Jan. 22, 1929.

1,699,825

A. F. WALTZ

WIRE TERMINAL CONNECTER

Filed July 17, 1926

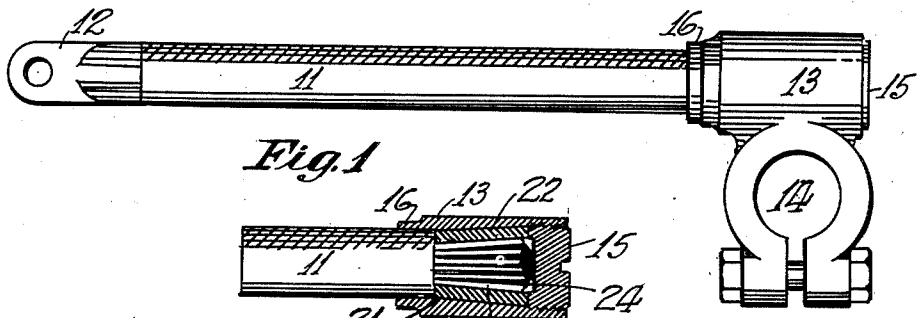


Fig. 1

Fig. 2

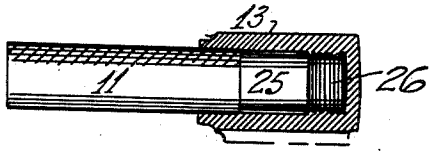


Fig. 3

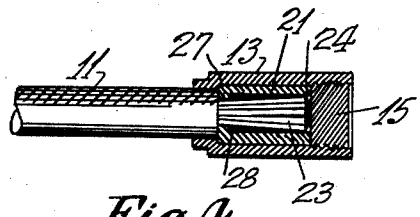


Fig. 4

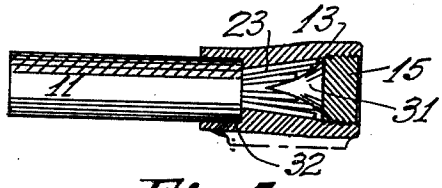


Fig. 5

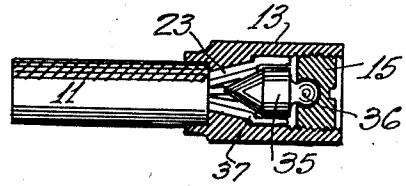


Fig. 6

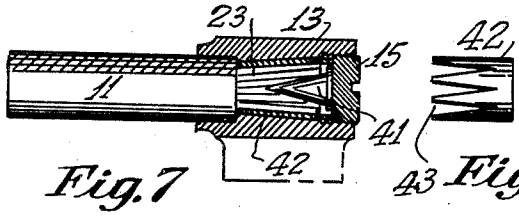


Fig. 7

Fig. 8

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UNITED STATES PATENT OFFICE.

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WIRE-TERMINAL CONNECTER.

Application filed July 17, 1926. Serial No. 123,052.

This invention relates to wire terminal connecters of a detachable and renewable type and has for an object to provide a terminal for an electrical conductor which can be applied to conductors of various lengths, a terminal in which the conductor can be renewed and a terminal which is free to rotate relative to the conductor. These and other objects of the invention will be understood from the following specification and the accompanying drawings, in which Fig. 1, is a storage battery lead embodying a preferred form of my invention, Fig. 2 is a cross-section showing the internal construction used between the conductor and the terminal in Fig. 1. Fig. 3 shows a modified construction with the outer shell in section; Fig. 4 shows in section another modified arrangement of connection between the conductor and the terminal. Fig. 5, 6 and 7 show in section alternative forms of construction for connecting the conductor to the terminal and Fig. 8 is a detail.

This invention is shown in connection with storage battery terminals of the type shown in my co-pending application, Serial No. 40,438, filed June 29, 1925, but is of general application and is not to be construed in any sense as restricted to battery terminals.

Cable 11 which forms the connecter, can be rotated relative to the clamp 14 to bring the eye 12 into any desired position. This is obtained by securing the end of the cable to a frusto-conical sleeve or shell which may be rotated in a cylindrical opening in 13. This sleeve is tightly secured in 13 by the end plug or screw 15 which should be loosened to permit of the turning movement of 11 as described All metal parts subject to corrosion by the battery fumes are protected by a non-corrosive metal in this construction.

Conductors of the size usually supplied for battery leads are stranded and covered with a heavy insulation. In applying the present invention, the conductor is bared and inserted in the sleeve where it is secured either by a drop of solder or by expanding the strands of the conductor by a wedge action inserted from the opposite end of the sleeve. The sleeve is round in section and may be cylindrical or slightly conical and is arranged to engage a corresponding aperture in the terminal with a snug fit but free to rotate with respect to the terminal. The sleeve is inserted in the terminal from the end with the larger opening and binds against the tapered sides of the opening, or engages a shoulder so that it cannot pass through the terminal. The sleeve may be made of brass or other material and is entirely enclosed by the terminal and protected from the fumes of the battery.

With this construction sleeves may be secured to conductors as the wire is taken off the reel, or a sleeve may be taken off one conductor and placed on another. The sleeve is rotatable in the terminal so that kinks developing in the wire can be released and the terminal at the opposite end of the conductor does not have to be secured in a predetermined relation to the battery terminal.

