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ELECTRICAL FUSEHOLDER CONSTRUCTION

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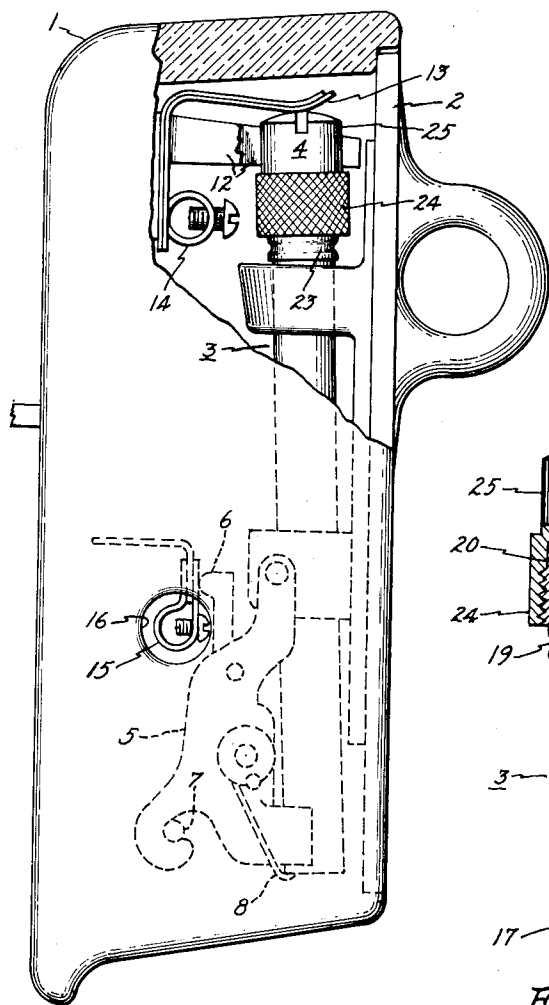


Fig. 1.

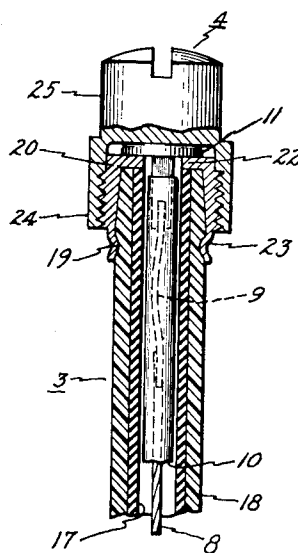
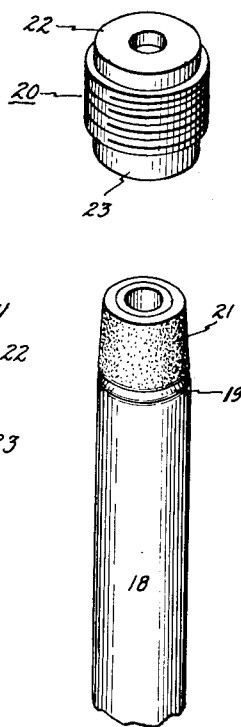


Fig. 2.

Fig. 3.



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ELECTRICAL FUSEHOLDER CONSTRUCTION

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1 Claim. (Cl. 200—132)

This invention relates to improvements in electrical fuseholders and more particularly, to an improved mechanical connection between a fuse tube or fuseholder and a combined closure cap and electrical contact therefor.

In the prior art it is well known to connect a closure cap or electrical contact to one end of a fuse tube or fuseholder by externally threading said one end of the fuseholder or fuse tube and internally threading the closure cap or electrical contact. Such a threaded connection does not always provide the necessary strength requirements since the threads cut in the fuse tube or fuseholder tend to weaken the fuse tube or fuseholder. To offset said weakening of the fuse tube or fuseholder by the threads cut therein it is necessary to increase the thickness of the fuse tube or fuseholder in order to obtain a strong closure cap or electrical contact to fuse tube or fuseholder connection. The necessity for cutting threads in the fuse tube or fuseholder increases the cost thereof due to the thread cutting operation required thereon and the increased thickness required therein.

Accordingly, in a fuseholder or fuse tube having a closure cap or contact thereon, it is an object of this invention to provide an improved low cost and reliable connection between the fuseholder or fuse tube and the closure cap or contact.

In a fuseholder or fuse tube having a closure cap or contact thereon, my invention comprises a gradually conically tapered force fit connection therebetween.

In a fuseholder or fuse tube having a closure cap or contact thereon, my invention further comprises a conically tapered force fit and interlocked connection therebetween.

