June 30, 1931. A. SCHNEIDER 1,812,307

TERMINAL CONNECTION FOR ELECTRIC CIRCUIT WIRES

Filed May 22, 1928 2 Sheets-Sheet 1

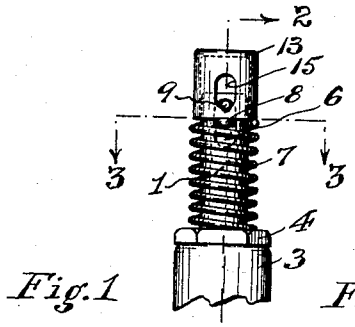


Fig. 1

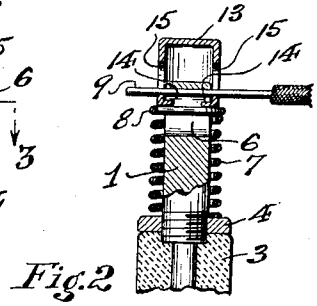


Fig. 2

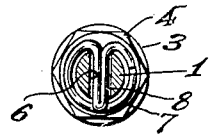


Fig. 3

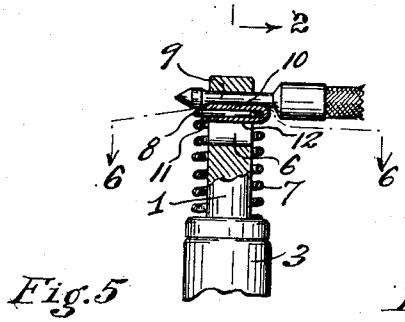


Fig. 5

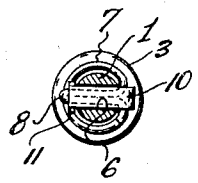


Fig. 6

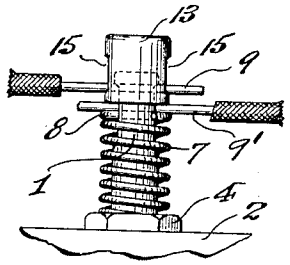


Fig. 4

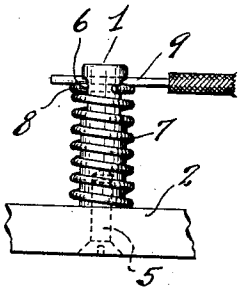


Fig. 7

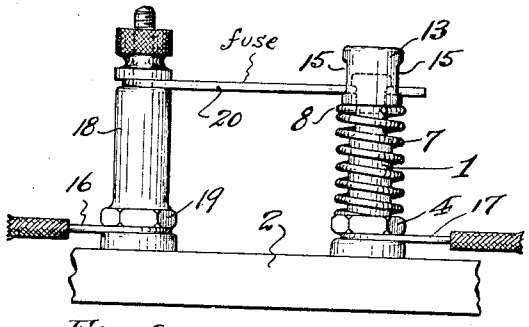


Fig. 8

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June 30, 1931. A. SCHNEIDER 1,812,307

