May 28, 1957 K. W. SWAIN 2,794,099

CONNECTION BETWEEN LINE CONDUCTOR AND FUSE

Filed Nov. 25, 1955

Fig. 1.

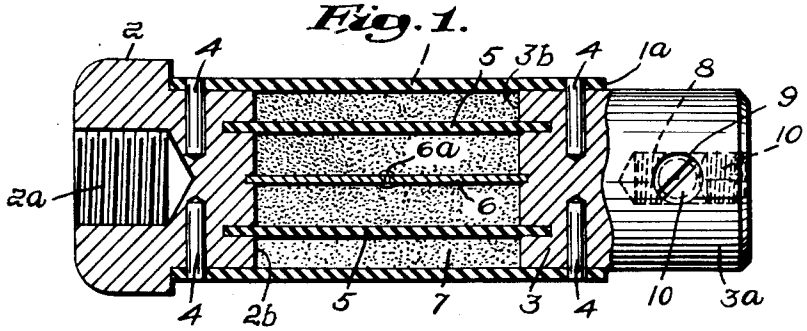


Fig. 2.

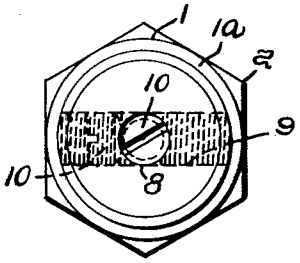


Fig. 3.

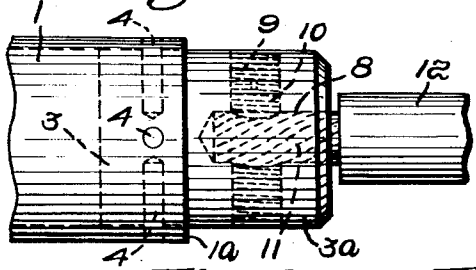


Fig. 4.

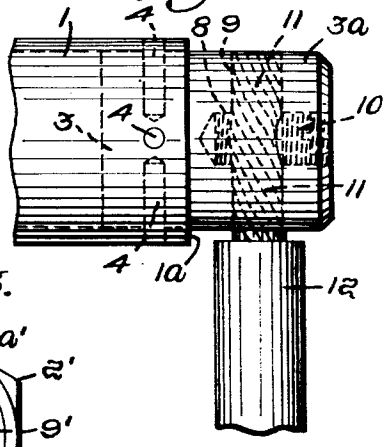


Fig. 5.

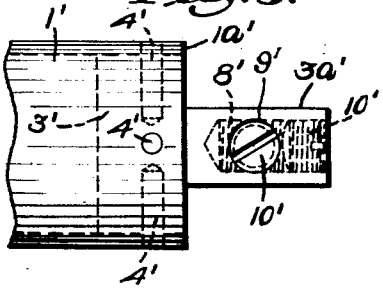
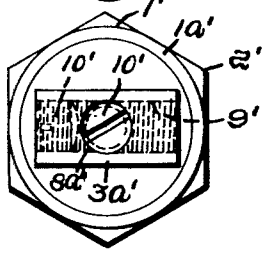


Fig. 6.



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CONNECTION BETWEEN LINE CONDUCTOR AND FUSE

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1 Claim. (Cl. 200—132)

This invention relates to electric fuses, and more particularly to means for connecting electric fuses into electric circuits.

Generally electric fuses are inserted into fuse holders provided with conductor-clamping-screws. Provision of these conventional fuse holders increases the space requirements for circuit protection by fuses as well as the cost of circuit protection. In conventional fuse holder arrangements there is a voltage drop between each terminal element of the fuse and each fuse holder contact in engagement with the terminal element, and there is an additional voltage drop between each fuse holder contact and the line conductor, such as a wire or cable, being clamped to it.

It is one object of this invention to eliminate all these drawbacks by providing a system of electric fuses whose terminal elements are adapted to readily receive line inductors such as, for instance, wires or cables directly, i. e. without the intermediary of fuse holders, or cutouts.

Another object of the invention is to provide a system of fuses whose terminal elements are adapted to readily receive line conductors such as, for instance, wires or cables, arriving from different directions to the point where the fuse is located.

Still another object of the invention is to adapt one or both terminal elements of a fuse to form solderless connectors capable of establishing firm line contacts with any line conductor such as, for instance, a wire or a cable.

These and other objects and advantages of the invention will become more apparent from the following description and the accompanying drawing illustrating embodiments of the invention. In the drawing—

Fig. 1 shows in longitudinal section, partly in side elevation, a fuse embodying the invention;

Fig. 2 is a top-plan view of the structure of Fig. 1;

Fig. 3 is a side elevation of the conductor clamping means of the fuse structure shown in Figs. 1 and 2 with a line conductor inserted therein in axial direction;

Fig. 4 is a side elevation of the conductor clamping means of the fuse structure shown in Figs. 1 and 2 with a line conductor inserted therein in transverse direction;

Fig. 5 is a side elevation of an arrangement similar to that shown in Fig. 1; and

Fig. 6 is a top plan view of the structure of Fig. 5.

