Feb. 26, 1929. 1,703,236

J. H. HICKEY

FUSE

Filed Oct. 25, 1926

Fig. 1.

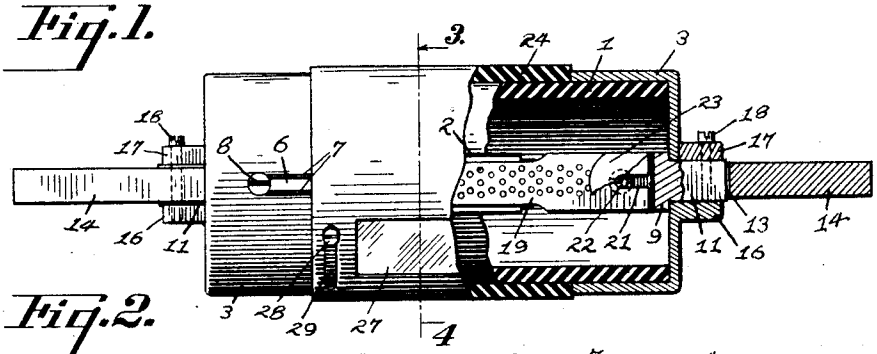


Fig. 2.

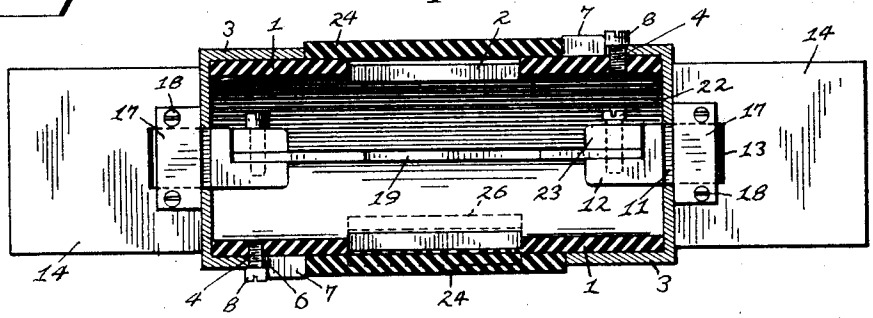


Fig. 3.

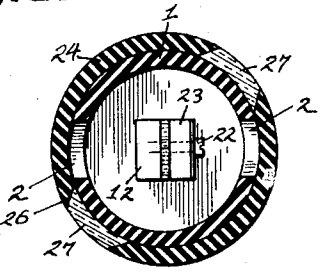


Fig. 4.

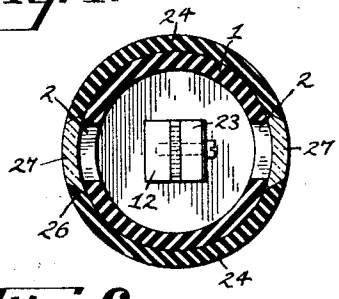


Fig. 5.

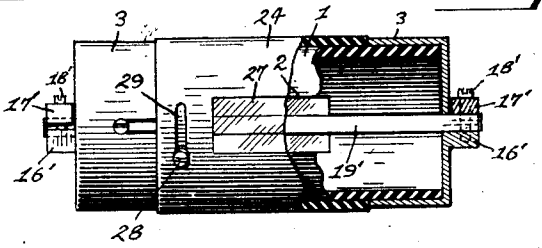


Fig. 6.

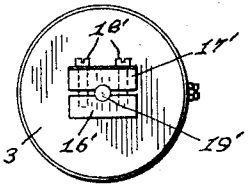
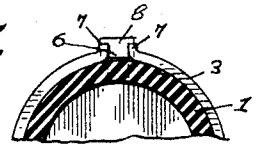


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN H. HICKEY, OF SAN FRANCISCO, CALIFORNIA.

FUSE.

Application filed October 25, 1926. Serial No. 144,008.

My invention relates to improvements in fuses, and particularly to improvements in fuse construction whereby a fusible conductor is made readily replaceable and is rendered observable in service.

The primary object of the present invention is to provide improved construction for fuses.

Another object is to provide an improved fuse wherein the fusible element is normally completely encased within an insulating shell and in which the fusible element may be rendered observable when desired.

A further object is to provide improved means for detachably mounting and connecting the fuse terminals upon the body of the fuse to facilitate the initial assembly and the subsequent refilling of the fuse.

