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OUTLET FOR ELECTRICAL CONDUCTORS

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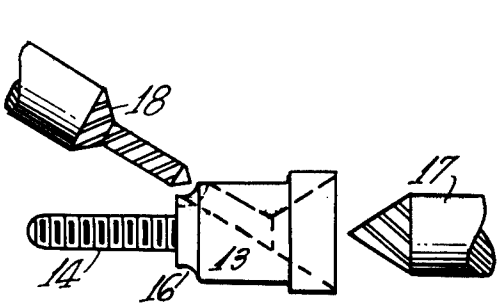


Fig. 1

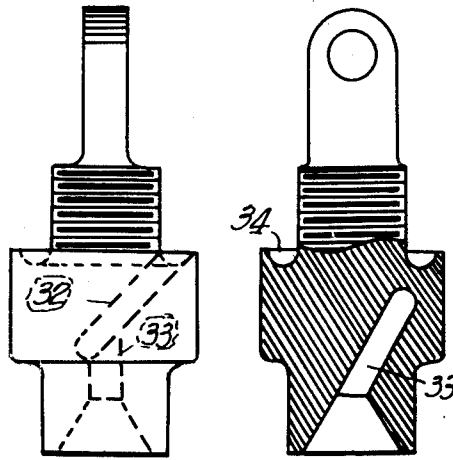


Fig. 3

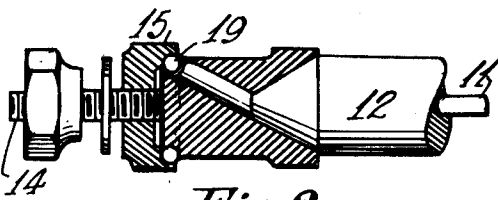


Fig. 2

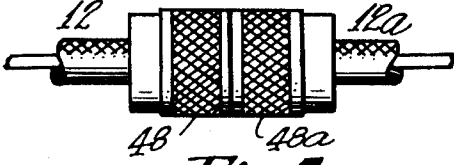


Fig. 5

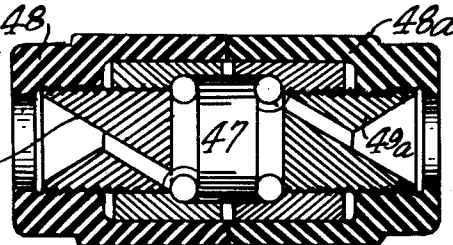


Fig. 4

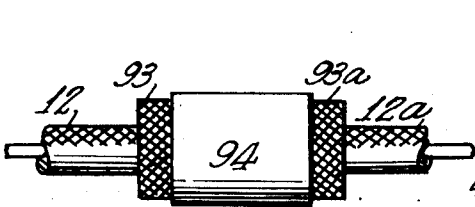


Fig. 7

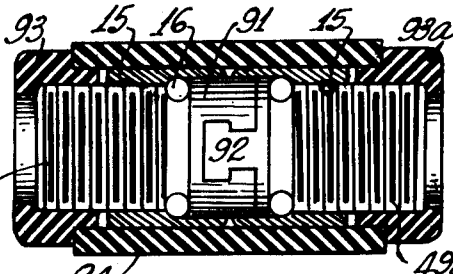


Fig. 6

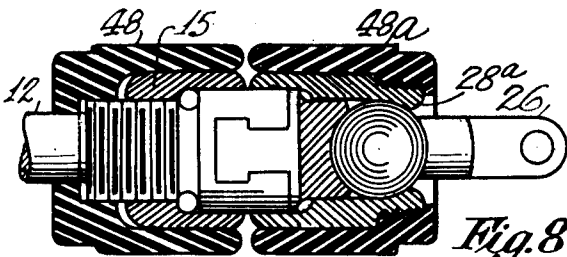


Fig. 8

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# UNITED STATES PATENT OFFICE

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## OUTLET FOR ELECTRICAL CONDUCTORS

Application filed October 14, 1924. Serial No. 743,557.