Referring now to the drawing and more particularly to Figs. 1 and 2 thereof, reference numeral **1** has been applied to indicate a tubular casing of insulating material, preferably a synthetic-resin-glass-cloth-laminate. Casing **1** is closed by metal plugs **2** and **3** on both ends thereof. Plug **2** is provided with an internally screw-threaded recess or tap hole **2***a* adapted to receive an externally screw-threaded contact stud (not shown). The outer surface of plug **2** is in the shape of a hexagon to facilitate mounting of plug **2** upon the aforementioned contact stud. Both plugs **2** and **3** are press-fitted into

casing **1** and secured to it by means of a plurality of angularly displaced transverse steel pins **4**. The inner base surfaces **2***b*, **3***b* of plugs **2**, **3** are each provided with three grooves. The radially outer grooves receive a pair of spaced insulating plates **5** for maintaining plugs **2**, **3** properly spaced while the fuse is being assembled, and the radially inner groove receives a ribbon-type fuse link **6** preferably made of silver. Link **6** is provided with a tin rivet **6***a* to cause disintegration thereof at temperatures below the fusing point of silver. The space inside of casing **1** is filled with a non-gas-evolving pulverulent arc-quenching filler **7**, preferably chemically substantially pure quartz sand. Plug **3** projects beyond the edge **1***a* of casing **1** and this projection **3***a* of plug **3** is provided with two internally screw-threaded bores, or tap holes, **8**, **9**. One of the internally screw-threaded bores or tap holes **8** extends in an axial direction, and the other of the internally screw-threaded bores or tap holes **9** extends transversely across the first mentioned bore or tap hole **8** intersecting the same at right angles. Both tap holes **8**, **9** have exactly the same diameter and are internally screw-threaded with identical threads. A clamping screw or set-screw **10** is arranged in either of both holes **8**, **9**. In Figs. 1 and 2 both positions of the clamping screw or set-screw **10** have been shown. (Figs. 1 and 2 ought not to be interpreted as suggesting that there is a clamping screw or set-screw **10** in both holes **8**, **9**.)

Fig. 3 shows the clamping or set-screw **10** as being inserted into tap hole **9**. End **11** of a cable **12** stripped of its insulation is inserted into tap hole **8** and screw **10** is firmly pressed against the bare end **11** of cable **12**. As a result, cable **12** is firmly pressed against the screw threads in tap hole **8**, i. e. the crests of the screw threads in tap hole **8** engage under pressure the sides of the bare end **11** of cable **12**, establishing line contacts where the specific contact pressure is very high.

According to Fig. 4, the bare end **11** of cable **12** is introduced into tap hole **9** and clamped in position by means of set-screw **10** inserted into tap hole **8**. In this position of cable **12** the crests of the screw-threads in tap hole **9** bite into the bare end **11** of cable **12**, establishing an excellent high pressure line contact. It will be understood that the bare end **11** of cable **12** might, if desired and more convenient, be inserted into the upper end of tap hole **9** rather than in the lower end thereof, as shown in Fig. 4.

Figs. 1 to 4 refer to the preferred embodiment of my invention, yet in some instances it may be desirable to resort to the structure shown in Figs. 5 and 6 wherein plug **3'** press-fitted into the upper end of casing **1'** and held therein by transverse steel pins **4'** is provided with a prismatic projection **3***a'* extending beyond the edge **1***a'* of casing **1'**. Two tap holes **8'** and **9'** are machined into projection **3***a'*. The former extends in a direction longitudinally of the fuse and the latter intersects the former at right angles. Both possible positions of the single set-screw **10** have been indicated in Figs. 5 and 6. A wire or cable may be installed in the structure of Figs. 5 and 6 in the same fashion as shown in Figs. 3 and 4.

Where the core of the cable **12** or other line conductor is relatively rigid and/or subject to high changes in temperature, it may be desirable to provide another type of set-screw comprising conventional means precluding the screw to turn loose once it has been firmly set.

Although there are herein shown and described but two forms of structures embodying my invention to illustrate typical fuses in which it may be employed, it should be understood that fuses embodying my invention may be altered considerably from those specifically disclosed without departing from the spirit and scope thereof.

The invention claimed is as follows:

In combination a fuse comprising a substantially tubular casing of insulating material, a fuse link arranged inside of said casing, a pair of terminal elements conductively interconnected by said link closing the ends of said casing, at least one of said pair of terminal elements being in the shape of a plug having a substantially cylindrical portion press-fitted into said casing and a portion situated outside of said casing, a pair of tap holes in said outer portion comprising a first tap hole extending in axial direction of said outer portion and a second tap hole extending transversely across said outer portion and intersecting said first tap hole at right angles, said pair of tap holes having identical internal screw-threads, a bare line conductor terminal inserted into one

of said pair of tap holes, and a set-screw inserted into the other of said pair of tap holes exerting pressure against said conductor terminal to cause the crests of the screw-threads in said one of said pair of tap holes to engage under pressure the surface of said conductor terminal.

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