Aug. 21, 1934. A. G. STEINMAYER 1,970,634

LIQUID FUSE

Filed April 18, 1932

Fig. 1

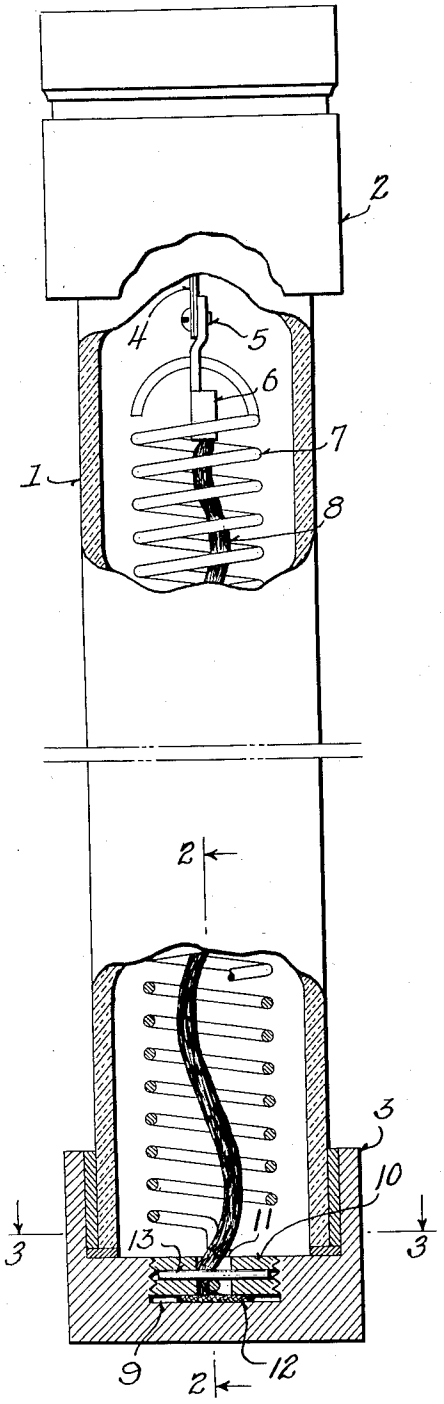


Fig. 2

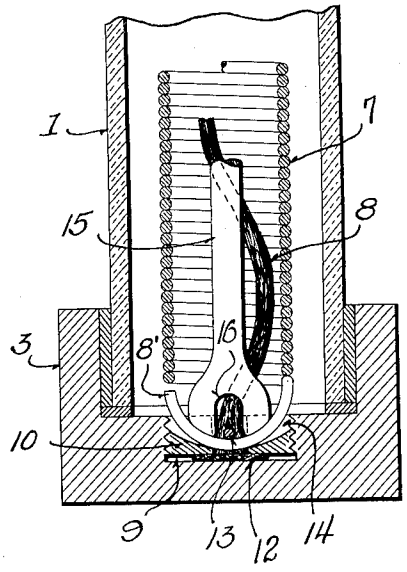
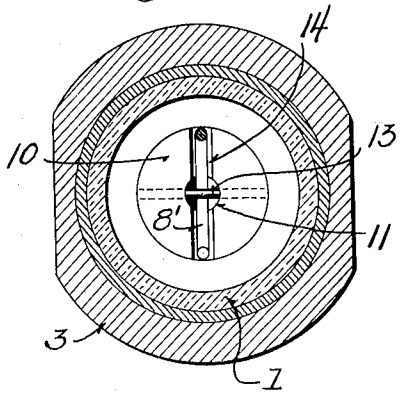


Fig. 3



Inventor

Alvin G. Steinmayer

By

Arthur R. Woolfolk Attorney

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LIQUID FUSE

Alwin G. Steinmayer, Milwaukee, Wis., assignor to Line Material Company, South Milwaukee, Wis., a corporation of Delaware

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4 Claims. (Cl. 200—117)

This invention relates to liquid fuses.

In liquid fuses it is the usual practice to provide an upper and lower contact between which a tube of insulating material, such as glass, is positioned and then fill the tube with an arc extinguishing liquid. Within the tube it is the regular practice to provide a fuse which is pulled downwardly by means of a spring, the fuse being connected to the upper contact and the spring connected to the lower contact.

A flexible leader is also provided between the lower contact and the lower end of the fuse so as to relieve the spring of the necessity of carrying the current.

Objects of this invention are to provide a novel means of attaching the spring and the flexible leader to the lower contact, so that the attachment may be effected with the utmost ease, and also so that a new leader or a new spring may be substituted for the old leader or old spring if at any time such a change should become necessary, the construction permitting the ready detachment or attachment of the spring and leader even after the body portion of the liquid fuse is completely assembled.

Further objects are to provide a means for attaching a leader and a spring in a liquid fuse to the lower contact, which means may be manipulated through the agency of a special tool or by means of an ordinary screw driver having a relatively long shank so as to provide the utmost facility in attaching the leader and spring to the lower contact either during the initial assembly or at any time that it becomes necessary to repair the device.