This invention relates to outlets for electrical conductors and may be used to apply an attachment at the end of an insulated conductor which is concentric with the conductor and which can readily be attached or removed. This attachment may be developed into a screw stem, eyelet, or other shape to suit the conditions where the conductor is to be used. The objects of the invention are to provide the conductor with a screw end, eyelet or other type of connection in a comparatively inexpensive manner, that does not use solder and can be quickly changed or replaced without special tools, also to provide a type of connector that is flexible and relieves the insulation from strain and the conductor from vibration. These and other objects of the invention and some of its applications will be more fully understood from the following specifications and the accompanying drawings in which Fig. 1 is a view of a stem with a screw shank showing the method of drilling Fig. 2 shows in section an application of the stem in Fig. 1; Fig. 3 shows in two views, a modified form of drilling for the stem; Figs. 4 and 5 are a coupling embodying the invention, Fig. 4 being in section; Figs. 6 and 7 are another form of coupling, Fig. 6 being partly sectioned and Fig. 8 is another coupling, partly sectioned and having a ball and socket connection.

This invention consists in applying to the end of the wire a stem which is concentric with the wire and has a hole drilled obliquely from the centre to the edge where it terminates in a ridge or groove. The wire is inserted in this hole and turned around the groove where it is clamped in place by a cup-shaped nut which tightly binds the wire to the stem. The end of the stem or the nut may be formed in any shape desired to suit the conditions where the conductor is to be applied. When used as a coupling for an electrical conductor the cup-shaped nut is also used to hold the adjoining parts in alignment. The exposed parts may be protected by an insulating covering which is readily detachable.

Referring to the drawings, the stem is indicated by 13 which, in Figs. 1 and 2, terminates in a screw stem 14 and is provided

with a shoulder 16. This part may be drilled as indicated in Fig. 1, in which the drill 17 makes a conical opening in the end to receive the insulation, and the drill 18 drills an oblique hole from the groove or shoulder 16 to the conical opening as shown clearly in section in Fig. 2. Drill 18 may be arranged to counterbore the hole where it joins with the shoulder so as to avoid sharp and abrupt edges at this junction.

In Fig. 2 the wire is indicated by 11 and the insulation by 12. The insulation is removed from the end of the wire after the manner in which a pencil is sharpened so that it fits the conical opening in the end of the stem as shown, the wire is pushed through the oblique hole and the end turned around the shoulder as indicated at 19 where it is clamped in position by the cup-shaped nut 15. It is preferred that the wire be turned around the shoulder in the direction in which the screw tightens so that as it is clamped in place the insulation will be tightly drawn into the socket.

This type of outlet has several advantages; the stem being concentric with the wire, it aligns therewith and takes up comparatively little space; the rubber insulation fits tightly into the base of the stem and forms a cushion to absorb jars and vibrations which tend to crystalize the metal in the conductor; where a conical opening is made in the base of the stem it will adapt itself to insulations of various thicknesses; the wire may be removed by releasing the nut 15 and can be replaced again or a fresh portion of wire may be inserted; the wire cannot spread as it is clamped in position. This is very important in the case of stranded wires as it guards against the possibility of loose strands.

When the oblique hole is drilled as shown in Figs. 1 and 2, the wire in turning horizontally in the groove makes a bend which is substantially 90 degrees. For larger wires it may be desirable to avoid sharp bends of this character by a construction such as is shown in Fig. 3. In this case the oblique hole is drilled from both ends with the drills set at different angles. The hole

33 is drilled from below toward the edge and hole 32 is drilled from the groove to intersect the hole 33 with the drill inclined in the direction in which the clamping nut

5 turns when it is tightened. This brings the end of the wire into groove 34 inclined toward the plane of the groove.

The construction in Fig. 4 and in Fig. 6 has the cup shaped nut 15 screwed on the stem from the wire side which leaves the outer end free to be shaped as desired. In Fig. 4 the insulated thimble 48 covers the terminal from the insulation of the wire as far as desired. It is preferably made a snug fit on the insulation of the wire where it enters the stem. This construction is double ended and thereby forms a wire connector. It will be noted that the construction about the centre section 47 has a stem 49 with a thimble 48 on one end and a stem 49a with a thimble 48a on the other end, the thimbles 48 and 48a meeting in abutting relation. The wires enter this device from both ends as shown in Fig. 5 and when assembled it forms an insulated coupling which can readily be uncoupled by unscrewing the thimbles and nuts and removing the wires.

