March 18, 1941. R. K. WINNING 2,235,275

TERMINAL

Filed April 22, 1938

Fig. 1.

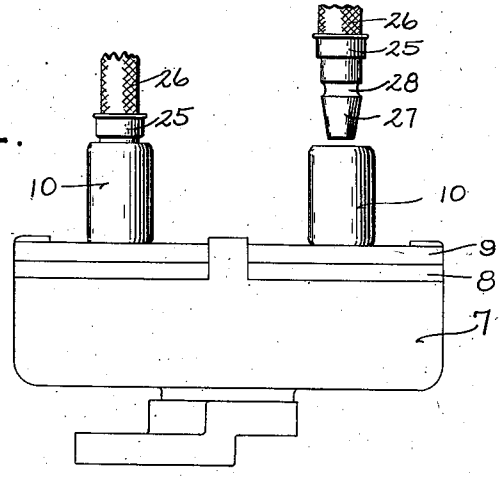


Fig. 2.

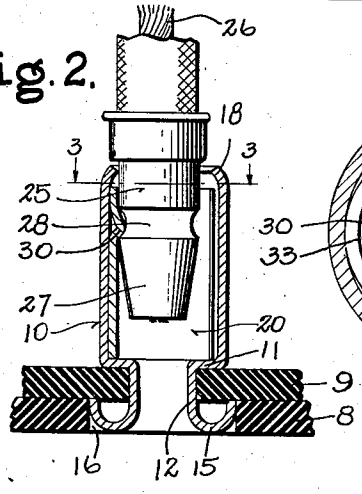


Fig. 3.

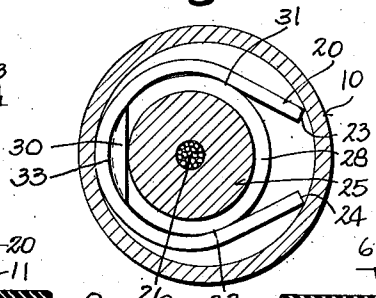


Fig. 5.

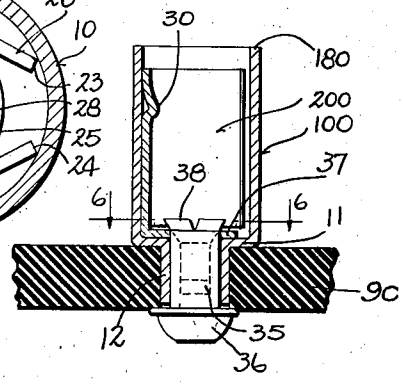


Fig. 4.

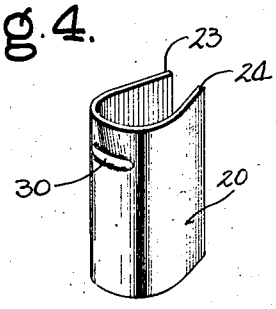
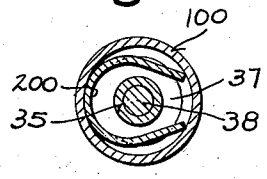


Fig. 6.



INVENTOR
ROBERT K. WINNING
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS

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UNITED STATES PATENT OFFICE

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TERMINAL

Robert K. Winning, Milwaukee, Wis., assignor to Clum Manufacturing Company, Milwaukee, Wis., a corporation of Wisconsin

Application April 22, 1938, Serial No. 203,491

6 Claims. (Cl. 173—328)

This invention relates to improvements in terminals.

It is the primary object of the invention to provide a novel and simple terminal useful particularly for switches and the like to provide integrally a contact and the barrel portion of a terminal clip. It is a further object of the invention to provide a terminal which can be assembled inexpensively and with great facility, and one which will project at right angles to the terminal head and will provide for the semi-positive retention of a cable anchored thereto, and will assure an effective electrical contact between such a cable and the terminal.

Other objects will appear in more detail from the following disclosure.

In the drawing:

Figure 1 shows in side elevation a switch to which, by way of illustration, the present invention is applied, one conductor being shown applied to a terminal on the back of the switch and another conductor being shown in the proximity of the terminal receptacle.