In a fuseholder or fuse tube having a closure cap or contact thereon, my invention further comprises an adhesive and conically tapered force fit connection therebetween.

Also, in an electrical insulating material fuseholder or fuse tube having an electrically conductive metallic closure cap or contact on one thereof, my invention comprises an adhesive gradually tapered force fit and indented connection between said closure cap or contact and one end.

The features of my invention which I believe to be novel are set forth with particularity in the appended claim. My invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing.

In the drawing, Fig. 1 is a side view of one form of my invention when used in an enclosed type fused cutout. Fig. 2 is a sectional side view of my said one form of invention. Fig. 3 is an exploded side view of my said one form of invention. Like reference numerals will be used throughout the various figures to indicate identical parts.

Referring now to the drawing, and more particularly to Fig. 1, illustrated therein is a well known form of en-

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closed type fused cutout comprising an electrical insulating material housing 1 closed by an electrical insulating material door 2. Mounted on the door 2 is an electrical insulating material fuse tube or fuseholder 3. The upper end of the fuse tube or fuseholder 3 is closed by an electrically conductive metallic closure cap and contact 4, and the lower end of the fuse tube or fuseholder 3 is open. Pivotaly connected to the door 2 is a metallic hinge member 5 having a rearwardly spring biased metallic contact 6. The lower end of the metallic hinge member 5 is hooked on to a pair of trunnions 7, only one of which is shown, fixed to the housing 1. Disposed within the fuse tube or fuseholder 3 is an electrically conductive fuse link 8 having a fusible portion 9 therein surrounded by an auxiliary fuse tube 10. As is well known in the art auxiliary fuse tube 10 is constructed of kraft or rag paper and is adapted to generate an electrical arc extinguishing gas when subjected to an electrical arc or the heat thereof. A buttonhead 11 connected to the upper end of the fuse link 8 is in electrical contact with the closure cap and contact 4 and the lower end of the fuse link 8 is tautly fastened to the hinge member 5 whereby the hinge member 5 snugly abuts the lower end of the fuse tube or fuseholder 3.

Disposed within the upper end of the housing 1 and connected to the rear wall thereof by cementing or the like is an upper line terminal connecting clamp and contact comprising a pair of resilient metallic latching fingers 12 adapted to engage the closure contact 4, a resilient metallic member 13 engaging the upper end of the closure contact cap 4 and biasing the fuse tube or fuseholder 3 downwardly, and line terminal connecting clamp 14 adapted to have an upper (not shown) electrical line lead connected thereto. Disposed within the lower end of the housing 1 and connected to the rear wall thereof as by cementing or the like is a lower line terminal connecting clamp and contact 15 adapted to be electrically engaged by the rearwardly spring biased metallic contact 6 and have a lower (not shown) electrical line lead connected thereto. The side walls of the housing 1 have apertures 16 formed therein, only one of which is shown, adjacent to the line terminal connecting clamp 14 and the lower line terminal connecting clamp and contact 15 whereby upper and lower line leads may be conveniently connected thereto by inserting said line leads into the apertures 16.

The fuse tube or fuseholder 3 has an inner electrical insulating material liner 17 constructed of vulcanized rag fiber or the like, as is well known in the art, whereby the liner 17 will generate electrical arc extinguishing gases when subjected to an electrical arc or the heat thereof. An outer tubular member 18 of the fuse tube 3 is constructed of resin impregnated rag or paper fiber compacted in a die and heat cured, or other electrical insulating material, as is well known in the art. With the door 2 closed an electrical circuit is completed between the upper and lower line leads through the line connecting clamp 14, resilient elements 12 and 13, closure contact cap 4, buttonhead 11, fuse link 8, hinge 5, spring biased contact 6, and the lower line terminal connecting clamp and contact 15. At relatively low overcurrents the fusible portion 9 will fuse and the auxiliary fuse tube 10 will generate electrical arc extinguishing gases therein. At relatively high overcurrents the gas pressures built up within the auxiliary fuse tube 10 will burst the auxiliary fuse tube 10 and the electrical arc between the fused ends of the fuse link 8 will cause additional electrical arc extinguishing gases to be generated by the interior gas generator liner 17. When the fuse link 8 is fused or ruptured the hinge member 5 is no longer tautly connected with respect to the lower end of the fuse tube 3 whereby the resilient member 13 causes the

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fuse tube 3 to move downwardly and disengage itself with respect to the pair of latching fingers 12 whereby the door 2 and fuse tube assembly mounted thereon is free to drop open. When the fuse tube 3 moves downwardly the hinge member 5 pivots clockwise about the trunnions 7 and the lower end of the fuse link 8 is extracted from within the fuse tube 3 whereby the electrical arc between the fused ends of the fuse link 8 is elongated. Also, inasmuch as the upper end of the fuse tube 3 is closed, the electrical arc extinguishing gases generated within the fuseholder 3 are expelled out of the lower open end of the fuseholder 3. This gaseous expulsion action in combination with elongation of the electrical arc extinguishes the electrical arc.

As will be obvious to those skilled in the art, the high pressure gases generated within the fuseholder 3 impose very high stresses on the fuseholder 3 and the connection between the closure contact cap 4 and the upper end of the fuseholder 3. If said connection is not strong enough to withstand the stresses imposed thereon the contact closure cap 4 will be exploded off the upper end of the fuseholder 3 thereby damaging the interior of the cutout and resulting in insufficient gaseous expulsion action out of the lower open end of the fuse tube. The bottom of the housing 1 is open by virtue of a not shown cutout portion therein whereby the ionized gases expelled out of the lower open end of the fuseholder 3 do not increase likelihood of flashover between the upper and lower line terminal contacts after the door 2 and fuseholder assembly mounted thereon has dropped open. However, if the closure contact cap 4 is blown off the upper end of the fuseholder 3 ionized gases will enter the housing 1 thereby increasing likelihood of a flashover between the upper and lower line terminal contacts after the door and fuse tube assembly has dropped open.

In my invention, formed adjacent to the upper end of the tubular member 18 is an outer circumferentially extending groove 19. Also, the outer cylindrical surface of the upper end of the tubular member 18 is given a gradual and uniform conical taper extending from the groove 19 to the upper end of the tubular member 18. Said groove and taper can be formed by machining. However, when tubular member is constructed out of fiber, machining severs the fibers and has a tendency to weaken the upper end of the tube. To avoid such tendency the groove 19 and taper are preferably formed in tubular member 18 by pressure before final curing thereof. An externally threaded electrically conductive cylindrical tubular or sleeve-like metallic connector member 20 has the internal cylindrical surfaces thereof tapered identically to the taper formed on the upper end of the tubular member 18. Applied to either or both of the tapered surfaces of the upper end of tubular member 18 and sleeve-like member 20 is an adhesive or cement 21. The average internal diameter of the sleeve-like member 20 is slightly less than the average external diameter of the tapered cylindrical surface of the tubular member 18 and the member 20 has an adhesive gradually conical tapered force fit with respect to the upper end of the tubular member 18. The upper end of the cylindrical tubular member 20 has an apertured

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flange 22 formed thereon which abuts against the upper end edges of the fuseholder 3, and the lower portion 23 of the cylindrical tubular member 20 is crimped, indented, or rolled into the circumferentially extending groove 19. This adhesive tapered force fit and crimped connection between the cylindrical tubular member 20 and the upper end of the fuse holder 3 is gas tight whereby no ionized gases will escape from the upper end of the fuseholder 3 to increase likelihood of a flashover between the upper and lower terminal contacts of the cutout after the door and fuseholder assembly have dropped open.

The closure contact member 4 has an internally threaded downwardly extending flange 24 formed thereon. The buttonhead 11 of the fuse link 18 is clamped between the head portion 25 of the closure contact cap 4 and the apertured flange 22 of the cylindrical tubular member 20 when the closure contact cap 4 is turned down on the cylindrical tubular member 20. A threaded connection as the threaded connection between the members 24 and 20, is gas tight whereby no ionized gases will escape from the upper end of the fuseholder 3.

While there has been shown and described a particular embodiment of the invention, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention, and therefore it is intended by the appended claim to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

In a high current interrupting electrical insulating material tubular fuseholder having a fuse link therein and adapted to generate electrical arc extinguishing gases therein at high pressures when subjected to an electrical arc and the heat thereof and having one end thereof closed by a metallic closure contact cap; said metallic closure contact cap being threadably gas tight connected to a metallic tubular connector, said metallic tubular connector surrounding said one end, said metallic tubular connector and said one end having uniform gradual and similar conically tapered interior and exterior surfaces respectively telescoped with respect to each other in forced fit relationship, an adhesive disposed between said telescoped interior and exterior surfaces, said fuseholder one end having an external circumferentially extending groove therein, said metallic tubular connector having an inturned portion, and said inturned portion being disposed within said groove in interlocking relationship with respect thereto.

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