TERMINAL CONNECTION FOR ELECTRIC CIRCUIT WIRES

Filed May 22, 1928 2 Sheets-Sheet 2

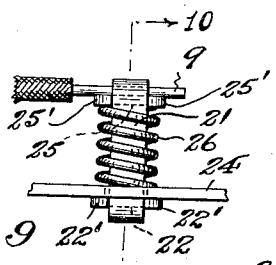


Fig. 9

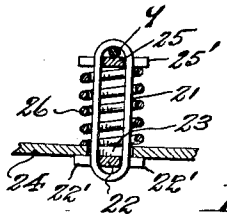


Fig. 10

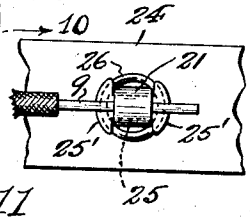


Fig. 11

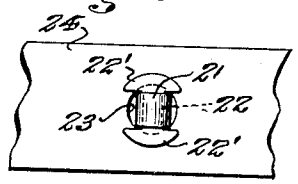


Fig. 12

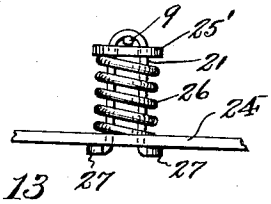


Fig. 13

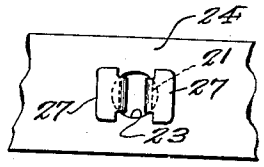


Fig. 14

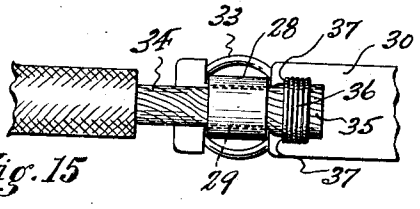


Fig. 15

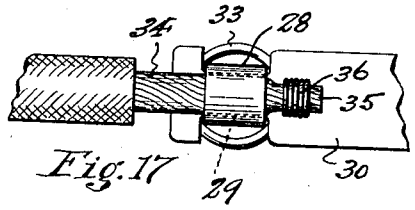


Fig. 17

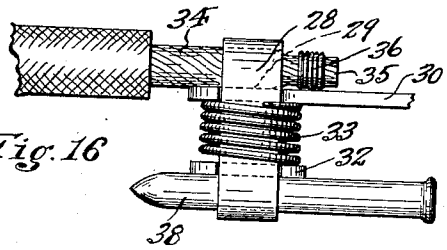


Fig. 16

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UNITED STATES PATENT OFFICE

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TERMINAL CONNECTION FOR ELECTRIC CIRCUIT WIRES

Application filed May 22, 1928. Serial No. 279,731.

This invention relates to terminal connections for electric circuit wires and the like; and the invention has reference, more particularly, to a novel construction of self-acting binding post or connector which automatically and securely grips a wire or other conductor inserted therein.

The invention has for its principal object to provide a simple and inexpensive form of self-acting binding post or connector which is easy to manipulate, which is efficient and secure in its gripping action whereby loose connections are entirely eliminated, and which consists of comparatively few parts cooperating one with another in a novel manner.

The invention has for a further object to provide a novel form of terminal connection which may be made in a variety of specific forms, all of which, however, embody the essential principles of construction whereby a strong, durable, efficient and easily manipulated self-acting connection is provided.

Other objects of this invention, not at this time more particularly enumerated, will be clearly understood from the following detailed description of the same.

The invention is illustrated in various specific forms in the accompanying drawings, in which:—

Figure 1 is a side elevation of a form of binding post suitable to serve as a terminal connection for spark-plugs, or as a stationary binding-post, etc.; Figure 2 is a vertical longitudinal section through the same on line 2—2 in Figure 1; Figure 3 is a transverse section through the same, taken on line 3—3 in Figure 1; Figure 4 is a side elevation of the same to illustrate its adaptability to operatively engage and grip a plurality of wires; Figure 5 is a sectional view illustrating a slightly modified form of the novel terminal connection; Figure 6 is a transverse section of the latter, taken on line 6—6 in Figure 5; Figure 7 is a side elevation of a somewhat simplified form of the novel terminal connection; and Figure 8 is a side elevation showing the terminal connection as it may be used for fuse mounting.

Figure 9 is a side elevation of a terminal connection embodying the principles of the instant invention, but showing a form thereof capable of axial swiveling movement; Figure 10 is a vertical section through the same, taken on line 10—10 in Figure 9; Figure 11 is a top end view of the same; and Figure 12 is a bottom end view of the same.

Figure 13 is a side elevation of a modified form of swivel type terminal connection; and Figure 14 is a bottom end view of the same.

Figure 15 is a top end elevation and Figure 16 is a side elevation, showing a manner by which the terminal connection can be positively locked; and Figure 17 is a top end view of the same showing the position of a cable end as disposed for insertion or withdrawal from the terminal connection of the kind shown in Figures 14 and 15.

Similar characters of reference are employed in the hereinabove described views, to indicate corresponding parts.

Referring first to Figures 1 to 4 of the drawings, the reference character 1 indicates the main post of the novel terminal connection. This post may be of any desired cross-sectional shape, and may be suitably secured mechanically, and connected electrically if desired, at its lower end to any desired supporting base 2 (as shown in Figures 4, 7 and 8), or it may form the external terminal first of a spark-plug 3 (as shown in Figures 1, 2, 3, 5 and 6). If desired, the lower end of the post may be provided with a lock-nut 4 to secure the same against displacement from the part to which it is attached, or it may be otherwise mechanically united to such part as by a screw 5 as indicated in Figure 7.