Further objects are to provide a screw plug which clamps the lower end of the leader tightly against the lower contact and thus secures an excellent electrical connection between the leader and the lower contact, and which is provided with means for receiving the lower end of the tension spring to thereby securely hold the tension spring in place in a reliable manner, such screw plug being readily manipulable either at the initial assembly or at any time that it may be desired to repair the fuse or interchange parts thereof.

An embodiment of the invention is shown in the accompanying drawing, in which:

Figure 1 is a side elevation, partly broken away, showing a liquid fuse with the attaching means in place.

Figure 2 is an enlarged sectional fragmentary view on the line 2—2 of Figure 1.

Figure 3 is an enlarged transverse sectional view on the line 3—3 of Figure 1.

Referring to the drawing, it will be seen that the liquid fuse comprises the insulating tube 1 formed of glass or other material, to which an upper and lower contact 2 and 3 are secured. These contacts or terminals are formed of metal and the upper contact is connected to the fuse link 4 in any usual manner (not shown). The lower end of the fuse link 4 is secured in any suitable manner, as by means of the bolt 5, to a fitting 6 into which the upper looped end of the tension spring 7 is hooked. This fitting is also tightly clamped to the upper end of the flexible conducting leader 8.

The lower contact 3 is provided with a cylindrical depression or recess 9 which is threaded and which receives a threaded clamping plug 10. This clamping plug 10 is provided with a central aperture 11 through which the lower end of the leader 8 extends. The leader is provided with a bunched or folded lower end 12 which is clamped below the plug 10 and tightly against the adjacent portion of the lower contact 3, as shown clearly in Figures 1 and 2.

The metal plug or clamping plug 10 is provided with a transverse pin 13 which extends diametrically through the plug and which anchors the lower end of the spring 7, as clearly shown in all three views of the drawing. The pin is prevented from sliding out of place, as is obvious from Figure 1, as it cannot slip outwardly from the plug when the plug is screwed into place. Thus the spring is securely mechanically anchored in place, and in addition the flexible leader is tightly clamped in place, thereby affording an excellent electrical connection between the flexible leader and the lower contact.

The plug 10 is provided with a transverse slot 14 which may have a rounded bottom if desired, as shown in Figure 2, although this is not essential. For instance, the slot 14 may be milled out or otherwise formed with the utmost ease. This slot accommodates the lower loop 8′ of the spring 7, as most clearly shown in Figure 2. In addition to this the slot will receive the lower end of a forked tool 15, the tool being provided with a cut out or notch in its central lower portion, as indicated at 16, so as to freely straddle the lower portion of the leader and the transverse pin 13.

It has been found, however, that an ordinary screw driver can be used to screw the plug into place or to remove it by slightly compressing the portion of the flexible leader 8 which is adja-

cent the plug, as there is considerable room in the central aperture 11, of the plug 10. However, a forked tool does not in any way distort or compress the lower portion of the flexible leader 8, as is apparent from an inspection of Figure 2.

It is clear that the plug may be screwed into place during the assembly of the device or may be removed and replaced even after the device has been completed or is in service as the device may be removed from its holder (not shown) and the upper cap removed to permit the entry of a tool such as a screw driver.

It is clear that this invention provides a very simple and effective means to mechanically anchor both the flexible leader and the spring to the lower contact and liquid fuse, and in addition affords an excellent electrical connection between the flexible leader and the lower contact.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. A liquid fuse comprising an upper contact and a lower contact, a tubular body portion located between said contacts, said lower contact having an internally threaded aperture formed therein, a fuse link having its upper end secured to said upper contact, a spring having its upper end connected to the lower end of said fuse link, a screw threaded plug connected to the lower end of said spring and screwed into said internally threaded aperture of said lower contact, said plug having an aperture therein and said spring having a lower looped portion positioned within the aperture in said plug, and a pin carried by said plug and extending transversely of the aperture of said plug and through the lower looped portion of said spring, whereby said spring is detachably connected to said lower contact.

2. A liquid fuse comprising an upper contact and a lower contact, a tubular body portion located between said contacts, said lower contact having an internally threaded aperture formed therein, a fuse link having its upper end secured to said upper contact, a spring having its upper end connected to the lower end of said fuse link, and a screw threaded plug connected to the lower end of said spring and screwed into said internally threaded aperture of said lower contact, whereby said spring is detachably connected to said lower contact, said screw threaded plug having a transverse slot formed therein whereby said plug may be manipulated by a suitable tool.

3. A liquid fuse comprising an upper contact and lower contact, a tubular body portion located between and carried by said contacts, said lower contact having an internally threaded aperture formed therein, a screw plug screwed into said aperture and having a transversely extending pin and having a central aperture therethrough, a fuse link having its upper end connected to said upper contact, and a flexible leader and a spring each having its upper end connected to the lower end of said fuse link, said spring having its lower end connected to the transverse pin of said plug, and said flexible leader passing through the aperture in said plug and clamped between the bottom of said plug and the adjacent portion of said lower contact.

4. A fuse having spaced contacts, a fuse link and a flexible leader electrically connecting said contacts, one of said contacts having an internally threaded hole provided with a closed bottom, and a plug screwed into said hole, said plug having an aperture therethrough through which said flexible leader passes, the end of said flexible leader being clamped between said plug and the bottom of said hole, said plug having a transversely extending, tool receiving slot on the side opposite the bottom of said hole.

ALWIN G. STEINMAYER.