Figure 2 is an enlarged detail view of my improved terminal in axial section.

Figure 3 is a still further enlarged detail view taken in transverse section in the plane indicated at 3—3 in Fig. 2.

Figure 4 is a detail view in perspective showing the contact spring which I preferably employ in the jack or receptacle portion of my improved terminal.

Figure 5 is a view similar to Fig. 2 showing a modified embodiment of the invention.

Figure 6 is a view taken in section in the plane indicated at 6—6 in Fig. 5.

Like parts are identified by the same reference characters throughout the several views.

The casing shown at 7 may, as above indicated, be understood to constitute the casing of a switch such as is used for automotive lighting control. This switch has a terminal head including the separate plies 8 and 9 upon which are mounted the terminals to which this invention pertains. While one specific form of the invention illustrated has particular utility where a multi-ply terminal head is used, it is not to be understood to be limited either to the particular construction disclosed or to use with this particular style of terminal head.

My improved terminal is made from tubular stock and includes integrally a barrel 10 constricted to provide a shoulder at 11 and a rivet portion 12 which extends through the relatively small aperture in the ply 9 of the terminal head. The end of the rivet portion 12 of the terminal is spun outwardly and turned back upon itself as shown at 15 to provide a contact, the terminal head ply 8 having a relatively large aperture at 16 to receive this contact portion of the device. The extreme margin of the contact portion 15 of the device seats against the inner face of ply 9, and the shoulder 11 is seated against the outer face of said ply, thus rigidly fixing the position of the terminal with respect to ply 9 quite independently of ply 8 of the terminal head. Ply 8 thus merely constitutes a dielectric bearing surface for the moving contactor (not shown) of the switch, and may be omitted where no such surface is desired, thus leaving ply 9 alone to constitute the terminal head.

The outer end of the barrel or jack receptacle 10 is slightly constricted at 18 and this serves to retain within the receptacle the spring 20 which is preferably made of some highly elastic conductive material such as phosphor bronze, and is preferably in the form of a split tube of horseshoe shape in cross section. It has an arcuate intermediate portion and tangential marginal convergent portions adapted to be spread or additionally separated by an inserted plug. The constricting marginal flange 18 of the receptacle 10 confines this spring somewhat loosely but the opening extending longitudinally through the spring has slightly less width than the diameter of the plug 25 which is receivable therein. This plug is fixed at the end of the conductor or cable 26. It has a tapered portion 27 and an annular groove at 28.

The introduction of the tapered portion 27 of the plug spreads the spring slightly, the spreading being particularly necessary to enable the larger cross section of the plug to pass a rib formed at 30 in the spring. As soon as the groove 28 of the plug registers with the rib 30 of the spring, the tension of the spring is somewhat reduced but is still maintained at a sufficient value so that its side margins 23 and 24 will press the inner wall of the receptacle 10 and the curved intermediate portion of the spring will likewise be pressed into intimate contact with an opposite inner wall portion of the receptacle.

The plug will maintain a very good electrical contact with spring 20 along at least three separate lines, at 31, 32 and 33 respectively (Fig. 3). The engagement of the rib 30 in groove 28 will maintain the parts semi-positively against separation, but the spring will be sufficiently yielding to permit the plug to be readily withdrawn from the jack receptacle when desired. In this

construction there is nothing required in the way of a mechanical connection of the parts, the spring 20 being held in the receptacle solely by the conformation of the respective parts. The device is therefore extremely simple and inexpensive; it provides an excellent electrical connection; and what is particularly desirable for the purposes of the present invention, it projects directly rearwardly from the terminal head.

In the construction shown in Figs. 5 and 6 the barrel or receptacle 100 has a shoulder at 11, just as above described. It also has the reduced extension at 12 which projects through the terminal head 90. The metal is not, however, upset at either end, the upper margin 180 being the full diameter of the receptacle and the lower margin not being spun over or riveted as in Fig. 2.

