Oct. 19, 1948. R. H. BENTLEY 2,451,466

ELECTRIC WIRE TERMINAL

Filed Feb. 28, 1946 2 Sheets-Sheet 1

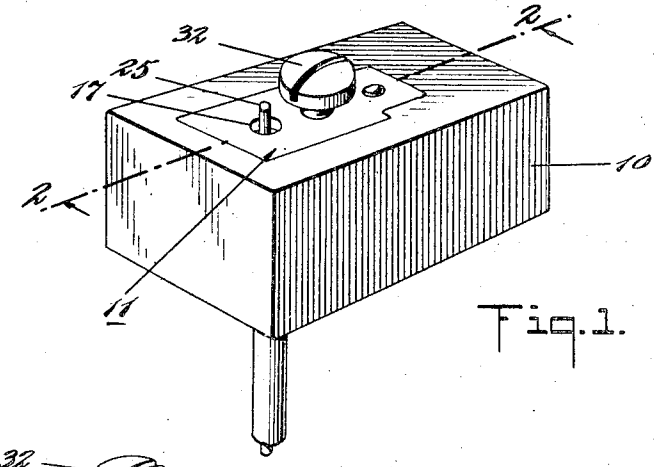


Fig. 1.

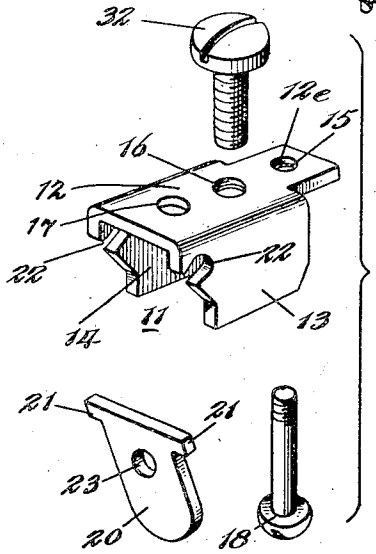


Fig. 3.

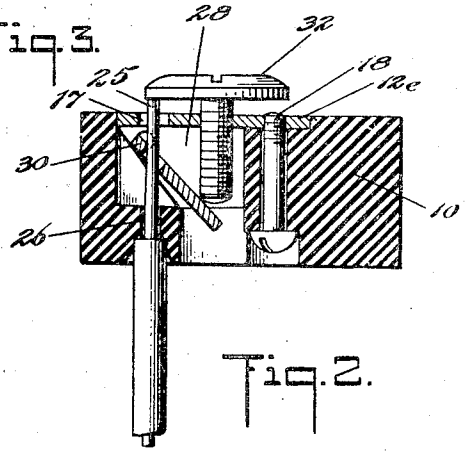


Fig. 2.

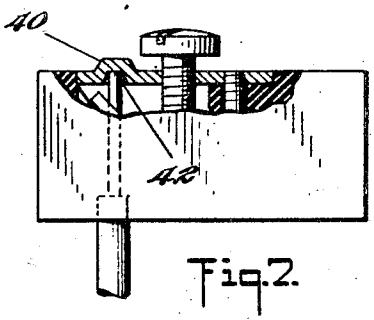


Fig. 2.

