. 1, 2 and 3.

The insulator 10 is formed of rubber or other suitable flexible insulating material and is preferably, but not necessarily, substantially circular in cross-section and increases in diameter from its rear end toward the front end thereof. The insulator is provided with a longitudinally extending passage 11 in its smaller end, which passage extends inwardly of the insulator from the small end to an enlarged recess 12 formed in the insulator intermediate the ends thereof. The recess 12 is separated from an enlarged longitudinally extending bore 13 located in the enlarged end of the insulator by an inwardly extending ring 14 preferably formed integral with the body of the insulator and being provided with an opening 15 lying in axial alignment with the passage 11 in the small end of the insulator and with the bore 13 in the large end of the insulator, the opening 15 being of smaller diameter than the diameter of the passage 11 and such as to grip the usual conductor which is passed therethrough. The large end of the insulator is further provided with an external bead 16 strengthening the insulator and acting as a shock absorbing cushion at such end. The thickness of the material of the insulator preferably is greater adjacent the recess 12 than adjacent the opposite ends of the insulator, it being noted that the material gradually decreases in thickness from the recess toward the small end of the insulator.

The insulator may be used with various forms of electrical connecting clips of the spring or hinged jaw type. A good illustration of this type of clip is to be found in my Patent No. 1,779,442 granted October 28, 1930, and therefore a clip corresponding to that shown in said patent will be shown and described herein, by way of illustration.

The clip, as illustrated, comprises two members 17 and 18 having crossed portions 19 and jaws 20 arranged at their free ends, the jaws 20 being pressed yieldingly together by a spring 21. The clip members 17 and 18 are pivotally connected together by providing on the member 17 spaced tongues 22 which extend through slots in the member 18.

It will be noted that the sides of both clip members are flanged inwardly or channeled and that

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such flanges extend along the arms or cross portions 20 and beyond the bend at the forward end of the arms so as to extend well along the jaws to strengthen the same. It will further be noted
 5 that the flanges on the clip member 18 extend rearwardly beyond the point of the pivotal connection of said member with the member 17 and are continued back along an extension 23 of the member 18, which extension 23 is adapted to receive an electrical conductor 24 and is provided
 10 with a terminal screw 25 extending through a threaded opening on the center line of the extension and between the flanges. The rear end of the extension 23 is provided with a reduced extension 26 having along its opposite edges ears
 15 27, which can be bent inwardly upon the electrical conductor or cord 24.

In using the insulator and the electrical connecting clip, the end of the conductor or cord 24
 20 may be skinned off and the copper strands twisted together and inserted into the passage 11 in the small end of the insulator 10, and the copper strands of the conductor threaded through the opening 15 in the interior ring 14 and into the enlarged bore 13 of the insulator. The end of
 25 the conductor may then be grasped and the conductor or cord pulled through the insulator after which the end of the cord is positioned between the two ears 27 at the rear of the clip and the copper strands screwed under the head of the
 30 terminal screw 25. The ears 27 are then pinched down upon the cord or conductor.

The insulator may now be operatively positioned upon the connecting clip so that the nose of the clip is fully exposed or is substantially flush with
 35 the end of the insulator and therefore substantially protected by the insulator, Figs. 1 and 2 indicating the first mentioned position of the clip and Fig. 3 the last mentioned position thereof.

When the clip is arranged with its nose fully exposed, as indicated in Figs. 1 and 2, the ears 27
 40 of the clip will rest against the outer side of the ring 14 and properly locate the clip with respect to the insulator and indicate that the clip has been drawn the required distance within the insulator. When the clip and insulator are in this
 45 relative position, the ring 14 will engage with the conductor or cord 24 passing through the opening 15 in the ring and will bind the cord and prevent the insulator from slipping back on the cord when the clip is applied to a terminal, it being
 50 remembered that the opening 15 is smaller in diameter than the passage 11.

When the insulator is arranged on the clip, so
 55 as to substantially completely cover the nose of the clip, that is the nose of the clip is substantially flush with the end of the insulator, the clip and insulator will take the relative positions indicated in Fig. 3. The clip may be so positioned by pulling
 60 on the cord or conductor 24 and pressing on the nose of the clip to force the reduced extension 26 and the ears 27 of the clip into the recess 12 of the insulator, the ring 14 flexing sufficiently to allow the passage of the reduced extension and ears through the opening 15 therein. When the
 65 clip has been so positioned, the reduced extension 26 and the ears 27 will be arranged within the recess 12 and the rear end of the flanged extension 23 of the clip member 18 will bear against
 70 the outer or forward side of the ring 14, while the ears 27 will bear against the rear or inner side of the ring and hold the insulator from slipping back upon the cord or conductor when the clip is applied to a terminal.

