

Dec. 23, 1941.

H. ALTSCHULE

2,266,841

INDICATOR FUSE

Filed Feb. 24, 1941

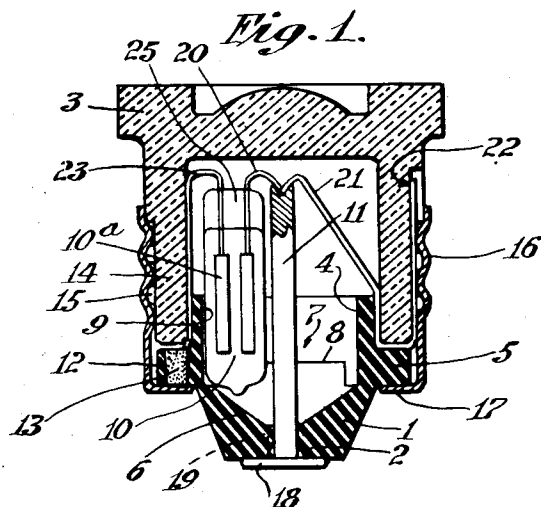


Fig. 2.

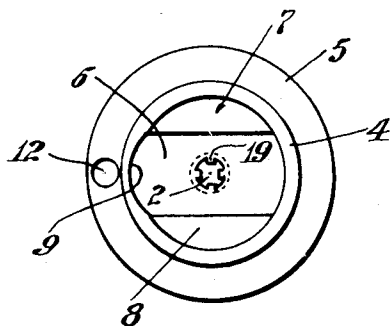


Fig. 3.

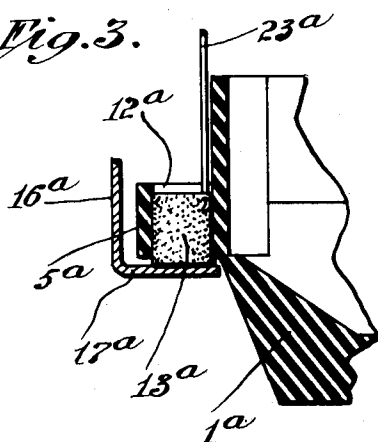
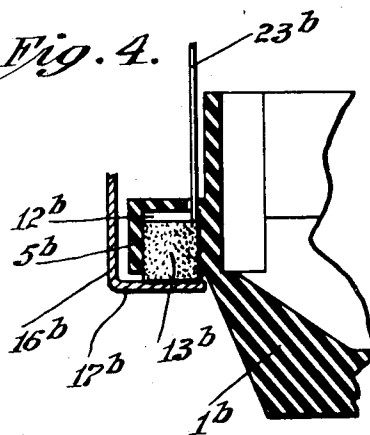


Fig. 4.



INVENTOR
Herman Altschule

BY *Pandolfi*
ATTORNEY

UNITED STATES PATENT OFFICE

2,266,841

INDICATOR FUSE

Herman Altschule, Newark, N. J., assignor to
Utility Electric Corp., East Newark, N. J., a cor-
poration of New Jersey

Application February 24, 1941, Serial No. 380,120

9 Claims. (Cl. 200—121)

This invention relates to new and useful improvements in indicator fuses.

It is the object of the present invention to provide an indicator fuse of the screw-plug type which can be easily assembled from simple and preferably standard parts, and which will withstand the strains set up by the fusing of the customary fusible link.

One embodiment of the invention is illustrated in the drawing in which Fig. 1 is a vertical cross-section of an assembled plug fuse;

Fig. 2 is a plan view of the plug base before assembling; and

Figs. 3 and 4 are vertical cross-sections of modified mounting arrangements for the resistor used in the plug fuse.

Referring now to the drawing, 1 is a substantially cup-shaped base having a central perforation 2 through its bottom. The inside of the base is hollowed out and this hollowed-out portion together with a corresponding hollowed-out portion in a top or cover 3 form an unobstructed explosion chamber. The base is provided below its lip 4 with an annular flange 5 projecting to the outside. The bottom of the hollowed-out portion of the base 1 is as shown in Fig. 1 at 6 sloping down toward the central perforation 2. However, as best shown in Fig. 2, this is true only for the central sector of the base, the two lateral sectors 7 and 8 being level and, therefore, forming two raised platforms with respect to the central sector. At one point, the internal side wall of the base 1 is provided with a vertical groove 9. The width of the groove is the same as the width of the sloping portion 6 in the base and it extends along the straight portion of the said wall up to the lip.

Within the groove 9 fits an oblong evacuated glass cylinder 10 enclosing two electrodes 10a in a neon atmosphere, or a suitable incandescent illuminant. The lower end of the gaseous discharge lamp hangs within the compartment between shelves 7 and 8. The discharge lamp is kept in its upright position by a copper bar or rivet 11 which although shown separated may at a few points contact with the side wall of the lamp envelope 10 and keeps it nested within the groove 9. The rivet 11 does not press the lamp 10 but the spacing between the rivet and the lamp is never so great as to permit the lamp to fall out of the groove 9.