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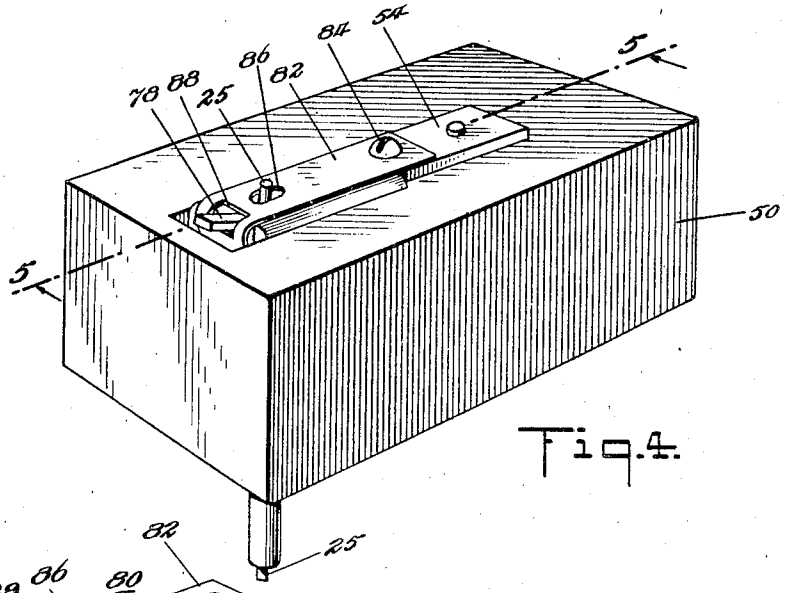


Fig. 4.

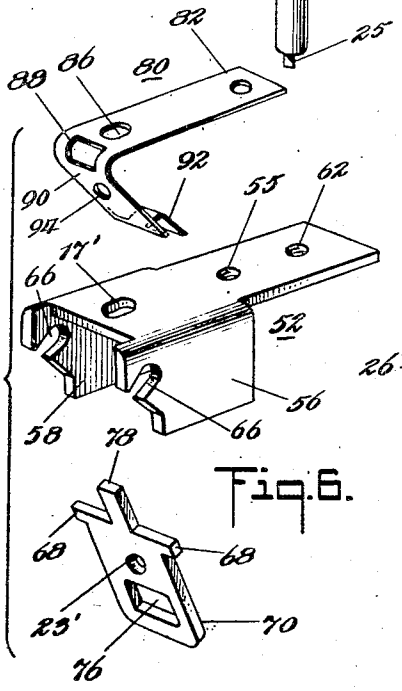


Fig. 6.

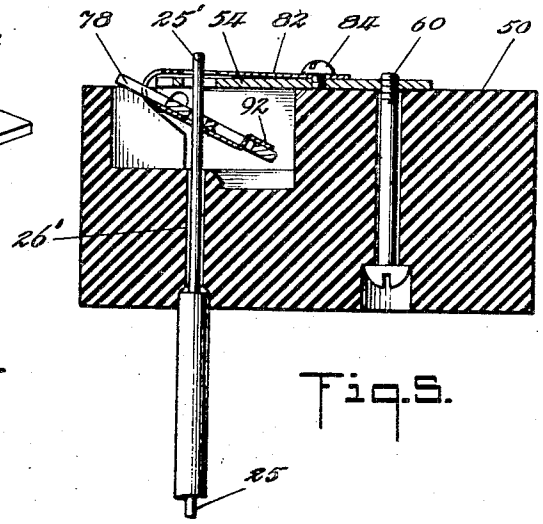


Fig. 5.

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UNITED STATES PATENT OFFICE

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ELECTRIC WIRE TERMINAL

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Application February 28, 1946, Serial No. 650,946

16 Claims. (Cl. 173—259)

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This invention relates to electric wire terminals for use with electrical devices of all sorts.

It is an object of the invention to provide a terminal construction in which the bared end of an electric wire may be inserted through a passage in an insulating body into engagement with the terminal and may be there secured more effectively than by mere clamping action, yet without the need for bending the wire around the shank of a terminal screw. A related object is to accomplish the securing by means of a screw bolt without bending the wire around the screw shank.

Another object of the invention is to provide a terminal connection for the bared end of an electric wire which is inserted through a passage in an insulating block into engagement with the terminal and is there held automatically without the need for a securing screw or bolt.

Another object is to provide in terminals of the foregoing types, means to limit to a predetermined length the amount of wire inserted through the insulating block.

Another object of the invention is to provide an improved wire terminal structure of the foregoing type which may be cheaply manufactured and assembled and which in use will reduce the cost of connecting wires to electric devices.