In lieu thereof I may use a rivet, or nut 35 and bolt 38 as a means of mounting the terminal, securing the spring therein and providing the contact. The spring 200 corresponds to that already described in its general form, but it is provided at its bottom with an ear 37 which is turned inwardly at right angles to the axis of the receptacle and apertured to receive the bolt 38. The bolt 38 engages this ear and the nut 35 engages the inner face of terminal head 90, thus coacting with the shoulder 11 to clamp the terminal head and thus to fix the terminal therein. The nut 36 is preferably made hemispherical to constitute a contact. This device is likewise very inexpensive as judged by existing terminal constructions and, like the construction first described above, it projects at right angles to the terminal head and is adapted to be easily mounted and to permit the cable plugs 25 to be snapped in and out with facility.

I claim:

1. In a device of the character described, the combination with a receptacle open at its end and a contact spring therein comprising a spring member having an arcuate intermediate portion and tangential convergent portions adapted to be spread by a member insertable between said tangential portions said spring member having portions in contact with the interior of the receptacle at different sides thereof, and means for securing said spring within said receptacle, said means comprising a restricting flange about the open end of the receptacle.

2. The combination with a tubular receptacle provided with an annular terminal head seat from which said receptacle projects substantially at right angles, said receptacle being open at its free end, of a split sleeve within the receptacle and likewise open at its ends, said sleeve including a curvilinear portion and sides disposed on minor chords of said receptacle with said sides provided with margins convergent along tangential planes and interiorly engaged with the receptacle along lines parallel with its axis, and means for retaining said spring sleeve within the receptacle, said sleeve being adapted for expansion under pressure of an inserted plug for increased pressure contact with the receptacle along said lines.

3. The combination with a tubular receptacle provided with an annular terminal head seat from which said receptacle projects substantially at right angles, said receptacle being open at its free end, of a split sleeve within the receptacle and likewise open at its end, said sleeve including a curvilinear portion and sides disposed on minor chords of said receptacle with the margins of said sides interiorly engaged with the receptacle along planes tangential to the curvilinear portion, and means for retaining said spring sleeve within the receptacle, the curvilinear wall portion of the sleeve having an inwardly projecting transversely extending rib, adapted to serve as a detent for a sleeve expanding plug.

4. The combination with a tubular receptacle provided with an annular terminal head seat from which said receptacle projects substantially at right angles, said receptacle being open at its free end, of a split sleeve within the receptacle and likewise open at its end, said sleeve including a curvilinear portion and sides disposed on minor chords of said receptacle with the margins of said sides interiorly engaged with the receptacle along planes tangential to the curvilinear portion, and means for retaining said spring sleeve within the receptacle, the curvilinear wall portion of the sleeve having an inwardly projecting transversely extending rib adapted to serve as a detent for a sleeve expanding plug, said sleeve retaining means including an electrical contact connected with said receptacle adjacent said seat and means electrically and mechanically connecting said sleeve directly with said contact.

5. The combination with a tubular receptacle provided with an annular terminal head seat from which said receptacle projects substantially at right angles, said receptacle being open at its free end, of a split sleeve within the receptacle and likewise open at its end, said sleeve including a curvilinear portion and sides disposed on minor chords of said receptacle with the margins of said sides interiorly engaged with the receptacle along planes tangential to the curvilinear portion, and means for retaining said spring sleeve within the receptacle, the curvilinear wall portion of the sleeve having an inwardly projecting transversely extending rib adapted to serve as a detent for a sleeve expanding plug, said sleeve retaining means including an apertured ear on said sleeve and a contact comprising means extending through said seat and engaged with said ear.

6. The combination with a tubular receptacle provided with an annular terminal head seat from which said receptacle projects substantially at right angles, said receptacle being open at its free end, of a split sleeve within the receptacle and likewise open at its ends, said sleeve including a curvilinear portion and sides disposed on minor chords of said receptacle with said sides provided with margins convergent along tangential planes and interiorly engaged with the receptacle along lines parallel with its axis, and means for retaining said spring sleeve within the receptacle, said sleeve being adapted for expansion under pressure of an inserted plug for increased pressure contact with the receptacle along said lines, said sleeve-retaining means including an apertured ear on the end of said sleeve nearest said seat and projecting transversely of said sleeve, together with a contact having a shank portion extending through said seat and the aperture of said ear and provided with a head engaging said ear.

ROBERT K. WINNING.