July 2, 1940. J. T. VATAVA 2,206,794

ELECTRIC FUSE

Filed Feb. 16, 1939

Fig. 3.

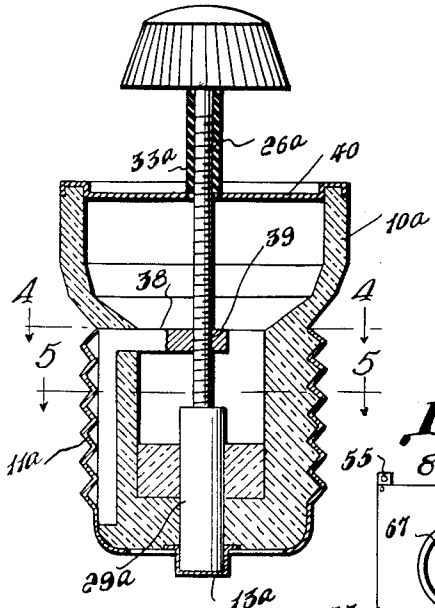


Fig. 4.

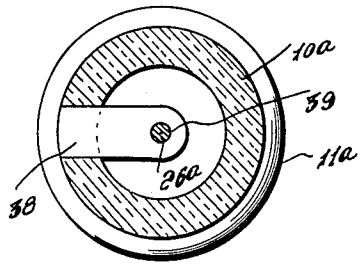


Fig. 5.

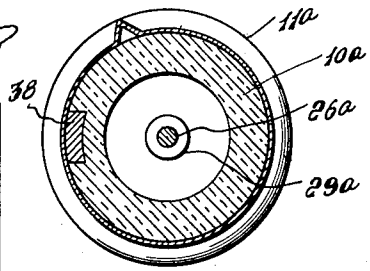


Fig. 7

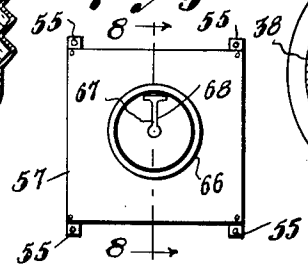


Fig. 6.

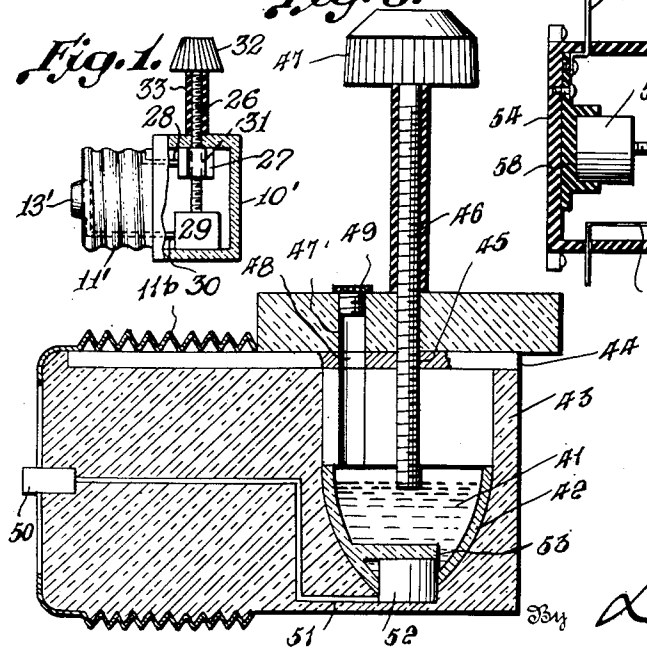


Fig. 1.

Fig. 8.

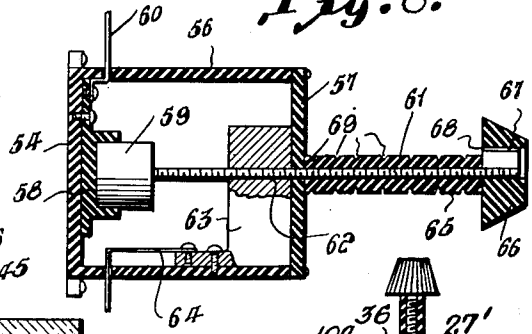
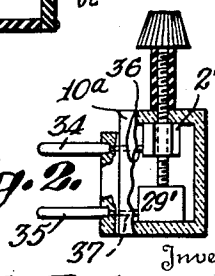


Fig. 2.



Inventor

J. T. Vatava

By L. F. Randolph

Attorney

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ELECTRIC FUSE

Joseph T. Vatava, Cleveland, Ohio

Application February 16, 1939, Serial No. 256,813

8 Claims. (Cl. 200—125)

This invention relates to an electric fuse for an overload circuit breaker and it aims to provide a novel construction which is adjustable for immediate reuse after blowing or interruption of an electric circuit wherein it is used.