Other objects and advantages of the invention will become apparent as it is described in the accompanying drawings.

In the drawings—

Fig. 1 is a perspective view of the invention;

Fig. 2 is a transverse section view taken along line 2—2 of Fig. 1;

Fig. 3 is an exploded perspective view of the metallic parts employed in the invention;

Fig. 4 is a perspective view of another form of the invention;

Fig. 5 is a longitudinal section view taken along line 5—5 of Fig. 4;

Fig. 6 is an exploded perspective view of the parts employed in the form of the invention as illustrated in Figs. 4 and 5.

Fig. 7 is a view similar to Fig. 2 but of a third form of the invention.

Referring to Figs. 1–3, the insulating block 10 may be part of any electrical device. The conducting parts of the terminal comprise a stamped sheet metal terminal member 11 of substantially U-shape having a central portion 12 from the sides of which parallel side plates 13 and 14 are bent down. There is an extension 12e from the central portion having formed therein a screw threaded aperture 15 which receives a securing

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bolt 18 passing through the block 10 from one side so as to secure the member 12 upon the other side of the block.

The side plates 13 and 14 are provided with similar notches 22 to receive square-sectioned trunnion extensions 21 of a jaw member 20 which is pivotally mounted between the side plates 13 and 14 and pivots upon the trunnions as they seat within the notches 22. The notches 22 are made with their mouths of width equal to the thickness of the jaw member 20, and with their bottoms slightly greater in width, i. e. the notches diverge inwardly, so that the square trunnions 21 may be inserted sideways. Thereafter the jaw pivots slightly whereupon the trunnions are held in the notches because their diagonal dimensions being greater, will not permit them to move out of the mouths of the notches. To receive the bare end 25 of an electric wire, a round hole 17 is formed in the central portion 12 of the terminal member. This hole 17 is in partial register with a round hole 23 formed in the jaw member 20 and both the holes 17 and 23 are in partial register with passage or bore 26 in the block 10.

In order that the terminal member and its associated jaw 20 may be received within the block 10, the block is hollowed out. Inclined surfaces 30 are provided within the recess 28 adjacent one end thereof, upon which the jaw member may lie and by which the pivotal movement of the jaw member in a direction away from the mid portion of the member 12 may be limited. Thus the inclined surfaces are within the area between the side plates 13 and 14.

A binding screw or bolt 32 is threaded into a hole 16 in the mid portion of the member 12 between the holes 15 and 17 in such a position that the end of the screw bolt 32 may engage the free end of the jaw member 20.

In use of the terminal the bared end 25 of an electric wire is threaded through the passage 26 in the block 10 and then through the hole 23 in the jaw 20 and finally through the hole 17 in the member 12. Thereafter the screw bolt 32 is turned down until its end engages the jaw 20 and causes the jaw to pivot about its trunnions 21 of the notches 22 in the side plates 13 and 14 of the member 12, whereupon the diagonally opposite edges of the aperture 23 in the jaw member 20, i. e. top edge at the left side and the bottom edge at the right side, as viewed in Fig. 3, will bite into opposite sides of the bare wire end 25 at spaced points thereon, thus gripping the wire end firmly. This gripping action tends to press the left side of the lower part of the bared

end 25 (see Fig. 3) against the left side of the passage 26. As a result the wire is held in an extremely effective gripping action by the terminal structure and may not be pulled out even when a considerable amount of force is applied beyond the maximum force that would ordinarily be applied to wire terminals in ordinary use.

The hole 17 provides an additional point of contact and gripping action on the wire end when the screw is turned down, and thus adds to the firmness of the grip on the wire.

However, with some of the heavier gauges of wire used in house wiring, an extremely firm and adequate grip may be had even if the hole 17 is omitted. In such case the inner or under surface of the central portion 12 will serve as a stop to limit the amount of wire that may be passed into the block passage 26.

A similar limiting function may be performed, when the hole 17 is present, by the head of the screw 32, which overlies the hole 17. Thus the end of the wire will engage the underside of the head of the screw 32 to stop further movement of the wire. (See Fig. 3.)