When the conductors are comparatively stiff it is more convenient to separate the two ends of the coupling than to remove the conductors. The construction shown in Fig. 6 provides for this condition by dovetailing the two ends of the stems in the centre and holding them in alignment. The central section of 49 is grooved as shown at 91 and the central section of 49a is formed to match the groove in 91 as indicated at 92. These parts are slipped together and when the nuts 15 on each stem are tightened up to clamp the wire the cup shaped ends of these nuts enclose the sections 91 and 92 so that these parts are held in alignment and a secure mechanical connection is obtained. By partially unscrewing the nuts it is apparent that the stems may easily be separated without removing the wires. Insulation is provided by the thimbles 93 and 93a which are grooved as shown to receive the end of the insulating tube 94 making a complete assembly as shown in Fig. 7. The engaging parts 91 and 92 ordinarily are a fairly tight fit and insure reliable contact, however these parts can be brought into a pressure contact by screwing up on thimbles 93 and 93a which, acting against tube 94 in abutting relation tend to separate the stems at the centre.

Attention is called to the fact that in most of the illustrations the stem is an integral part between the conductor and the object to which it connects and the cup-shaped nut merely secures the conductor to the stem.

The detailed structure of the various illustrations may be combined as desired, for instance, the drilling of any of the parts may be deflected as shown in Fig. 3. Fig. 8 shows

the combination of a coupler with a ball type outlet with the nut 28a holding the ball in place and protected by the insulating thimbles shown.

The various parts necessary for applying this invention can be produced on screwing machines and are adaptable for quantity production at low cost.

Having thus described my invention, I claim:

1. In combination, a stranded wire, a terminal having a ledge with an annular groove connected by a passage corresponding to the size of the stranded wire with the axial centre of said terminal, said passage being deflected from the axial centre and deflected from its original direction for a substantial part of its length so that it approaches the groove at less than a right angle, said passage and groove receiving said conductor and means for clamping said conductor in said groove.

2. In combination, a stranded wire, a terminal having a stem with a ledge having an annular groove connected by a passage corresponding to the size of said stranded wire with the axial centre of said terminal, a substantial part of said passage being deflected towards the plane of said groove and in the annular direction of said groove and arranged to receive said conductor and means for clamping said conductor in the groove in said ledge.

3. In combination, a wire comprising a conductor and insulation, a terminal having a threaded portion and a ledge with an annular groove, a passage connecting said groove with the axial centre of said terminal to receive said conductor, a cup-shaped nut on said threaded portion clamping said conductor in the groove on said ledge and a thimble of insulating material threaded on said threaded portion in rear of said cup shaped nut and enclosing said cup-shaped nut.

4. In combination, a plurality of wire terminals with their ends locked in sliding engagement, a threaded portion on each one of said terminals, a cup-shaped nut on said threaded portion for clamping a wire to said terminal, said nut also holding said terminals in engagement.

5. In combination, a plurality of wire terminals having sections engaging transversely of their central axis, a threaded section on one of said terminals, a cup-shaped nut on said threaded section for clamping a conductor to said terminal and for preventing said terminals from moving transversely relative to each other.

6. In combination, a plurality of wire terminals having engaging sections and having threaded sections, a nut on one of said threaded sections for clamping a conductor to said terminal and for holding said terminals in engagement and an insulating sleeve

threaded on each of said sections and enclosing said terminals.

7. In combination, a plurality of wire terminals with their ends locked in sliding engagement, threaded portions on the outer ends of said terminals, nuts on said threaded portions for clamping the wires to said terminals and for holding said terminals in engagement and thimbles of insulating material threaded on said threaded portions and enclosing said terminals.

8. In combination, a plurality of wire terminals having threaded stems and means for holding their ends in locking engagement, nuts on said threaded stems for clamping wires to said terminals and thimbles of insulating material threaded on said stems meeting in abutting relation to enclose said terminals.

9. In combination, a wire terminal having a threaded stem at each end, means for clamping a wire to each of said stems and similar thimbles of insulating material threaded on said stems meeting in abutting relation to enclose said terminal.

Signed at New York, in the county of New York and State of New York, this 20th day of December, 1922.

MATTHEW H. LOUGHRIDGE.