

Nov. 26, 1940.

D. M. SEIFER

2,223,153

STRAIN RELIEF FOR CONDUCTORS

Filed Feb. 10, 1939

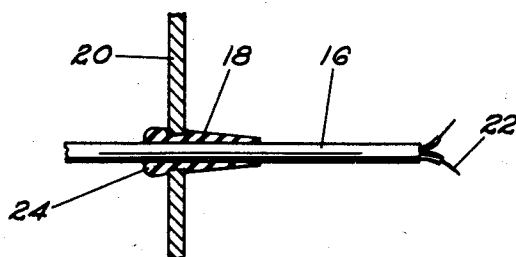
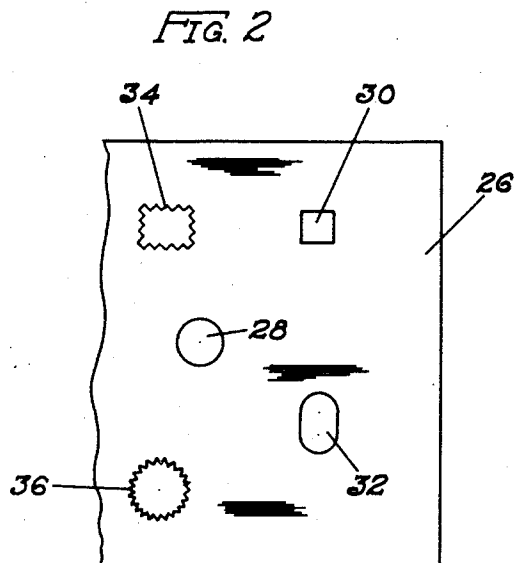
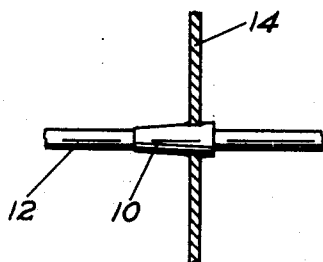
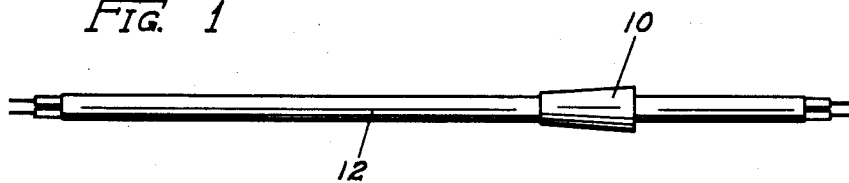
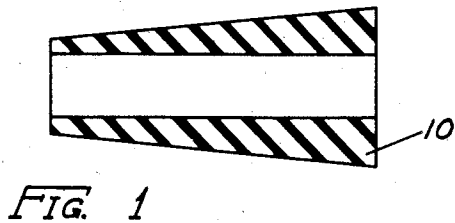


FIG. 4

FIG. 5

DANIEL M. SEIFER
INVENTOR

PER

Albert F. Fike
ATTORNEY

UNITED STATES PATENT OFFICE

2,223,153

STRAIN RELIEF FOR CONDUCTORS

Daniel M. Seifer, Chicago Heights, Ill., assignor to
Diamond Wire & Cable Co., Chicago Heights,
Ill., a corporation of Illinois

Application February 10, 1939, Serial No. 255,677

1 Claim. (Cl. 173—322)

This invention relates to an improved strain relief for conductors such as electric current-carrying wires and the like and has, for one of its principal objects the provision of a simple yet effective means for effectively reducing and practically eliminating any undesirable pull on the wire, particularly at the point where the same is connected to binding posts or other connections so that there will be no danger of the current connections being accidentally broken.

One of the important objects of this invention is the provision, in a strain relief for an electric attachment such as a light cord, cable or the like, which will substantially eliminate possibilities of broken connections at the points where the wires are connected to other current-carrying devices such as junction points with radios, electric fans, vacuum cleaners, heating elements, lamp sockets and the like.

A still further object of the invention resides in the incorporation into a wire of means comprising a combined strain relief and reinforcement which will prevent abrupt bending or breaking of the wire or the insulation at the points of most wear and which, furthermore, will support any longitudinal pulls which may be imposed upon the wire during operation of the attached device, while, at the same time, facilitating the assembly of the wire into any particular electrical unit.