In the form of the invention illustrated in Fig. 7 the stop function of the central portion of the terminal plate is combined with the advantage of an additional bearing and contact engagement between the wire and the terminal plate. That is done by striking up an indentation 40 from the inside of the central portion of the terminal plate so that the end of the wire, when abutting the plate, may move sideways to engage the shoulder of the indentation as the terminal screw 32 is turned down.

Referring to the form of invention illustrated in Figs. 4, 5 and 6, an insulating block 50 may be a part of any electrical device. On this block is mounted a sheet metal terminal member designated generally by the numeral 52 and comprising a flat plate like mid portion 54 from the sides of which flat plate extensions 56 and 58 are bent at right angles, parallel to one another. The plates 56 and 58 may be and preferably are of lesser length than the mid portion 54. The member 54 is secured upon the top surface of the block 50 by means of a securing bolt 60 passing through the block 50 from one side and threaded into an aperture 62 in the portion 54.

In the end edges of side plates 56 and 58, inwardly diverging notches 66 are provided to receive square-sectioned trunnion-like extensions 68 of the flat jaw member 70, which is preferably stamped from sheet metal.

As in the previous form of the invention, a hole 17' is provided in the member 52 in partial register with a hole 23' in the member 70, both holes being in partial register with a passage 26' in the block 50. In order to make the jaw 70 automatically grip the bare end 25' of the electric wire, a leaf spring member designated generally by numeral 80 is provided. The leaf spring 80 is preferably stamped from spring steel as a strip and is bent permanently into an acute angle as best illustrated in Fig. 6. One arm 82 lies upon the top surface of the member 52 and is secured there by a screw 84 threaded through an aperture through the end of the arm 82 and screwed into a registering screw threaded hole 55 in the member 52. In order that the bare end 25' of the wire may pass freely through this arm 82, an aperture 86, equal to or larger than the hole 17' is punched in the arm 82. At the bend of the spring member 82, a rectangular aperture 88 is provided through which an extension 78

from the upper end of the jaw member 70 may extend. By means of this extension, the jaw may be manipulated if and when necessary to release the wire as is hereinafter more fully explained.

For the purpose of urging the jaw 70 in clockwise direction (referring to Fig. 5) about its trunnion bearings, the other end 90 of the spring member 80 passes around the pivoted end of the jaw member 70 and lies beneath the lower surface of the jaw member and has a bent finger 92 on its end extending up through an aperture 76 in the jaw 70. Thus, the end of the finger 92 lies upon the uppermost end surface of the free end of the jaw 70 and causes the action of the spring to be extended downwardly on the jaw.

To enable the wire 25' to pass freely through the spring arm 90, an aperture 94 larger than, and in register with, the aperture 23' is provided in the arm 90.

In use of the terminal, the bare end of the wire 25' is threaded through the passage 26' and through the registering apertures 94 and 23' in the spring and jaw member respectively, and then through the registering apertures 17' and 86 in the members 54 and 80, respectively. During this passage, the jaw 70 may pivot upwardly (referring to Fig. 5) bringing the aperture 23' in more accurate register with passage 26' and the hole 17' to permit the end 25 to thread therethrough. However, when a reverse attempt is made to pull the wire out of the passage 26, the action of the spring member 82 causes the jaw to grip the sides of the wire in a manner similar to the pressure exerted by the screw bolt 32 in the previously described form of Figs. 1–3. Since the action of this spring is in a direction to move the aperture 23' of the jaw member 70 out of register with the passage 26' and concomitantly to cause gripping of the upper left edge of that aperture with the left side of the wire 25' and the lower right edge of the aperture 23' with the right side of the wire, the greater the pull on the wire, the greater will be the gripping action of the jaw. The wire is thus held with a grip far greater than any maximum force which would normally be encountered in the normal use of the terminal.