The flange 5 of the base has a downwardly tapering perforation 12 into which is placed a correspondingly tapered resistor 13, the lower end of which protrudes beyond the lower face of

the flange 5. The resistor 13 is held within the flange 5 by the lip of cover 3 seated on the flange 5 of the base. The outside of side walls 14 of the cover has formed therein a helical ridge 15 on which is screwed a screw-threaded brass shell 16. The lower end of the shell is turned in at 17 engaging the lower face of flange 5 of base 1. Thus the shell 16 serves firmly to clamp together top 3 and base 1 and makes contact with the resistor 13.

The copper rivet has a head 18 which engages the bottom of base 1. When the copper rivet is pushed through the central perforation 2 in the base, small projections 19 within the opening will be broken off so as to insure a firm fit between the rivet and the base. The upper end of the rivet 11 terminates near the top of the explosion chamber and it has a V-shaped cut. Into this V are soldered one end of a lead-in wire 20 connected with one of the electrodes 10a and passing to the outside through the glass seal 25 of the tube, and one end of a fusible link 21. The fusible link 21 is bent down towards the lip 4 of the base, then bent around the contacting lips of base 1 and cover 3 and bent up to lie within a vertical groove 22 cut in the outside surface of side wall 14 of cover 3.

The other electrode 10a of the gaseous discharge tube is also provided with a lead-in wire 23 which is bent down between the contacting lips of cover 3 and base 1 and held in contact with the resistor 13.

In assembling the device, first the rivet 11 is inserted through base 1. The lamp 10, resistor 13, and link 21 are then put in place. Since the upper end of the rivet 11 is clear of all obstruction and on a line with the seal 25, lead-in wire 20 and the fusible link 21 can be easily soldered to it. The upper ends of fusible link 21 and lead-in wire 23 have been bent into the shapes shown before they are placed in the chamber. The cover 3 seated on the base, and the screw shell 16 put in place and by a drop of solder in a groove of cover 3, as indicated at 22, anchored in place.

As well known, the fusible link 21 is usually formed of a strip of zinc approximately $\frac{1}{8}$ of an inch wide having a weakened or bridge portion of approximately $\frac{1}{8}$ of an inch. This weakened portion is located in the downwardly sloping part of the link approximately midway between the lip 4 and the rivet 11.

When the plug is screwed into a fuse socket by means of its shell 16, the latter will make electrical contact with one terminal of the power

supply circuit and the head 18 of the rivet 11 with the other in a central contact of the socket. Normally, therefore, a connection will be established between the two sides of the circuit through rivet 11, link 21, and shell 16. If there is an excessive surge of current or short circuit, then the link 21 will become fused and open the circuit above traced. When this happens, the gaseous discharge lamp will light up over a path-including rivet 11, lead-in wire 20, electrodes 10a, lead-in wire 23, resistor 13, shell 16. Owing to the high resistance of this path, normally current flows over the low resistance path formed by link 21, but when the link 21 breaks, then can flow only over the high resistance path and the lamp will light up.

The cover 3 is made of glass or other transparent or translucent material so that the lighting of lamp 10 can be noticed from the outside and the fuse replaced by a new fuse. To aid in this, the end of the lamp provided with the seal 25 is turned up. The seal 25 acts as a lense. Furthermore, since the customary getter blackens the walls of the glass envelope, I place it (not shown) near the lower end of the envelope 10 so as not to reduce light radiation through the cover 3.

Owing to its position, the rivet 11 not only holds the lamp 10 in place, but protects the walls thereof from particles of zinc that might otherwise rupture it when the link 21 fuses.

The amount of zinc that may become vaporized is a minimum consistent with a rivet 11 which is long enough to permit easy connections and to afford protection for the lamp. Thus, the pressure set up within the explosion chamber is slight and will not be such as to rupture the fuse or any part thereof. The fit between cover 3 and base 1 is loose enough so that the pressure that is built up when the link fuses will slowly be dissipated.

In the modification shown in Fig. 3, base 1a contains in its flange 5a, not a tapered hole but one, 12a, the sides of which are straight. Within this hole fits a straight-sided resistor 13a contacting with turned-in flange 17a of a screw-threaded shell 16a.

In another modification shown in Fig. 4, the flange 5b of base 1b has an opening 12b formed in its bottom surface into which leads lead-in wire 23b through a small hole provided in the top surface of flange 5b. The resistor 13b is held within the cavity by flange 17b of screw-threaded shell 16b.

Obviously, many other modifications will suggest themselves to one skilled in the art without departing from the spirit of the invention defined in the claims.

What is claimed is:

1. In a fuse; a base and a cover therefore enclosing an explosion chamber; a first outside contact for said fuse projecting through said base into the chamber; an electric lamp in said chamber partly covered by said contact having two lead-in wires, one of which is connected with said contact; a fusible link in said chamber connected with the contact; and a second outside contact for said fuse connected with the fusible link and the other lead-in wire.

2. In a plug fuse; a base and a cover therefore enclosing an explosion chamber; a rivet projecting through said base into the chamber; an electric lamp in said chamber having two lead-in wires, one of which is connected with the rivet; a resistor in contact with the other lead-in wire;

a fusible link in said chamber connected with the rivet; and a metal shell on the outside of said base and cover connected with the fusible link and the resistor.

