Jan. 11, 1927. 1,614,014

T. E. MURRAY

ELECTRIC FUSE

Filed Jan. 8, 1925

Fig. 1.

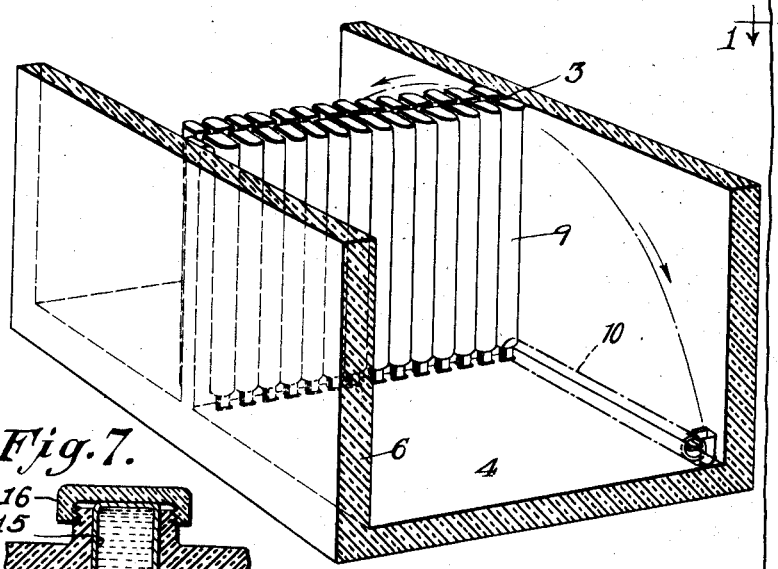



Fig. 2.

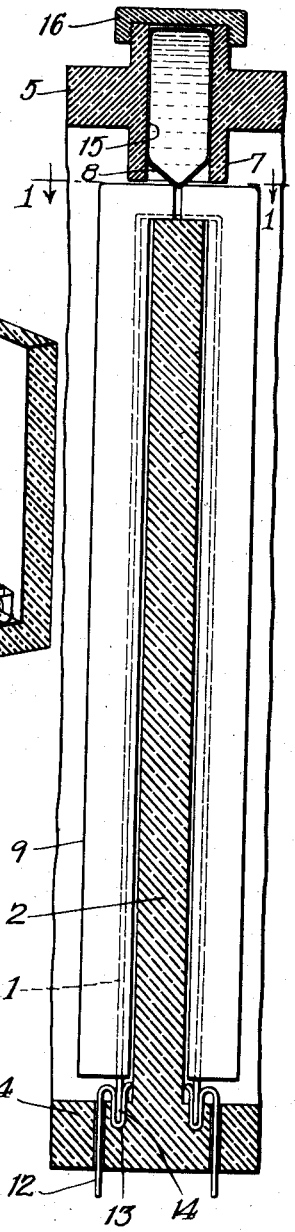



Fig. 7.

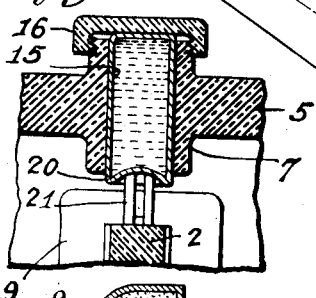
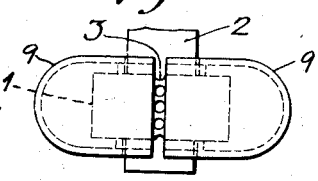



Fig. 4.



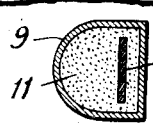




Fig. 3.

Fig. 5.

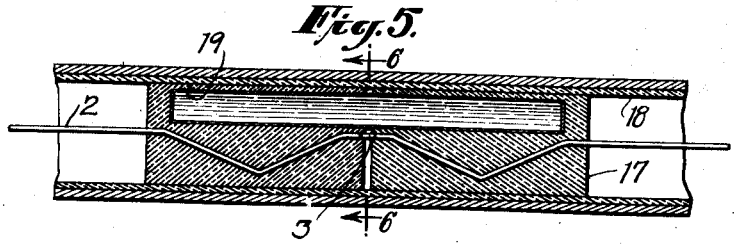
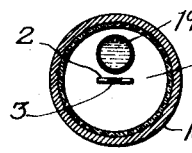



Fig. 6.

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By His Attorney

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# UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF BROOKLYN, NEW YORK.

## ELECTRIC FUSE.

Application filed January 8, 1925. Serial No. 1,144.

In a previous patent of Thomas E. Murray, Jr., No. 1,073,619, there is described a repulsion fuse comprising a pair of arms located on opposite sides of a column or body of refractory insulating material so that when the reduced central portion of the fuse is burned out, the two arms are thrown wide apart to prevent arcing and burning away of the remaining portions of the fuse and the terminals.

The present invention covers an improvement on fuses of this type and certain features of improvement applicable to other types as well. The accompanying drawings illustrate an embodiment of the invention.

Fig. 1 is a perspective view of a number of fuses alongside of each other in a casing, the casing being in section on the line 1—1 of Fig. 2;

Fig. 2 is a vertical section between a pair of the fuses;

Fig. 3 is a cross-section of part of a fuse;

Fig. 4 is a plan of a fuse;

Fig. 5 is a longitudinal section of a fuse of another style;

Fig. 6 is a cross-section thereof on the line 6—6;

Fig. 7 is a vertical section of a modification.