It is possible to release the gripping action of the terminal upon the wire 25' by pressing downwardly (referring to Figs. 4 and 5) upon the extension 78 with a screw driver or other implement, whereupon the wire may be quite easily withdrawn.

As in the previously described forms the hole 17' may be omitted or, as a substitute an indentation like 40 may be provided, in the terminal member 54.

From the foregoing it may be observed that I have provided a novel wire terminal structure which may be inexpensively manufactured and assembled and is capable of general use with electrical devices and which provides an extremely effective, certain and positive grip on a bare wire end.

In my co-pending application, S. N. 720,413, filed January 6, 1947, my invention is disclosed in another form and claims are made to be specifically and in generic form.

Modifications within the scope of my invention will occur to those skilled in the art therefore I do not limit my invention to the preferred embodiments herein illustrated and described.

I claim:

1. An electric terminal connector comprising an

insulating body, a conductive member mounted on one side of said body and having a hole therein, said body having a passageway terminating at the other side of said body, a jaw member having a fixed pivotal connection with said conductive member and having an aperture in partial register with said passageway and hole to receive the bared end of an electric wire, inserted through said passageway into said jaw aperture, and means causing the edges of said jaw aperture simultaneously to grip opposite sides of said wire end and to cause the wire to engage the side of said hole.

2. An electric wire terminal connection comprising an insulating body, a conductive member mounted on one side of said body, a jaw member associated with said conductive member, said body having a passageway terminating at the other side of said body and said jaw having an aperture positioned so that the bared end of a wire may be inserted through said passageway into said jaw aperture, and means causing edges of said jaw aperture simultaneously to grip opposite sides of said wire end, said means also causing another portion of said wire end to press against the surface of said passageway, whereby to hold the wire from removal.

3. An electric wire terminal connection comprising an insulating body, a conductive member mounted thereon, a pivoted jaw member associated with said conductive member, a fixed pivotal mounting for said jaw member, said body having a passageway and said jaw having an aperture positioned so that the bared end of a wire may be inserted through the passageway into the jaw aperture, and means mounted on said conductive member and acting on the jaw member to tilt it relative to said wire in a direction to cause the edges of said jaw aperture firmly to grip opposite sides of said wire end, the direction of tilt being such that a pull on said wire increases the gripping action of the jaw on both sides of the wire.

4. An electric wire terminal connection comprising an insulating body, a conductive member mounted thereon, a tiltable jaw member pivotally associated with said conductive member, a fixed pivot for said jaw member, said body having a passage and said jaw member having an aperture positioned so that when the bared end of a wire is inserted through said aperture engagement of the wire with the sides of said aperture will tend to move the jaw to improve the registration of said aperture and passage, said engagement acting oppositely on attempt at reverse movement of said wire and thereby making said jaw firmly grip said wire simultaneously on both sides, and means engaging said jaw member to cause it to grip said wire simultaneously on both sides.

5. An electric wire terminal connection comprising an insulating body, a U-shaped conductive member mounted on one side of said body and having notches in its side portions, said body having a passage terminating at the other side of said body, a jaw member between said side portions having trunnions pivoting in said notches, affording a fixed pivot for said jaw member, said jaw having an aperture positioned so that the bared end of an electric wire may be inserted through said passageway into said jaw aperture, and means causing edges of said jaw aperture simultaneously to grip opposite sides of said wire end.

6. An electric wire terminal connection comprising an insulating body, a conductive member

having bearing notches whose mouths are narrower than their interiors, a jaw member having rectangular trunnions whose smallest dimension will permit insertion into said notches, said trunnions being held in said notches upon rotation of said jaw from the entrance position and affording a fixed pivot for said jaw member, said body having a passage and said jaw having an aperture positioned so that the bared end of an electric wire may be insterted through both, and means causing edges of said jaw aperture simultaneously to grip opposite sides of said wire end.

7. An electric wire terminal connection as claimed in claim 3 wherein the means acting on the jaw to tilt it is a screw bolt.

