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ELECTRICAL CONNECTORS

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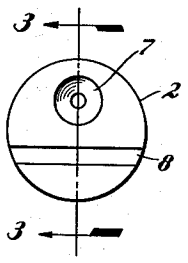


Fig. 2

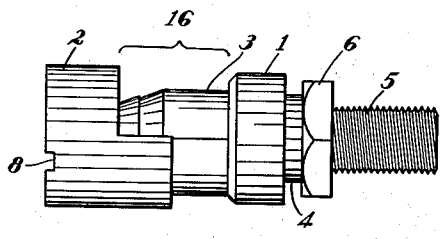


Fig. 1

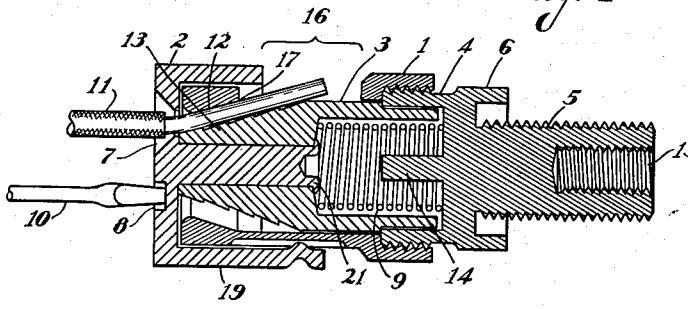


Fig. 3

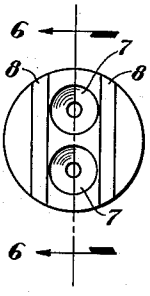


Fig. 5

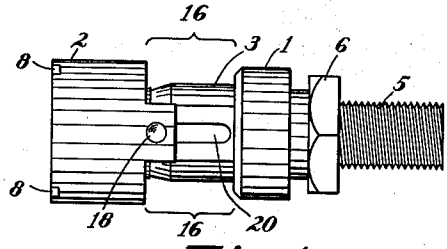


Fig. 4

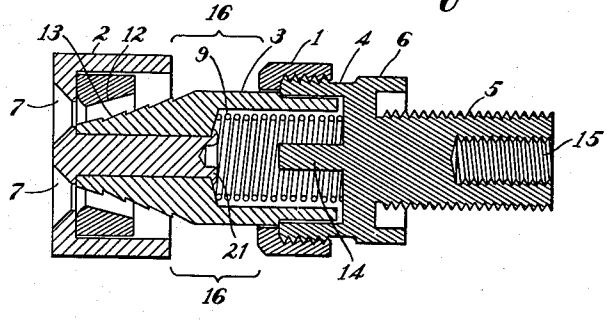


Fig. 6

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ELECTRICAL CONNECTORS

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1 Claim. (Cl. 339—255)

Our invention relates to electrical connectors, and more particularly to quickly operated types of electrical connectors which are adapted to secure bare wire.

Our invention finds particular application as a binding post for apparatus which must be rapidly connected without the use of lugs, tips, or other forms of wire terminals. An example of such apparatus is a field telephone switchboard for military use. Such a switchboard is frequently set up under battle conditions, and it is of utmost importance that the field telephone wire be connected to the board in the shortest possible time. This rapidity of connection, furthermore, must be obtainable even under adverse conditions, such as extreme cold, heat, moisture, etc. These specifications are the more difficult to meet because such applications require that the connection established be maintained even when the connected wires are subjected to sudden jerking, as for example if a soldier should accidentally trip over the wire.

Electrical connectors usable for connecting wire under adverse conditions and for maintaining that contact when the wire is subjected to unusual strains have been known before our invention, but have in general been expensive and complicated to produce.

It is accordingly an object of our invention to provide a new and useful type of electrical connector which is capable of quick connection.

It is another object of our invention to provide an electrical connector in which contact may be quickly established with a bare wire.

It is still another object of our invention to provide an electrical connector to which a bare wire can quickly be connected, yet which secures the wire against accidental disconnection.

It is a further object of our invention to provide a quick-connect type of electrical connector adapted to receive a bare wire, which can be quickly and easily manufactured.