Another object is to provide such a fuse structure having a fuse member adapted to contact with an electrode, which contact is destroyed by a slight melting or evaporation of the fuse at the zone of contact when the short circuit occurs, and which fuse is screw threaded or otherwise adjustable so that it may be thereafter immediately adjusted to again establish the contact and accordingly the electric circuit.

A further object is to provide such a construction wherein the fuse element of metal, preferably the soft metals such as lead, aluminum, Wood's metal because of their lower melting points, will establish the aforesaid contact with a carbon element or equivalent.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawing illustrating a number of operative embodiments of the invention.

In said drawing:

Figure 1 is a view partly in elevation and partly in section through one form of the fuse;

Figure 2 is a view partly in elevation and partly in section through a modified form of fuse;

Figure 3 is a vertical sectional view taken substantially centrally through another modified form of the invention;

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 3;

Figure 6 is a central vertical sectional view through a further modified form of the invention;

Figure 7 is a front elevation of a final form of the invention, and

Figure 8 is a longitudinal sectional view taken on the line 8—8 of Figure 7.

Referring more specifically to the drawing, one form of the invention is shown in Figure 1, being an L-type of fuse plug. In this form, a fuse strip or element is designated 26 and is in the form of an externally screw threaded rod, being of any suitable metal, but preferably a soft metal such as lead, aluminum, Wood's metal or the like, because of their low melting points. The body in this form is designated 10', having a screw threaded conductor shell 11' thereon and a cap 13' thereon, the shell 11' and cap 13' being conductors, with the shell 11' threaded to detachably connect with a conventional socket. A nut 27 is stationarily secured within the body 10', being of conducting metal and having a conductor 28 connecting it to the shell 11'. An electrode or contact block 29 is rigid in the base of body 10' and a conductor 30 connects the same to the cap 13'. Body 29 may be of any suitable material and for instance is preferably of carbon and when the circuit is closed, the fuse member 26 contacts at its lower end with such block 29. The threads of the screw member 26 engage those in the bore 31 of fixed nut 27 and the screw fuse 26 is operable through the turning of a knob 32 thereon, located exteriorly thereof. Fuse strip 26, exteriorly of the body 10', may be surrounded by a tube 33 of suitable insulation, such as a flexible rubber tube, which will collapse or yield to permit inward adjustment of the screw 26.

In the operation of this form of Figure 1, a short circuit will burn away that portion of the lower end of fuse strip 26 contacting the carbon block 29, thereby opening the circuit. Such circuit may be instantly closed through the adjustment of the knob 22 which screws the fuse member 26 again into contact with the block 29.

The form of Figure 2 is substantially like that of Figure 1. It differs therefrom with respect to prong contacts 34 and 35, adapted to engage in a wall receptacle or otherwise, instead of having screw connection with the receptacle or socket and such prongs correspond in the circuit to the shell 11' and cap 13', respectively. The insulating body, here shown at 10a is advantageously shaped differently from that at 10'. Prong 34 has a conductor 36 leading therefrom to a nut 27' corresponding to that at 27 and the prong 35 has a conductor 37 leading therefrom to the block 29' corresponding to that at 29.

In Figures 3 to 5, a screw rod or strip form of fuse is employed at 26a of the same material as that at 17 and 26, which co-acts with a block or contact 29a, preferably of carbon, in the same manner that the fuse member 26 co-acts with the block 29 in the form of Figures 1 and 2. This form has a body 10a of insulation adapted to be screwed into a socket of a conductor band or shell 11a, disposed in conducting relation with an L-shaped conductor bracket 38 which has a screw threaded opening 39 in which the fuse rod 26a is adjustably threaded. A cap 13a corresponding to that at 13', is of conducting material and in conducting relation with the carbon block 29a. A closure 40 may be provided over the upper end of body 10a and a collapsible insulating

tube 33a, like that at 33, may surround the fuse rod 26a exteriorly of body 10a.

In Figure 6, I have shown an example of the practice of the invention with an electrode of mercury or quicksilver, the latter being shown at 41 and suitably retained in a well 42 within a body of insulation 43. Such body 43 has a conductor shell 11b of screw form for engagement with a socket which is in conducting relation with a bar conductor 44 embedded in the body 43 and having a screw threaded opening at 45 operatively engaged by the screw threads of a fuse rod 46 similar to those employed at 26 and 26a and of the same material as such fuse rods. Fuse rod 46 by means of a knob 47 is adjustable and its inner end co-acts with the mercury electrode 41 in the same manner as the rods 26 and 26a co-act with their carbon contacts 29 and 29a, respectively, more specifically, the adjacent end of the fod 46 burning away upon short circuit, at the zone of engagement of contact with the mercury 41, and later the rod being screwed to again contact the mercury and establish the circuit, through operation of knob 47. The mercury may be supplied to the well 42 through alined passages 47' and 48 in the body 43 and bar 44 and such passage is normally closed by a screw plug or any equivalent at 49.