8. An electric wire terminal connection as claimed in claim 3 having means to limit to a predetermined length the portion of said wire which may pass through said passageway.

9. An electric wire terminal connection comprising an insulating body, a conductive member mounted thereon, a jaw member associated with said conductive member, said body having a passage and said jaw having an aperture positioned so that the bared end of an electric wire may be inserted through both, and a screw bolt in said conductive member engaging said jaw member to cause the edges of said jaw aperture to grip opposite sides of said wire end, said bolt having a head engageable by the tip of said wire to limit to a predetermined length the portion of said wire which may pass through said passage.

10. An electric wire terminal connection comprising an insulating body, a U-shaped conductive member mounted thereon, the side portions of the U being beneath the surface of the body, and having bearing notches formed therein, a jaw member moving between said side portions and having trunnion bearings pivoting within said notches, said body having a passage and said jaw having an aperture each for the reception of a bared end of an electric wire, said jaw being inclined at an angle to the wire, and a screw bolt in said conductive member having its end engaging said jaw at a point remote from said pivot causing the edges of said jaw aperture to grip said wire on opposite sides, and pressing said wire against the wall of said passage.

11. An electric wire terminal connection comprising an insulating body, a U-shaped conductive member mounted on one side thereof, the side portions of the U being beneath the surface of the body and having bearing notches formed therein, a jaw member moving between said side portions and having trunnion bearings pivoting within said notches affording a fixed pivot for said jaw member, said body having a passage and said jaw having an aperture each for the reception of a bared end of an electric wire, said jaw being inclined at an angle to the wire, and means carried by said conductive member having its end engaging said jaw at a point remote from said pivot causing the edges of said jaw aperture to grip said wire simultaneously on opposite sides, and pressing said wire against the wall of said passage.

12. An electric wire terminal connection comprising an insulating body, a U-shaped conductive member mounted thereon, the side portions of the U being beneath the surface of the body, and having bearing notches formed therein, a jaw member moving between said side portions and having trunnion bearings pivoting within said notches, said body having a passage and said jaw having an aperture each for the reception of a

bared end of an electric wire, said jaw being inclined at an angle to the wire, and a leaf spring member carried by said conductive member having its end engaging said jaw at a point remote from said pivot causing the edges of said jaw aperture to grip said wire on opposite sides, and pressing said wire against the wall of said passage.

13. An electric wire terminal connection comprising an insulating body, a U-shaped conductive member mounted thereon, the side portions of the U being beneath the surface of the body, and having bearing notches formed therein, a jaw member moving between said side portions and having trunnion bearings pivoting within said notches, said body having a passage and said jaw having an aperture each for the reception of a bared end of an electric wire, said jaw being inclined at an angle to the wire, and a leaf spring member carried by said conductive member having its end engaging said jaw at a point remote from said pivot causing the edges of said jaw aperture to grip said wire on opposite sides, and pressing said wire against the wall of said passage, said jaw member having an extension for moving said jaw against the spring action to release said wire.

14. A terminal connection as set forth in claim 12, wherein one part of the spring member overlies said conductive member and another part of the spring member underlies the jaw member and has a finger extending through and pressing upon said jaw member.

15. An electric wire terminal connection comprising a conductive member, a pivoted jaw member mounted in notches in said conductive member, said conductive member having a hole and said jaw member having an aperture positioned so that the bared end of a wire may be inserted through said aperture into said hole, and means mounted on said conductive member and acting on the jaw member to tilt it relative to said wire in a direction to cause the edges of said jaw aperture firmly to grip opposite sides of said wire end simultaneously, the direction of tilt being such that a pull on said wire increases the gripping action of the jaw member on both sides of the wire simultaneously.

16. An electric wire terminal connection as claimed in claim 15 having means fixedly positioned relative to said conductive member against which a portion of the bared end of the conductor near to the portion gripped by the jaw member is pressed as said tilting means acts on said jaw member in order to support the conductor against a bending tendency of said jaw member.

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