Referring to the drawings, 11 is the insulated conductor which is provided with the eye-terminal 12 at one end and the battery connecter 14 at the opposite end which is shown in the form of a clamp to engage the battery post. Developed from this connecter is the cylindrical terminal 13 in which the conductor is inserted at 16 and the closure plug 15 is provided at the opposite end. The invention resides in the method of securing the conductor in the cylindrical terminal.

In Fig. 2 the sleeve 21 is a tapered cylinder and snugly fits the bore of the terminal which is also tapered, as indicated at 22. The insulation of the conductor 11 is removed leaving the strands 23 bare, which, when inserted in the sleeve brings the insulation into abutting relation with the end of the sleeve and as the insulation is inserted in the terminal at 16 this end of the opening in the terminal is effectively closed to the fumes that may arise from the battery and, at the same time, the insulation is protected from fraying and breaking at a vital part. The metal of the terminal 13 is reduced in cross-section as indicated at 16 so that this portion of the lead can be tightly formed against the insulation. A drop of solder as indicated at 24 is placed on the end of the strands after they have been spread in the sleeve which makes an effective joint both electrically and mechanically. The sleeve is tightly forced into the terminal by the end plug 15 which screws into 13.

Attention is called to the fact that most battery terminals are made of lead and for lead terminals the sleeve is preferably made of brass or some comparatively hard metal which readily seats in the lead and is easily rotated in the lead. By removing the plug 15 it is apparent that the conductor and sleeve can be pushed through the terminal and,

when removed, the sleeve may be unsoldered and another conductor applied thereto.

In Fig. 3 the construction is modified by making a screw attachment between the sleeve and the terminal. The sleeve 25 is secured to the bare end of the conductor as shown and is threaded at the outer end as at 26 where it screws into 13. In this case the end opening in 13 is not necessary.

In Fig. 4 the sleeve is modified to use a shoulder construction instead of a taper connection. The terminal 13 is shouldered at 27 to receive the sleeve 21 which is shouldered at 28 to provide an interior in which the strands may be expanded.

A wedging method of securing the strands in the terminal is shown in Fig. 5. The terminal 13 has a tapered opening as shown with a shoulder at 32 against which the insulation abuts. The strands 23 are spread in the tapered opening by the conical point 31 of the cap 15. No sleeve is provided in this case, the strands making direct contact with the terminal 13.

The construction in Fig. 6 follows the lines of Fig. 5 with the exception that a crimp is formed in the strands of the conductor at 37 by the shape of the conical wedge 35 and the interior contour of the terminal 13. The interior, it will be noted is partly cylindrical and partly tapered and has the ledge at 37 to form the crimp in the wires. The wedge 35 is formed separately from the end plug 15 and is connected therewith by the ball and socket connection at 36.

The construction in Fig. 7 uses the toothed sleeve shown in Fig. 8. This sleeve 42 is cylindrical in form and is provided with the tapering teeth 43 so that when inserted in the opening in 13, Fig. 7, the taper of the opening closes up these teeth and thereby tightens them on the strands 23 of the conductor while these strands are spread out by the conical wedge 41, forced into place by the cap 15.

In a construction of the kind described conductors can be assembled on terminals as convenient, either with or without the use of solder and the connection is completely concealed and protected.

Having thus described my invention, I claim:

1. An electrical connection comprising a stranded conductor and an insulating cover partly removed to bare an end portion of the conductor, a frusto-conical conductor member surrounding said bared portion, the strands being permanently held in spread relation by solder in said member, the smaller end of said member contacting the end of the insulating cover and having an external diameter substantially the same as the diameter of the cover, a non-corrosive terminal member comprising a receptacle constructed to fit snugly around the frusto-conical member and an adjoining section of the insulated conductor and means comprising a non-corrosive removable element for closing the receptacle and holding the frusto-conical member in close contact with the interior of the receptacle.

2. An electrical connection comprising a stranded conductor and an insulating cover partly removed to bare the end of the conductor, a shell attached to and surrounding the bared end of the conductor, the strands being permanently held in spread relation by solder in said shell, said shell contacting at one end with the end of the insulating cover, said shell being of the same diameter at said end as the insulating cover and greater in diameter toward the other end, a connecter member of non-corrosive conducting material provided with a receptacle comprising a tubular portion surrounding the insulating cover adjacent the shell and a portion constructed to fit snugly around the shell and means comprising a non-corrosive removable member normally closing the receptacle and holding the shell in position.

3. An electrical connection comprising a stranded conductor and an insulating cover for the conductor, a non-corrosive member provided with a bore comprising a tubular portion closely surrounding the insulated conductor and a tapered portion in axial alignment with and merging at its smaller end with the tubular portion, a shell tapered throughout its length to fit snugly the interior of the tapered portion of the bore and having its interior converging throughout its length towards the smaller end of the shell to closely surround a bared portion of the conductor at said end, means for fastening the shell and conductor together with bared strands within the shell permanently held in spread relation by solder, said shell contacting the end of the insulating cover, and a removable non-corrosive device normally closing the larger end of the tapered portion of the bore and holding the sleeve in position in said bore.

Signed at New York, in the county of New York and State of New York this 9th day of July, A. D. 1926.

ANTON F. WALTZ.