Further objects and advantages of our invention will become apparent as the following description proceeds and the features of novelty which characterize our invention will be pointed out with particularity in the claim annexed to and forming a part of this specification.

For a better understanding of our invention, reference may be had to the accompanying drawing in which:

Fig. 1 is an elevational view of one embodiment of our invention;

Fig. 2 is an end view of the embodiment of our invention shown in Fig. 1;

Fig. 3 is a sectional view of the embodiment of our invention shown in Fig. 1, taken along the line 3—3 of Fig. 2;

Fig. 4 is an elevational view of a second embodiment of our invention;

Fig. 5 is an end view of the embodiment of our invention shown in Fig. 4; and

Fig. 6 is a cross-sectional view of the embodiment of our invention as shown in Figs. 4 and 5 taken along the line 6—6 of Fig. 5.

Referring now to the drawing, Fig. 1 discloses one embodiment of our invention which is suitable for mounting on an electrical panel or other surface. This particular embodiment thus forms a binding post. However, the principles involved in our invention are fully adaptable to other forms of electrical connectors, as those skilled in the art will readily appreciate.

Visible in Fig. 1 are a body member 1, a cap member 2 and a portion of wedge member 3. Attached to body member 1 is a base member 4 which has a threaded portion, or stud, 5 which we prefer to provide, in the embodiment shown, to assist in securing body member 1 to the panel or other surface on which it is mounted. Stud 5 may thus receive a mating nut on the rear side of the mounting panel to secure the connector in place. We may further prefer to provide a hexagonal portion 6, so that a wrench may be fitted thereon to assist in securing the connector to the panel.

Shown in Fig. 2 is the cap-end view of the embodiment disclosed in Fig. 1. Here are visible a funnel-shaped wire-receiving passage, or hole, 7 and a screw driver slot 8.

The disposition of parts in this embodiment of our invention is more clearly indicated in Fig. 3. A spring 9 forms a resilient means tending to bias the wedge member 3 out of cylindrical body member 1. Fig. 3 has been drawn with the resilient means 9 compressed, as by means of a screw driver blade 10 placed in slot 8, and with a wire 11 inserted in the space between wedge member 3 and body member 1. From this view, it can readily be understood that upon the removal of blade 10 from slot 8, resilient means 9 will bias wedge member 3 so that wire 11 will be tightly secured in the space between the inner annular anvil portion 12 of body 1 and the conical surface 13 of wedge member 3.

Wedge member 3 is made generally conical in shape because this configuration can be made quickly and cheaply by automatic machines such as automatic screw machines. A cylindrical extension on the base of conical member 3 may be provided to serve as a bearing surface for the member when it is moved axially within body member 1. The other parts (body member 1, cap member 2 and base portion 4) can obviously be made on a screw machine also, thereby contributing materially to the low cost and ease of fabrication of this embodiment of our invention. While we have shown base portion 4 threaded into one end of body member 1, those skilled in the art to which our invention appertains can readily appreciate that base portion 4 may be attached to body member 1 by any convenient means.

We may prefer to provide a stud portion 14 on base member 4 to assist in centering spring 9 when assembling this embodiment of our invention. Furthermore, we may choose to provide a threaded portion 15 in stud 5 to receive a screw (not shown) for securing an internal-connecting wire on the back of the panel or other surface to which the binding post is fastened.

To assist in securing wire 11 between conical surface 13 of wedge member 3 and anvil portion 12 of body member 1, we may prefer to provide one or more serrations formed on the conical surface 13 and extending in an annular or circumferential direction around that conical surface. Furthermore, we may prefer to form these serrations with a sawtooth contour extending toward the base of conical wedge member 3. Serrations of this particular contour have proved to be particularly effective in retaining wire in the connector.

A feature of our invention resides in the provision of a cut-out portion 16 in body member 1 adjacent the conical surface of wedge member 3 when resilient means 9 is fully compressed. This cut-out portion preferably extends over substantially most of the circumference of

body member 1 in the region described, this preferred contour perhaps being more readily perceived in Fig. 1. When cut-out portion 16 is included in our invention, a wire 11 can easily be guided, with the aid of funnel-shaped passage 7, through the space between conical surface 13 and anvil portion 12, and through cut-away portion 16. No pains need be taken to insert the wire a particular distance, as any excess merely protrudes through cut-out portion 16. Making cut-out portion 16 extend over a substantial part of the circumference of body member 1 is advantageous because the end of the wire inserted in the binding post need not be carefully guided in order to poke it completely through and so secure it tightly.

Those skilled in the art can appreciate that by appropriate changes in contour, anvil portion 12 may be diminished merely to an edge 17, yet adequate clamping action for some purposes may be obtained. Edge 17 is liable to be so sharp as to cut or substantially weaken the wire, however, and we therefore prefer to provide an anvil portion as shown.

In making connections under difficult conditions, as in battle, it is desirable that the screw driver slot always be in a given orientation relative to the apparatus on which it is mounted, in order to avoid confusion. Furthermore, the wire-receiving passage should preferably always be centered with respect to the cut-away portion 16. We may therefore prefer to provide a rider 18 formed, as by dimpling, in the skirt portion 19 of cap 2. Rider 18 is located and dimensioned to mate with a longitudinal recess 20 formed in body member 1; and recess 20 is oriented to allow cap 20 to move axially against the pressure of spring 9 but to prevent rotation of cap 2 relative to body member 1. Since wedge 3 is staked to cap 2 at point 21, wedge 3 necessarily moves with cap 2 at all times. Therefore, wedge 3 as well as cap 2 is prevented from rotating relative to body member 1.

Cut-out portion 16 serves the additional function of providing a clean-out space so that tiny ends of stranded wire accidentally broken off can be extricated from the interior of the binding post without disassembly.

There is an occasional requirement for a connector capable of accepting two or more wires at a time. Our invention is capable of supplying this service, as illustrated by the embodiment shown in Figs. 4–6. The side and end views, Figs. 4 and 5 respectively, illustrate this second embodiment of our invention with much the same configuration as the embodiment of Figs. 1–3. Similar reference symbols are therefore employed for the same parts. The main differences in Figs. 4–6 from Figs. 1–3 are the provision of plural wire-receiving passages 7 and the addition of dual cut-away portions 16. Also illustrated is the optional provision of plural screw driver slots 8.

The sectional view, Fig. 6, of this embodiment of our invention makes clear that the internal construction of this second embodiment of our invention may be similar to that of the first embodiment. Wires inserted in passages 7 will obviously be clamped at two separate points between conical surface 13 and anvil portion 12, and so secured firmly to the connector.

While we have shown and described our invention as applied to two specific embodiments thereof, other modifications will readily occur to those skilled in the art. We do not therefore desire our invention to be limited to the specific arrangement shown and described, and we intend in the appended claim to cover all modifications within the spirit and scope of our invention.

What we claim is:

In an electrical connector, the combination of a body member having an inner annular anvil portion and having means for securing said body member to a stationary mounting such as a panel; a movable wedge of generally conical shape centrally disposed within said body member; a plurality of serrations formed on the conical surface of said wedge, each of said serrations extending in a circumferential direction around the conical surface of said wedge and forming a sawtooth contour extending toward the base of said conical wedge; resilient means biasing said serrations against said anvil portion; a cap member coupled for movement with said wedge, said cap member having a top portion and a skirt portion, said top portion having a screw driver slot and a funnel-shaped wire-receiving passage formed therein, said body having a longitudinal recess formed therein connecting said passage with the interior of said cap; said skirt portion carrying a rider located and dimensioned to mate with said recess, thus permitting said cap to be moved axially against the pressure of said resilient means but preventing, by means of said rider and said recess, the rotation of said cap relative to said body member; whereby force may be applied by a tool blade between said screw driver slot and said mounting to compress said resilient means, and a wire can be passed through said passage into the resulting space between said serrations and said anvil portion; said body member having a cut-away portion located adjacent said anvil portion such that the end of said wire may project through said cut-away portion, said wire being secured between said serrations and said anvil portion upon the removal of said force.

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