A further object of the invention is the provision of a strain relief for wires which can actually form a part of the insulation and which will readily adapt itself to openings in the panels or housings of instruments regardless of the shape of the opening and which, furthermore, can be employed from either direction especially so far as application to some electrical device is concerned.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawing and following specification.

The invention, in a preferred form, is shown in the drawing and hereinafter more fully described.

In the drawing:

Figure 1 is a side view of the improved strain relief element of this invention, the same being shown in section and as considerably enlarged.

Figure 2 illustrates the device in position on a flexible electric current carrying cable or the like.

Figure 3 is a sectional view showing the element in actual operating relationship on a wire

when the wire is fitted through an opening in a panel or the like.

Figure 4 shows a modified form of the invention and a slightly different method of application.

Figure 5 is a view of a panel having various openings therein through which the wires with the attached strain relief of this invention may be passed.

As shown in the drawing:

The reference numeral 10 indicates generally the body of the improved strain relief device of this invention, the same being preferably composed of flexible vulcanized rubber or similar material and having a central longitudinal opening therethrough for the passage of a current carrying electric cable or the like 12. This opening may be cylindrical in cross-section or elliptical or may be square or some other shape, depending on the contour of the conductor to which the strain relief element is applied.

The outer surface of the strain relief element 10 is substantially in the form of a frustrum of a cone as shown, and when the wire 12 with the attached strain relief element 10 is pulled through an opening of the proper size in a panel 14 as shown in Figure 3, the strain relief element will finally come to a point where its outside diameter is less than the inside diameter of the opening in the panel or other housing element 14, whereupon the resilient material of the strain relief element 10 will become compressed upon further pulling by the operator and finally arrive at a point where it can neither go forward nor backward owing to the tendency of the rubber or the like to expand and bulge as is illustrated in Figure 3.

If it is desired to insert a conductor 16 with a strain relief element 18 thereon through an opening in a panel or plate 20 from the outside thereof and still maintain a strain relief relationship with the free ends of the exposed wires 22, a slightly different form of the device of this invention is provided as illustrated in Figure 4, the difference being that the resultant outer end 24 is rounded as shown rather than squared as is the case with the element of Figure 3. This rounded effect provides a more neat appearing result on the outside of the cabinet of which the plate or panel 20 may form a part, and it has been found by experience and tests that if the conductor 16 is pulled through the opening to such an extent that a firm wedging occurs, it will be practically impossible to remove the same with the attached strain relief with-

out the use of some tools as a simple pull from either direction will not suffice.

In Figure 5, there is shown one panel 26 having a plurality of openings therein, anyone of which openings is adapted for satisfactory use with the strain relief device of this invention.

A circular opening is illustrated at 28, and if it is desired to guard the conductor in question against undesirable rotation or turning, a square opening such as shown at 30 may be used, and even an oval or elliptical opening 32 can be employed with considerable advantage in some instances.

If a more positive gripping effect is desired, the inner face of the opening may be provided with gripping teeth or the like as illustrated at 34 in the rectangular opening or at 36 in the circular opening shown.

The strain relief device of this invention may be applied to the conductors 12 and 16 by vulcanizing the same in position or by actually molding the same at the time that the conductors are made, or, if desired, the strain relief element can be applied to a conductor by simply slipping the same thereover to a desired point and then cementing it in position by means of a suitable adhesive.

It will be evident that herein is provided an improved reinforcement and strain relief for a current-carrying cord which may be economically manufactured and which, furthermore, may be simply installed with a minimum expenditure of

time and labor, and which, when installed, provides ample resistance to damage to the cord or its terminals, particularly so far as broken connections are concerned. Use of such a strain relief also eliminates possibility of shorting which results from tying knots in the cord or the use of metallic clamps which sometimes cut through the insulation.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than as necessitated by the prior art.

I claim as my invention:

In combination, an insulation coated electrical conductor with strain relief, a comparatively thin plate having an aperture through which the conductor is passed, the strain relief comprising a smoothly molded frusto-conical enlargement of the conductor coating, the said enlargement composed of resilient material, the smallest diameter of the enlargement being slightly less and the largest diameter of the enlargement being slightly greater than the diameter of the cylindrical aperture into which the conductor with its attached strain relief is fitted so tightly that a circumferential bulge rises adjacent the small diameter side of the frusto-conical enlargement preventing extraction.

DANIEL M. SEIFER.