Referring to the embodiment of the invention illustrated, each fuse comprises a strip 1 in two arms extending along opposite sides of a barrier 2 of porcelain or similar insulating material. This strip extends continuously over the top of the barrier where it is provided with a localized blowing point formed, for example, by a reduced portion 3. The barrier is part of or is mounted in a casing having a base 4, a top 5 and sides 6 and preferably also having end closures. The top and the ends are omitted from Fig. 1 for the sake of clearness.

Within the casing shown are a number of similar fuses located side by side. The top 5 of the casing has a pair of ribs 7 bearing on the encased upper ends of the fused strips and forming a chamber 8 within which will be confined the gases generated at the blowing point. There are thus provided two means for causing a violent separation of the arms of any fuse which blows. First, the gases confined in the chamber 8 and between the ends of the casings 9 will blow such ends apart. Secondly, the repulsion effect due to the arrangement of the branches on the opposite sides of the barrier 2 will throw them apart. When any fuse blows, therefore, its parts will be thrown down to the position shown in dotted lines at 10, Fig. 1.

Each of the arms of a fuse strip is enclosed in a separate casing consisting of a fiber tube 9 filled with granular material 11, Fig. 3, this tube extending to and over the top of the barrier 2 and serving to extinguish any arc which tends to form between the ends of the blown fuse or to prevent such an arc from traveling back very far along the arms of the fuse strip. The encased arms of the fuse strip are arranged to yield very readily at their lower ends. Line terminals 12 are provided having looped portions 13 set in sockets in the base of the casing so that the ends 14 of the fuse strip may be forced therein with a good frictional contact. When a fuse is blown and its arms thrown down, the ends 14 will bend or slip with comparative ease out of the looped terminals.

I propose also to provide means for positively extinguishing the arc by applying to it a quenching fluid. In Fig. 2, I have illustrated a container in the form of a sealed glass tube 15 with its lower end resting on the ends of the casings 9, being carried in a tubular recess formed by the flanges 7 and opened to the outside of the casing by means of a screw cap 16 to permit insertion and removal of the container. This container may be a thin vessel of glass or other frangible or destructible material carrying an arc-extinguishing material. Any usual or suitable quenching liquid or gas or solid may be used; specifically carbon tetrachloride, for example. When there is a blow-out the vessel will be broken and the extinguishing material will be showered upon the arc so as to co-operate with the other agencies referred to in extinguishing it promptly.

The same idea may be applied to a great variety of fuses. Figs. 5 and 6 show it applied to a fuse of the type illustrated in a co-pending application of mine Serial No. 755,135 filed December 11, 1924. In this case the two halves of the fuse strip 2 are encased at their ends in heads 17 which act in the manner of pistons in the tubular casing 18, being thrown apart violently by the gases generated in a space between them by the blowing out of the fuse at the point 3. A vessel 19 carrying the quenching material is arranged in recesses in the two heads so that it extends across the intermediate space and

will be ruptured by the pressure and heat of the gases generated when the fuse blows. In this case, as in that of Fig. 2, the moving parts carrying the adjacent portions of the fuse strip may be arranged to positively engage and break the vessel containing the quenching fluid or otherwise open the vessel so as to release the fluid. It is preferable, though not essential, to have the quenching material in the form of a liquid and to arrange it above the arc so that when released it will be showered down on the arc.

Fig. 7 shows the vessel 15 with its lower end having portions 20 in the path of flanges 21 on the fuse casings 9. When the fuse blows and the casings 9 are forcibly thrown outward, the flanges 21 will positively engage and break the bottom of the vessel and release the extinguishing liquid on the arc.

Though I have described with great particularity of detail a certain embodiment of my invention, yet it is not to be understood therefrom that the invention is restricted to the particular embodiment disclosed. Various modifications thereof may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim is:

1. An electric fuse comprising a fuse strip with two arms between which is a localized blowing point, casings for said arms extending to points closely adjacent to said blowing point at opposite sides thereof, and means for confining the gases generated by the blowing of the fuse so as to cause a violent separation of the two casings.

2. An electric fuse comprising a fuse strip with two arms between which is a localized blowing point, casings for said arms extending to points closely adjacent to said blowing point at opposite sides thereof, and an insulating barrier on opposite sides of which said casings are located so as to induce a repulsion effect between them and to throw them apart when the fuse blows.

3. An electric fuse comprising a fuse strip with two arms between which is a localized blowing point, casings for said arms extending to points closely adjacent to said blowing point at opposite sides thereof, said arms having free ends extending beyond said casings and adapted for frictional engagement with circuit terminals.

4. An electric fuse comprising a fuse strip with two arms between which is a localized blowing point, casings for said arms extending to points closely adjacent to said blowing point so as to confine the arc to the space between said casings and a body of quenching material adapted to extinguish the arc between said casings.

5. An electric fuse comprising a fuse strip with two arms between which is a localized blowing point, casings for said arms extending to points closely adjacent to said blowing point so as to confine the arc to the space between said casings and a body of quenching material adapted to extinguish the arc between said casings and means for causing a violent separation of said casings when the arc blows.

6. An electric fuse comprising a fuse strip with two arms between which is a localized blowing point in combination with an outside casing carrying the fuse, a vessel carrying quenching material, said casing including a chamber for said vessel adjacent to said point, which chamber is open to the outside of the casing, and means for holding the vessel in said chamber.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY