

Sept. 19, 1961

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3,001,002

SCREW-ON TYPE CONNECTOR

Filed Dec. 3, 1959

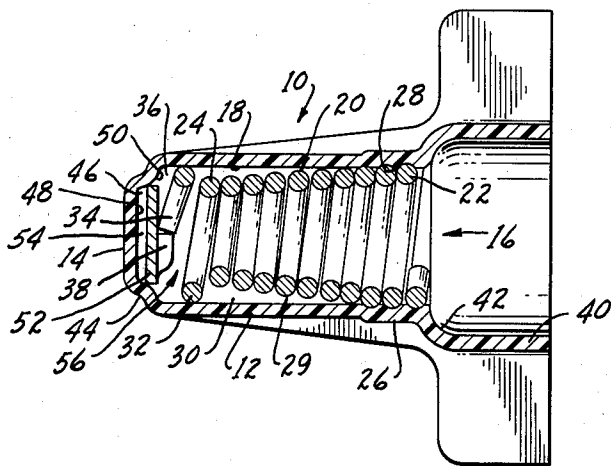
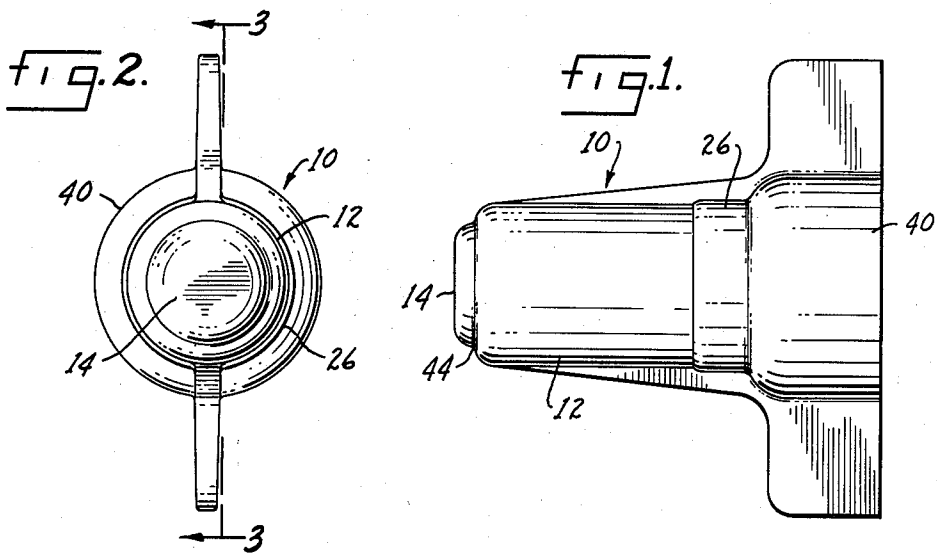


fig. 3.

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3,001,002

SCREW-ON CONNECTOR

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Filed Dec. 3, 1959, Ser. No. 857,176
3 Claims. (Cl. 174-87)

This invention is in the field of connectors and is a new and improved insulating cap with a connecting structure, constructed and arranged to be turned down or screwed down over the stripped ends of a plurality of electric wires, for example two or more, either stranded and/or solid, of the same or different sizes, or otherwise.

A primary object of the invention is a new and improved electrical connector of the screw-on type.

Another object is a connector having a cap of a stiffly flexible material constructed so that the sharp stripped ends of the wires being connected will not pierce, drill, penetrate or damage the end of the cap.

Another object is a connector structure with a shield for the stripped ends of the wires to prevent the cap from being damaged or pierced.

Another object is a connector protected against the stripped ends of the wires puncturing the end of the cap but without complicating manufacture or assembly.

Other objects will appear from time to time in the ensuing specification and drawings in which:

FIGURE 1 is a plan view of the connector;

FIGURE 2 is an end view; and

FIGURE 3 is a section along line 3-3 of FIGURE 2.

In the drawings, the connector has been shown with an insulating cap or cover which has been indicated generally at 10 and may include a generally cylindrical body or shell 12 closed at one end by an end wall 14, which is preferably integral with the cap and generally open at the other end at 16, providing what shall be termed a generally open central bore 18. The bore of the cap or coil houses or encloses a wire coil 20. For purposes of illustration, the coil has been shown generally tapered with a large end 22 adjacent the open end of the cap and a small end 24 adjacent the closed end.

I may provide an enlarged or thickened portion 26 in a cap or shell generally at the open end which may be formed with a threaded inner surface or relief surface 28 on the inside, although this is not necessary. The threads may be molded directly into the inside, and the large end 22 of the coil meshes into the groove of the threads. I prefer to make the cap or shell out of nylon, or polyethylene, or any other suitable thermoplastic material which is tough but somewhat resilient and at the same time is a good dielectric and suitable for high temperature use.

The inner surface of the bore may remain somewhat cylindrical from the open end toward the end wall, but the intermediate or middle turns of the coil have been shown as decreasing in diameter, or tapered, as at 29, so that a clearance or spacing is provided at 30 throughout the majority or a substantial portion of the length of the coil with respect to the inner surface of the cap, although this is not necessary.

An extended and possibly distended turn 32 may be provided adjacent the small end of the coil to serve as a guide or pilot for the small end to center it relative to the axial bore of the cap. The spacing, shown at 36, is not totally necessary and the coil may have a uniform pitch throughout its length.