3. In a fuse; a base and a cover therefore enclosing an explosion chamber; a bar forming one contact of the fuse projecting through said base into said chamber; an electric lamp in said chamber and held against a wall thereof by said bar, said lamp having two lead-in wires one of which is connected with said bar; a resistor connected with the other lead-in wire; a fusible link in said chamber having one end connected with the bar and the other end projecting to the outside; and a second contact for said fuse contacting with the projecting end of the fusible link and the resistor.

4. In a plug fuse; a base and a cover therefore enclosing an explosion chamber; a rivet projecting centrally through said base and into said chamber; an electric lamp in said chamber and held against a wall thereof by said rivet, said lamp having two lead-in wires projecting through its upper end and one of which is connected with the upper end of the rivet; a resistor connected with the other lead-in wire; a fusible link in said chamber having one end connected with the rivet and the free projecting to the outside; and a screw-threaded metallic shell contacting with the projecting end of the fusible link and the resistor.

5. In a fuse; a base and a transparent cover therefore enclosing an unobstructed explosion chamber; a rivet constituting a first outside fuse contact projecting centrally through said base and into said chamber above said base; an electric lamp in said chamber and held against a wall thereof by said rivet, said lamp having two lead-in wires projecting through one end, one of which is connected with the rivet; a resistor connected with the other lead-in wire; a fusible link in said chamber having one end connected with the upper end of the rivet and the other end projecting to the outside; and a second outside fuse contact contacting with the projecting end of the fusible link and the resistor.

6. In a plug fuse; a base and a transparent cover therefore enclosing an unobstructed explosion chamber; a rivet projecting centrally through said base and into said chamber above said base; an electric lamp in said chamber and held against a wall thereof by said rivet, said lamp having two lead-in wires projecting through one end on a level with the upper end of the rivet with which one wire is connected; a resistor mounted on the outside of said base and connected with the other lead-in wire; a fusible link in said chamber having one end connected with the upper end of the rivet and the other end projecting to the outside; and a screw-threaded metallic shell contacting with the projecting end of the fusible link and the resistor, and clamping the base and cover together.

7. In a plug fuse; a centrally perforated base having an annular flange projecting outward from the side; a resistor mounted in the flange; a transparent cover for said base and enclosing therewith an explosion chamber; an electric lamp having lead-in wires projecting through a glass seal forming a prism at one end thereof and standing partly within a groove in the side wall of the base with said seal near the roof of the chamber, one of said lead-in wires extending into contact with said resistor; a rivet projecting centrally through the base in contact through part of its length with the lamp to hold it with-

in said groove, and with its upper end in alignment with the lamp seal; a fusible link in said chamber having one end with the second lead-in wire connected to the upper end of the rivet and the other end projecting to the outside of the chamber; and a screw-threaded metallic shell engaging the outside of the cover and contacting with the free end of the fusible link, and having a turned-in flange engaging the flange in the base and the resistor.

8. In a plug fuse; a base and a cover enclosing an explosion chamber; an oblong electric lamp in said chamber; a rivet projecting through the base into the chamber and holding said lamp upright therein; a fusible link in said chamber connected with the rivet with which said lamp is also connected; and a screw-threaded metallic shell on the outside of the cover and contacting with the fusible link; and resistor connecting said shell with said lamp.

9. In a plug fuse; a centrally perforated cup-shaped base of insulating material having an annular flange projecting outward from the side and provided with a downwardly tapered perforation, the bottom of the cup sloping towards the central perforation except for two opposite shelves, and the side walls being straight except for a vertical groove in alignment with the space between the two shelves; a tapered resistor in the perforation of the flange; a transparent cover for said base also cup shaped and with its lip seated on said flange and with a helical ridge formed in the outside of its side wall, the cavities within the cover and base forming an ex-

plosion chamber; a gaseous discharge lamp having an oblong glass envelope enclosing two electrodes with lead-in wires projecting through a glass seal forming a prism at one end of the envelope, the lamp standing partly within the groove in the side wall of the base with said seal near the roof of the cover, the other end of the lamp projecting between said shelves, one of said lead-in wires extending into contact with said resistor between the lips of the base and top; a copper rivet projecting centrally through the base in contact through part of its length with the lamp to hold it within said groove, and having a head engaging the bottom of the base and a notched end in alignment with the lamp seal; a fusible link having one end with the second lead-in wire soldered within the notched end of the rivet and the other end projecting between the lips of the cover and base into a vertical groove formed in the outside of the cover side wall, the portion of the link between the rivet and the lips sloping downwards and being weakened; and a screw-threaded metallic shell engaging the helical ridge in the top and contacting with the free end of the fusible link, and having a turned-in flange engaging the bottom of the flange in the base and the resistor projecting therethrough, said shell constituting the sole means to the base and top together and serving to engage the screw-threaded part of a lamp socket, the central contact of which is engaged by the head of the rivet.

HERMAN ALTSCHULE.