A further object is to provide an improved means for detachably mounting the fuse terminals which will obtain maximum conductive efficiency.

Another object is to provide an improved construction which will facilitate the connecting of a fusible conductor between the terminals of a fuse and which will obtain full conductive efficiency.

A still further object is to provide an improved fuse construction which can be manufactured economically and which will be highly efficient both electrically and mechanically.

I accomplish these and other objects by means of the improved device disclosed in the drawings forming a part of the present application wherein like characters of reference are used to designate similar parts throughout the specification and drawings and in which,

Fig. 1 is a side elevation, partly in section, of my improved fuse construction.

Fig. 2 is a longitudinal section taken at right angles to the fuse as shown in Fig. 1.

Figs. 3 and 4 are transverse sections taken upon the line 3—4 of Fig. 1, showing the cover moved to cover and to uncover respectively the openings in the shell.

Fig. 5 is a side elevation, partly in section, of a smaller type of fuse, showing the adaption of my improved construction thereto.

Fig. 6 is an end elevation of the fuse shown in Fig. 5.

Fig. 7 is a broken sectional detail showing the manner in which the conductor caps are locked upon the ends of the shell.

Referring to the drawings, the numeral 1 is used to designate a shell having openings 2 formed in the sides thereof. Conductor caps 3 are detachably mounted upon the shell, said caps being fitted over the ends of the shell and detachably secured against rotative movement thereon by means of screws 4 threaded into the sides of the shell 1 and engaging longitudinally disposed slots 6 formed in the edges of the caps 3. Lugs 7 are upwardly turned at the outer ends of the slots 6 to engage the heads 8 of the screws 4 to lock the caps against longitudinal movement upon the shell. The screws 4 are arranged to be loosened sufficiently to permit the heads 8 to clear the lugs 7 whereby the caps may be moved off from the shell when desired without entirely removing the screws from engagement with the shell 1.

Terminals 9 are detachably secured upon the conductor caps 3. The terminals 9 are provided with shank portions 11 extending axially through the cap and contact lugs 12 extending inwardly into the shell. The shank portions 11 are preferably made rectangular in form and extend into recesses 13 formed in the backs of blades 14 secured upon the outer ends of the caps and arranged to engage a fuse block, not shown, in the ordinary manner. A lug 16 is formed upon each cap at the base and in connection with one side of the corresponding blade 14, said lug being arranged to engage and form conductive contact with one side of the shank. A clamping block 17 is mounted adjacent the opposite side of the shank, said block being arranged to be clamped against the shank by means of screws 18 threaded into the blade 14 and lug 16, whereby the shank may be detachably clamped between the block 17 and the lug 16 and form an efficient conductive contact.

The contact lug portions 12 extend inwardly from the caps 3 into spaced relation within the shell and are arranged to receive the ends of a fusible conductor 19 of predetermined current carrying capacity extending therebetween. The conductor 19 has a slot 21 formed at each end to receive a screw 22 threaded into the lug portion 12 and arranged to move a clamping block 23 into firm contacting relation with the end of the conductor 19 whereby the fusible conductor may be detachably clamped and an efficient electric contact maintained. The fusible element 19 may be of any desired character, a

form in which the element is apertured to form a conductive grid of known current carrying capacity being illustrated.

A cover 24 is mounted over the shell 1 between the caps 3, said cover having openings 26 formed therein to substantially correspond to the openings 2 formed in the shell 1. The cover is arranged to normally cover the openings 2 and is movable to move the openings 26 into registering relation with the openings 2 whereby the fusible element 19 within the shell may be observed. A transparent pane 27 of glass or other suitable material is preferably mitered into the openings of the cover 24 to insure that the fuse will be housed entirely should the cover be left inadvertently or intentionally with the openings 26 in registering relation with the openings 2. A screw 28 mounted upon the shell 1 and engaging a slot 29 formed in the cover 24 limits the movement of the cover 24 relative to the shell 1.

In assembling the fuse, the screws 22 and 18 are readily tightened to obtain a rigid clamping of the terminal of the fusible element 19 and the caps 3 respectively, and the flat contacting surfaces are caused to maintain an efficient conductivity. The screws 4 efficiently hold the caps against longitudinal and transverse movement, so that no strain will be imposed upon the fusible conductor 19, and said conductor will be held at all times in a position such that it may be readily observed through the registering openings 2 and 26.

The shell 1 and cover 24 are preferably made of insulating material and the cover is preferably held with the openings 26 and 2 out of registering relation, thereby obtaining a continuous insulating casing around the fuse. When it is desired to locate a fuse that has been blown, the cover of each fuse has only to be turned sufficiently to move the openings 26 into registering relation with the openings 2 of the shell and the fusible element may then be observed without removing the fuse from the block. In this manner the locating of blown fuses is greatly facilitated.

In replacing a blown fusible element 19, the screws 4 are loosened to permit the caps 3 to be removed from the shell 1, and the screws 18 and 22 unloosened sufficiently to release the clamping blocks from clamping positions. It will be noted that none of the screws need be entirely removed, hence, there is no danger of losing any of said screws and thereby destroying the utility of the fuse.

In smaller fuses, such as illustrated, in Figs. 5 and 6 of the drawings, the terminal elements 9 may be eliminated. In fuses of this smaller type, the shell 1 and cover 24 are arranged as above described, and conductor caps 3 arranged to engage fuse blocks directly, are secured upon the shell in the manner above described. In this form of fuse, the fusible element 19′ consists of a suitable length of fusible metal of calculated current carrying capacity, the ends of said element being extended through openings formed in the ends of the caps 3. A lug 16′ is formed upon the outer end of each cap, and a clamping block 17′ is connected to said lug by means of screws 18′, said block being movable by said screws to firmly clamp the ends of the fusible conductor and to maintain an efficient electrical contact therewith. The fusible element is easily replaced in this type of fuse by removing the cap and loosening the clamping block screws 18′ in the obvious manner.

My improved fuse, and the structural features particularly described in the present specification are, of course, subject to modification in numerous ways without departing from the spirit of the invention. I, therefore, do not wish to restrict myself to the specific form and construction illustrated and described, but desire to avail myself of all modifications which may fall within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A fuse comprising a shell; conductor caps mounted upon the ends of the shell, said caps having longitudinally disposed slots formed in the inner edges thereof and provided with outwardly turned lugs formed adjacent the ends of the slots; screws mounted upon the shell and engaging the slots to hold the caps against rotative movement, said screws being provided with heads engaging the lugs to secure the caps against longitudinal movement; a fusible conductor; and means for detachably connecting the conductor between the caps within the shell.

2. In a fuse, the combination with a shell and conductor caps arranged to fit upon the ends of the shell, of a screw mounted within the shell adjacent each cap and arranged to slidably engage slots formed in the edges of said caps to hold the caps against rotative movement; and lugs outwardly turned from the outer ends of the slots to engage heads formed upon the screws to hold the caps against longitudinal movement.

3. In a fuse, the combination with a shell and conductor caps detachably secured upon the ends thereof, of a pair of terminals detachably engaging the caps, said terminals having shanks extending axially through the caps; lugs formed upon the outer ends of the caps to engage one side of each terminal; and blocks arranged to be clamped against the opposite sides of the terminals to detachably clamp the shanks into conductive contact with the cap.

4. In a fuse, the combination with a shell and conductor caps detachably secured upon

the ends thereof, of a pair of terminals detachably engaging the caps, said terminals having shanks extending axially through the caps; lugs formed upon the outer ends of the caps to engage one side of each terminal; and blocks arranged to be clamped against the opposite sides of the terminals to detachably clamp the shanks into conductive contact with the cap; terminal lugs formed upon the inner ends of the terminals; and blocks movably connected to the terminal lugs and movable to clamp a fusible conductor into detachable connection therebetween.

5. In a fuse, the combination with a shell and conductor caps detachably secured upon the ends thereof, said caps being provided with contact blades arranged to engage a fuse block, of a pair of terminals detachably engaging the caps, said terminals having rectangular shanks extending through the caps and into recesses formed within the back portions of the blades; lugs formed upon each cap in connection with one side of the blade to engage one side of the shank; and a clamping block connected to the opposite side of the blade and movable to clamp the shank into engagement with the cap and shank, said block forming flat conductive contact with the shank.

6. In a fuse, the combination with a shell and a conductor cap detachably secured upon an end thereof, of a terminal detachably engaging the cap and having a shank extending axially through said cap; a clamping lug formed upon the outer end of the cap to engage one side of the shank; and a clamping block arranged to engage the opposite side of the shank to detachably clamp the terminal in conductive contact with the cap.

In witness whereof I hereunto set my signature.

JOHN H. HICKEY.