Since this form of the invention is also of the screw type, it has a central contact 50 and a conductor 51 leads therefrom to a conductor 52, exposed in the mercury 41 and having its upper surface protected by suitable insulating material 53 extending inwardly from the wall of the well 42, and preventing direct contact of the fuse rod with the contact or block 52.

In Figures 7 and 8, a form of the invention is shown for a box more like the old type of fuse outlet boxes. This box has an attaching plate at 54 adapted to be fastened to a wall or support as by means of screws or fastenings passed through lugs 55 at the corners thereof. A box section is built from plate 54 by providing a surrounding wall 56 and a rigidly mounted but detachable cover 57. A bracket of insulation 58 carried by the plate 54 mounts a contact block 59 of suitable conducting material and for instance carbon, a wire from one side of the circuit as at 60 being connected to the bracket 58. Block 59 is engaged by a fuse rod 61 of the same material as the strips or rods 17, 26, 26a and 46 and adapted to function in a similar manner with respect to the block 59. Rod 61 has screw threads engaging those in an opening 62 of a conductor bracket or block 63 within and suitably insulated from the box or receptacle and adapted to have a conductor for the other side of the circuit as at 64 connected thereto. Rod 61 exteriorly of the box or receptacle is surrounded by a tube 65 of insulation, equipped with an operating knob 66 and it is turnable with the rod since the latter has an enlargement 67 engaging a slot 68 of the knob. The tube 65 on its exterior is preferably weakened at intervals or provided with indications as at 69 enabling portions of the tube 65 at the inner end, to be removed by cutting or fracture, when necessary, to permit inward adjustment of the fuse rod 61. Such tube 65 may be made of hard or elastic rubber or any equivalent material.

Various changes may be resorted to provided they fall within the spirit and scope of the invention.

I claim as my invention:

1. A fuse structure of the class described having a contact, a fuse member in engagement with said contact and adapted to burn at the zone of engagement upon short circuit, and means whereby the fuse member may be moved into contact thereafter with the contact, comprising screw threads on the fuse member, and a conductor on the contact operatively engaged by the screw threads.

2. A fuse structure of the class described having a contact, a fuse member in engagement with said contact and adapted to burn at the zone of engagement upon short circuit, means whereby the fuse member may be moved into contact thereafter with the contact, comprising screw threads on the fuse member, a conductor on the contact operatively engaged by the screw threads, said contact being of carbon.

3. A fuse structure of the class described having a contact, a fuse member in engagement with said contact and adapted to burn at the zone of engagement upon short circuit, means whereby said engagement of the fuse member and contact may be reestablished thereafter, said contact being of quicksilver.

4. A fuse structure of the class described having a contact, a fuse member in engagement with said contact and adapted to burn at the zone of engagement upon short circuit, means whereby said engagement of the fuse member and contact may be reestablished thereafter, a body mounting the contact member and fuse member, the latter extending exteriorly of the body, and a collapsible insulating member on the fuse member exteriorly of the body.

5. A fuse structure of the class described having a contact, a fuse member in engagement with said contact and adapted to burn at the zone of engagement upon short circuit, means whereby said engagement of the fuse member and contact may be reestablished thereafter, a receptacle mounting the contact member and fuse member, insulating means about the screw member exteriorly of the receptacle, said insulating means having indications thereon to facilitate fracture to enable adjustment of the fuse member.

6. A fuse structure of the class described having a body, conductor means extending laterally therefrom for attachment in an electric circuit, a separated nut and contact in the body in circuit with the conductor means, a fuse member screw threaded in said nut and engageable with said contact, said fuse member being disposed at an angle to said conductor members.

7. A fuse structure of the class described having a body, conductor means extending laterally therefrom for attachment in an electric circuit, a separated nut and contact in the body in circuit with the conductor means, a fuse member screw threaded in said nut and engageable with said contact, said fuse member being disposed at an angle to said conductor members, and extending exteriorly of the body, and collapsible insulation about the fuse member exteriorly of the body.

8. A fuse structure of the class described having a body, a well therein containing quicksilver, a conductor bar in said body, a contact in said well exposed to the quicksilver, a fuse rod screw threaded to said conductor member and engageable at its inner end with said quicksilver, said body and conductor member having a passage therethrough enabling supply of quicksilver to said well, and a closure for said passage.

JOSEPH T. VATAVA.