July 14, 1925. 1,545,550

F. COATES

ELECTRIC FUSE

Filed April 16, 1925

FIG. 1.

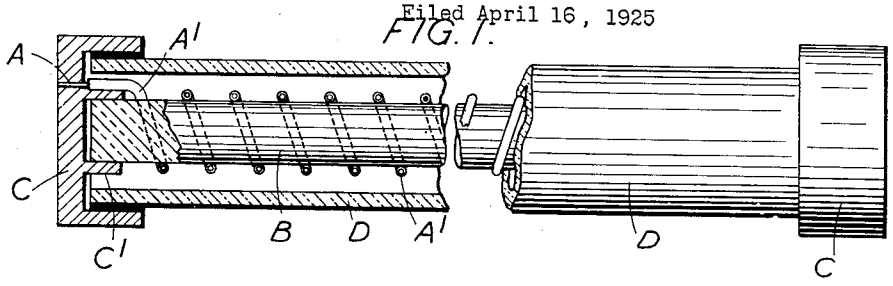


FIG. 2.

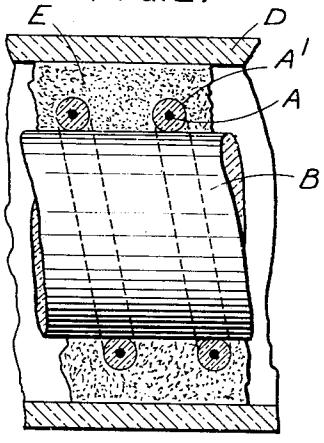


FIG. 3.

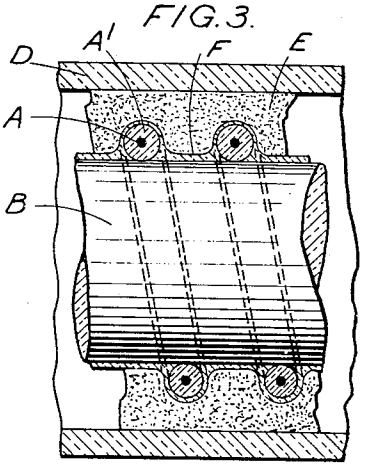


FIG. 4.

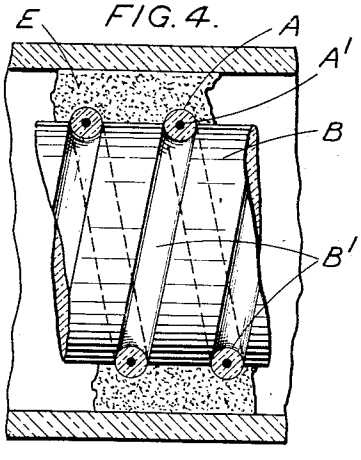
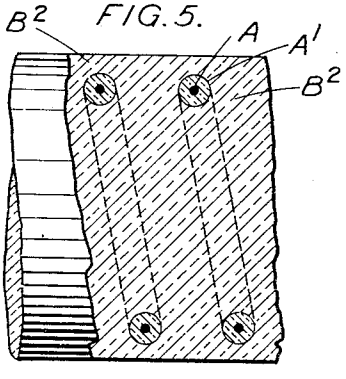


FIG. 5.



INVENTOR

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ATTYS.

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UNITED STATES PATENT OFFICE.

FRANK COATES, OF CLEADON, ENGLAND.

ELECTRIC FUSE.

Application filed April 16, 1925. Serial No. 23,693.

To all whom it may concern:

Be it known that I, FRANK COATES, subject of the King of England, residing at Cleadon, in the county of Durham, England, have invented certain new and useful Improvements in Electric Fuses, of which the following is a specification.

This invention relates to electric fuses and has particular reference to fuses for use in high voltage circuits as for example for connecting a power station busbar system to a potential transformer.

Such fuses are subjected to heavy currents under short-circuit conditions and in practice difficulty is experienced in providing a fuse of such a nature as to clear the short-circuit satisfactorily whilst the destructive effect is limited to the fusible element only.

One known method of dealing with this difficulty is to employ an external resistance in series with the fuse for the purpose of limiting the short-circuit current within the safe rating of the fuse but such a method entails several disadvantages of which the space occupied by the resistance and its cost may be mentioned as examples. Obviously the difficulty and the disadvantages above mentioned are emphasized when the fuses are required for use upon extra high voltage systems.

Many forms of high resistance fuses have been suggested and the fuse wire has been wound in spiral grooves in insulating supports or threaded through tubes and in some such constructions the space around the wire has been packed with insulating and refractory material such for example as asbestos or marble dust.

According to the present invention the wire or strip forming the fuse is provided with a covering of insulating and refractory material, preferably a wound covering of asbestos, which restricts the area of the path for the vapour when the fuse is volatilized, and this covered wire is wound in spiral or like form on a support of insulating material or is embedded in such material.

Various constructions may be employed in carrying out this invention, for instance, the ends of the spiral or covered wire wound upon the support may be connected to caps or contacts at the ends of the support. A tube or cover of some suitable insulating material may enclose the spiral wire and its support and may fit into the caps. The space between this outer tube and the supported spiral may be filled with any desired insulating medium such for example as marble dust or some form of insulating compound. Again the spiral fusible element covered with its layer of refractory insulating material and wound on its support may have applied to it and to the support a coating of some well-known vitreous enamel which can be baked hard and by its adhesion retains the spiral in position.

In another construction the spiral or like fusible element with its covering may be entirely embedded in an insulating substance which will then act as the support. In such a construction the outer cover may be dispensed with.

In the accompanying drawings,

Figure 1 is an elevation partly in section of one construction of fuse according to this invention, and

Figures 2, 3, 4 and 5 are sections of portions of other constructions of fuses also according to this invention, these figures being drawn to a larger scale than Figure 1.

With reference first to Figure 1 the fuse wire A with a covering of asbestos A^1 is wound in the form of a spiral upon a rod or support B of insulating material supported in a socket or recess C^1 in an end cap C. The fuse and its support is enclosed in a tube D of insulating material to which the end caps C are cemented or otherwise secured.

Figure 2 may be regarded as an enlarged view of a portion of Figure 1 and the parts bear corresponding reference letters. But Figure 2 also shows the space between the outer tube D and the support B filled with an insulating material such for example as marble dust or some form of insulating compound. This is indicated at E.

In the fuse shown in Figure 3 the wire or strip A with its insulating refractory covering A^1 is covered with vitreous or like material F such as some well known vitreous enamel which can be baked hard and by its adhesion retains the spiral in its position on the insulating support B. Again a filling of insulatng material E is provided between the fuse and its support and the outer insulating tube D.

Figure 4 shows the fuse wire A and its insulating and refractory covering A^1 wound in grooves B^1 in the support B.

In the form shown in Figure 5 the spiral formed by the wire A and its covering A^1 is entirely enclosed by insulating material B^2 cast or otherwise formed round it. In this construction there is no need for an outer enclosing tube and the ends of the fuse wire may be brought directly to caps fitting on the ends of the support B^2.

What I claim as my invention and desire to secure by Letters Patent is:—

1. An electric fuse for high voltage circuits comprising a conductor, a covering of insulating and refractory material around said conductor acting to restrict the area of the path for the vapour when the fuse is volatilized, a support of insulating material for said covered conductor which is wound around the support in spiral form, and a coating of vitreous material acting to retain said covered conductor in place on its support.

2. An electric fuse for high voltage circuits comprising a conductor, a covering of insulating and refractory material around said conductor acting to restrict the area of the path for the vapour when the fuse is volatilized, a support of insulating material for said covered conductor, means attaching said covering to said support, a tube of insulating material enclosing said support and covered conductor, conducting caps at the ends of said tube and supporting the ends of said insulating support, and electrical connections between each end of the covered conductor and the adjacent cap.

In testimony whereof I have signed my name to this specification.

FRANK COATES.