Provided in said post 1, adjacent to its upper free end, is a transverse opening 6, preferably somewhat elongated in the direction of the longitudinal axis of the post. Encircling the post 1 is a spiral compression spring 7, the lower end of which bears downwardly against the part to which the post is fixed. The upper end of said spring, in the forms of the connection shown in Figures 1 to 8 inclusive, is provided with peculiar formation by doubling the end portion thereof upon itself so as to provide a transverse

tongue 8 diametrically disposed and arranged to extend through the opening 6 of the post, thereby providing a yieldable jaw adapted to exert an upward thrust under the tension of the spring body. In the simplest form of the terminal connection, as illustrated in Figure 7, the tongue or yieldable jaw 8 may be utilized directly as a gripping contact against a wire or conductor terminal 9 which is inserted between the same and the upper end of the opening 6. The spring 7 permits the tongue or jaw 8 to yield downwardly when the wire or terminal 9 is inserted, and the spring tension forcefully thrusts the latter upwardly whereby the same is firmly gripped between the tongue or jaw 8 and the upper end of the opening 6 so that not only is the wire or terminal firmly and securely held against displacement but at the same time a good electrical contact between the parts is established and maintained. It may be desired in some cases to provide the tongue or jaw 8 with a metallic sheath to thereby afford a smoother surface as to this element and thus render the insertion and withdrawal of the wire end or terminal 9 somewhat easier. This modification is shown in Figures 5 and 6, wherein a metal shoe 10 is overlaid upon the tongue or jaw 8, said shoe 10 having a downturned perforate flange 11 at one end through which the free end of the tongue or jaw 8 projects, the opposite end portion of said shoe 10 being doubled around and under the tongue or jaw 8 as at 12, thus securely interlocking tongue and shoe together in operative assembled relation. In another form of my novel contact terminal connection, and as shown in Figures 1, 2, 4 and 8 more especially, I provide a movable contact cap or thimble 13 to slidably fit over the free end of the post 1. The lower margins of said cap or thimble are provided with diametrically opposed inturned keeper lugs 14 which engage in opposite sides of the post opening 6, thereby preventing both endwise and rotatable displacement of the cap or thimble from the post while nevertheless permitting a limited degree of sliding movement of the former relative to the latter. The tongue or jaw 8 thrusts upwardly against the cap or thimble. Said cap or thimble is provided in its opposite sides with openings 15 aligned with the opening 6 of the post 1. This form of terminal connection is very conveniently manipulated when it is desired to engage or disengage a wire or conductor terminal 9 therewith, since by pressing downwardly on the cap or thimble against the tension of the spring 7 the openings 15 and 6 of the cap and post respectively are brought into transverse alignment, thus permitting the insertion or withdrawal of the wire or conductor terminal 9 as the case may be. When the wire or conductor terminal 9 is in place and the cap is released the spring 7, acting through the tongue or jaw 8, thrusts the cap upwardly whereby the wire or conductor terminal 9 is firmly gripped between the lower ends of the openings 15 of the cap and the upper end of the post opening 6, in a manner clearly to be understood from an inspection of the drawings. As illustrated in Figure 4, the last described construction of terminal connection also lends itself admirably to use as a means for holding or engaging a plurality of wires, one, as 9, being secured in and by the openings 15 and 6 of the cap and post respectively in the manner above described, and, the other, as 9′, being thrust between the lower end of the cap and the tongue or jaw 8 of the spring 7.

It will be obvious that the novel terminal connector may be variously employed, and e. g. may be used as a fuse holder in the manner shown in Figure 8, wherein the circuit wires 16 and 17 may be secured, respectively, to the binding post 18 by the nut 19 and to the post 1 by the nut 4, and the fuse 20 then bridged between the binding post 18 and the terminal connector constructed as already above described. It will also be obvious that one of the novel terminal connectors may replace the binding post 18 in such use if desired.

Referring now to Figures 9 to 14 of the drawings, I have shown therein modified forms of terminal connectors embodying the general principles of this invention, but being so arranged as to permit of a swiveling action on their vertical or longitudinal axes. One such modified form, shown in Figures 9 to 12 inclusive, comprises a post in the form of an enlarged O-shaped element 21 having an I-shaped bottom keeper plate 22 arranged transversely within the lower end or loop thereof. Said element 21 is passed upwardly through an opening 23 in a base plate 24 or other part upon which the terminal connector is desired to be mounted until the cross-bars 22′ of the keeper plate 22 engage the under side of said base plate 24. Arranged transversely within the upper end or loop of said element 21 is an I-shaped contact shoe 25 having cross-bars 25′ at its opposite ends to retain the same against displacement from operative assembled relation to the element 21. A spiral compression spring 26 is arranged around said element 21 between the base plate 24 and the underside of said contact shoe 25, the same being adapted to thrust the latter toward the upper end or loop of said element 21, while at the same time holding the element 21 as a whole upwardly thrust with its keeper plate 22 stopped against the underside of the base plate 24. It will be noted that, with the element 21 so mounted, the same may turn on its vertical or longitudinal axis in the opening 23 of the base-plate 24, thus possessing a swiveling action which is very convenient,

and readily permits the adjustment of the terminal connector acocrding to the angle of approach made by the wire or the like 9 which is desired to be coupled thereto. To engage the wire or the like 9, the contact shoe 25 is depressed relative to the upper end of the element 21 and the wire 9 is inserted between the upper closed end or loop of said element and the contact shoe 25, the latter being thereupon released whereby the spring 26 will throw upwardly thereon to grip the wire between the same and the upper closed end or loop of the element 21. Wires may also be secured between the keeper plate 22 and the lower closed end or loop of the element 21 in a similar manner, if desired. In Figures 13 and 14 I have shown a simplified form of swivel type terminal connector which as to its general structure corresponds to that already immediately above described, except as to the lower end structure of the element 21 which instead of being furnished with a closed loop and keeper plate is bifurcated to provide outwardly and oppositely laterally projecting cross-bars or foot-pieces 27 adapted to engage the underside of the base-plate 24 adjacent the margins of the opening 23 thereof under the upward thrust of the opening 26.

Referring now to Figures 15 to 17 inclusive, I have shown an arrangement of the novel terminal connector adapted for comparatively heavy cable reception, and capable of being so manipulated as to permit of the cable end being locked against withdrawal therefrom. In this form of construction I also provide an elongated O-shaped element 28 vertically movable relative to the neck 29 of a bus-bar 30 or other form of contact member 31. Arranged within the lower end or loop of the element 28 is an I-shaped member 32, and around the element 28 and between the bus-bar 30 and member 32 is a compression spring 33. The cable end 34 is flattened out at 35 and is provided with a cross wrapping of wire 36 soldered thereto, the same providing stop shoulders 37. To attach the cable end the element 28 is first thrust upwardly relative to the bus bar 30 to expose the opening therethrough, and then the flattened part of the cable end 30 is turned in vertical plane so as to pass through said opening. When thus entered in the upper loop of the element 28 the cable end is given a quarter turn which brings the shoulders 37 in opposition to the sides of the element 28, thus stopping the cable end from withdrawal. The element 28 is now released, whereupon the tension of the spring 33 thrusting down on the member 32 draws the upper loop or end of the element 28 down on the cable end and into good electrical contact with the bus-bar 30. If it is desired to lock the element 28 against upward movement, a lock-bar 38 is inserted between the lower loop of the element 28 and the member 32, thus compressing the spring 33 to substantially its limit of compression while nevertheless retaining the upper loop in downwardly thrusting relation to the engaged cable end, so that no manipulation of the element 28 to release the cable end can be effected until said lock-bar 38 is withdrawn. This arrangement may also be used to couple two cable ends together, by inserting the second cable in the lower end of the element 28 in place of the locking bar 38.

From the above description it will be apparent that I have provided a very simple and practical construction of terminal connector capable of a wide variety of uses in connection with electric circuit wires or cables, and being itself capable of a wide variation as to structural detail while still embodying the essential principles of construction and mode of operation within the scope of this invention.

Having thus described my invention, I claim:—

1. In a device of the kind described, a post having an opening therethrough to receive a circuit wire end or the like, a compression spring around said post, said spring having its upper end portion extending diametrically through said post opening, said end portion being adapted to thrust upwardly toward said wire end to bind the same in gripped relation to said post.

2. In a device of the kind described, a post having an opening therethrough to receive a circuit wire end or the like, a base element with which said post is secured, a compression spring around said post, and a tongue provided at the upper end of said spring, said tongue extending through and movably cooperating with said post opening to bind said wire end therein.

3. The combination with an element having an opening to receive a circuit wire end or the like, a part on which said element is mounted, and a compression spring around said element having a doubled over end portion providing a tongue extending through said post element opening and movably cooperating with said post element to bind said wire end in said opening thereof.

4. The combination with an element having an opening to receive a circuit wire end or the like, a part on which said element is mounted, a cap overlying said post element and having a keeper lug engaging in said opening, to thereby retain said cap in assembled relation with said post element, while permitting a limited degree of sliding movement of the former relative to the latter, a compression spring around said element, said spring having a tongue shaped end portion projecting into said opening and engaging said lug, said cap being actuated by said spring and

movable relative to said element opening to bind said circuit wire end in and against displacement from said opening.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 19th day of May, 1928.

ADOLF SCHNEIDER.