75 It will be noted that in either position of the

clip, above referred to, that the insulator will be held against rearward movement on the cord or conductor and that the ring 14 of the insulator serves in both instances to indicate the
 80 proper position of the clip with respect to the insulator. Since the insulator is made of flexible material, the jaws of the clip may be opened by merely squeezing the large end of the insulator, as indicated in Fig. 5. It will further
 85 be noted that the small end of the insulator, or that end of the insulator extending from the recess 12 rearwardly is elongated and the thickness of the material decreases toward the rear end whereby the cord or conductor extending
 90 through such small end of the insulator will bend on a relatively large arc and, because the material is thinnest adjacent the rear end, the sharpest bend will occur near such end and remote from the thicker part of the insulator, thus decreasing the likelihood of breaking the copper
 95 strands of the cord and especially at the point of connection between the cord and clip.

Although a preferred embodiment of the invention has been illustrated and described herein, it will be appreciated that the invention is susceptible of various modifications and adaptations within the scope of the appended claims.

Having thus described my invention, I claim:

1. An insulator for an electrical connecting clip
 105 of the type specified comprising an elongated body formed of flexible insulating material and having a passage extending longitudinally of the body from one end toward the other end thereof for receiving the conductor connected to the clip, said body beyond said passage being freely flexible
 110 and having an enlarged bore for receiving the connecting clip, and a flexible gripping ring in said body at the inner end of said bore and provided with an opening for the conductor of smaller diameter than the diameter of said passage and aligned therewith.

2. An insulator for an electrical connecting clip of the type specified comprising an elongated body formed of flexible insulating material and having a passage extending longitudinally of the body from one end toward the other
 120 end thereof for receiving the conductor connected to the clip, said body beyond said passage being freely flexible and having an enlarged bore for receiving the connecting clip, and an internal gripping ring integral with said body located at the inner end of said bore and provided with an opening for the conductor of smaller diameter than the diameter of said passage and aligned therewith.

3. An insulator for an electrical connecting clip of the type specified comprising an elongated body formed of flexible insulating material and having a passage extending longitudinally of the body from one end toward the other end
 135 thereof for receiving the conductor connected to the clip, a recess in said body at the inner end of said passage and of greater diameter than the diameter of said passage, said body beyond said recess being freely flexible and having an enlarged bore for receiving the connecting clip, and a flexible gripping ring in said body separating said recess and bore and provided with an opening for the conductor of smaller diameter than the diameter of said passage and aligned
 145 therewith, said ring being adapted to grip said conductor when the clip is partially housed in said bore and a part of said clip when it is fully housed therein.

4. An insulator for an electrical connecting 150

clip of the type specified comprising an elongated body formed of flexible insulating material and having a passage extending longitudinally of the body from one end toward the other end thereof

5 for receiving the conductor connected to the clip, a recess in said body at the inner end of said passage and of greater diameter than the diameter of said passage, said body beyond said recess being freely flexible and having an enlarged bore for receiving the connecting clip,

10 and an integral gripping ring within said body separating said recess and bore and provided with an opening of smaller diameter than the diameter of said passage and aligned therewith,

15 said ring being adapted to grip said conductor when the clip is partially housed in said bore and a part of said clip when it is fully housed therein.

5. An insulator for an electrical connecting clip of the type specified comprising an elongated tapered body formed of flexible insulating material and having a passage extending longitudinally of the body from the small end toward the large end thereof for receiving the conductor

20 connected to the clip, a recess in said body at the inner end of said passage and of greater diameter than the diameter of said passage, said body at its large end beyond said recess being freely flexible and having an enlarged bore for

30 receiving the connecting clip, and a flexible gripping ring separating said recess and bore and provided with an opening for the conductor of smaller diameter than the diameter of said passage and aligned therewith, said ring being adapted to grip said conductor when the clip is partially housed in said bore and a part of said clip when it is fully housed therein.

6. An insulator for an electrical connecting clip of the type specified comprising an elongated tapered body formed of flexible insulating material and having a passage extending longitudinally of the body from the small end toward the large end thereof for receiving the conductor

85 connected to the clip, a recess in said body at the inner end of said passage and of greater diameter than the diameter of said passage, said body at its large end beyond said recess being freely flexible and having an enlarged bore for receiving the connecting clip, and a gripping ring

95 integral with said body separating said recess and bore and provided with an opening for the conductor of smaller diameter than the diameter of said passage and aligned therewith, said ring being adapted to grip said conductor when the clip is partially housed in said bore and a part

100 of said clip when it is fully housed therein.

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