The end 34 of the coil may be extended slightly or pulled away from the normal turns of the coil and an abutment 38 may be provided in or as an integral part of the shell or cap to function as a shoulder or anchor for the end of the coil. This abutment or shoulder may be of a suitable formation but it is preferred that it

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oppose the end of the coil to resist the normal rotative tendency of the coil, when the connector is being turned down over the stripped ends of a plurality of wires. The abutment may be a separate metal insert, but I find it easier to mold it as an integral part. The end 34 of the coil might be blunt, turned in or back, or otherwise suitably shaped, to engage the abutment regardless of its particular size, shape or disposition.

The open end of the cap may be provided with an enlarged, preferably integral skirt 40, which may be cylindrical and well rounded, as at 42, where it joins the shell or cap to function as a guide or funnel and also as a skirt to prevent arcing to a ground.

The end wall of the cap at the closed end of the bore is offset, as at 44, and somewhat reduced to provide a socket 46 which has a rear wall 48 somewhat reduced in its outside diameter as compared to the inside diameter of the cap bore and an undulating and somewhat tapered lead-in inner surface 50. This inner surface might be conical or frusto-conical instead of having the undulating contour shown. I position a washer or disk 52 of steel or any suitable metal in the cavity or socket. I prefer that the washer be a flat cadmium plated steel but it might be otherwise. The washer has an outside diameter which is slightly greater than the outside diameter of the rear wall 48 but somewhat less than the inside diameter of the bore 18. Thus, the washer will fit on or against the converging surface 50 and will normally be spaced slightly from the rear wall 48, as at 54, prior to the connector being used.

The use, operation and function of the invention are as follows:

I provide a cap or cover which is preferably made of a stiffly flexible plastic, such as nylon, polyethylene, or the like. A wire coil is positioned in the cap and is held therein in a suitable manner. The cap and coil, as a unit, are then screwed down on the stripped ends of a plurality of electric wires in a known manner. The coil functions like threads so that the cap and coil automatically feed down on the stripped ends of the wires and will compress the wires together and form grooves or threads thereon corresponding to the coil. The coil is interlocked to the cap so that when the cap is rotated, the coil will also be rotated.

When a connector of this type is used, the stripped ends of the wires are grouped together and the cap is screwed down on the stripped ends of the wires. Grouping the wires is manual and quite often the user will misalign them so that one wire will project behind the others. The ends of the wires have been snipped or cut off with electrician's pliers and will have two convergent sides leading up to a sharp apex edge or diameter. The result is that when the cap is screwed down on the stripped wires, if one wire projects beyond the others, it will strike the rear wall and may have a tendency to drill through before the operator stops turning the cap. This may also occur, but to a lesser degree, even if the stripped ends are more accurately aligned.

To prevent this, the washer 52 is positioned in the rear socket and may be spaced somewhat from the rear wall, as at 54. The washer is also spaced rearwardly from the smallest turn of the coil at the throat, as at 50, so that a substantial socket or cavity or chamber, designated generally 56, is provided between the throat 50 and the washer. Thus, the stripped ends of the wires may move a substantial distance past the throat before one or all of them contacts the washer. The sharp ends of the wires cannot drill through the washer but will only axially thrust it more solidly into the socket 46.

During assembly the washer is dropped into the cap before the spring is inserted. A rod or the like may be used to thrust down in the cap to force the washer

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tightly into a wedge fit with the convergent wall 50 of the socket. In any event, the axial thrust of the stripped ends will tightly seat the washer when the connector is used.

The material of the washer is not critical, and while cadmium plated steel has been mentioned specifically, any suitable metal or other material could be used which will resist the drilling action of the sharp ends of the wires.

The outside diameter of the washer is sufficiently greater than the throat diameter 50 such that the washer will not come out of the connector, even when the throat has been somewhat expanded in use.

While I have shown and described the preferred form and suggested several variations of my invention, it should be understood that several additional modifications, substitutions, alterations and changes may be made without departing from the invention's fundamental theme. The cross section of the wire may be round, square, or otherwise. I mentioned nylon as the material of the cap but it might be any other suitable material. With these and other modifications in mind, I wish that the invention be unrestricted, except as by the appended claims.

I claim:

1. In an article of manufacture, a connector for joining the stripped ends of two or more electric wires or the like, including a cap made of a stiffly flexible insulating material, the cap having a generally center bore open at one end and closed by an end wall at the other

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end, a generally cylindrical wire coil in the bore, means for holding the coil in the bore so that the coil and cap may be manually turned down on the stripped ends of a plurality of electric wires, and an impervious disk separate from the cap otherwise freely positioned next to the end wall behind the coil and having a diameter on the order of the bore to prevent the stripped ends of the wires from damaging the end wall.

2. The structure of claim 1 further characterized in that the end wall of the cap is offset outwardly somewhat in the form of an inner socket, a generally frusto-conic portion connecting the end wall to the outside wall of the cap and defining the socket therewith, the outside of the disk engaging the frusto-conic portion.

3. The structure of claim 1 further characterized in that the coil is trumpet shaped and is larger at one end than at the other, the large end being positioned toward the open end of the bore and the small end being toward the end wall but spaced forwardly therefrom, the disk being disposed next to the end wall and spaced from the small end of the coil.

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