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L. L. STOFFEL

2,157,777

RESISTOR

Filed April 8, 1937

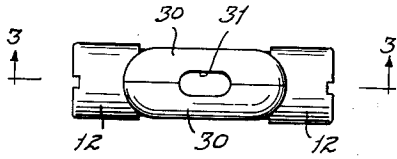


Fig. 1

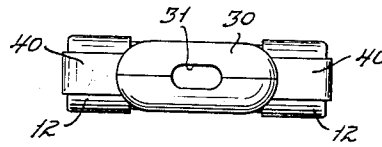


Fig. 7

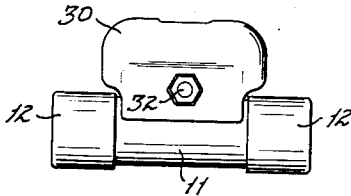


Fig. 2

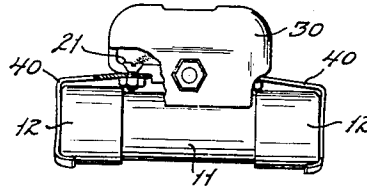


Fig. 8

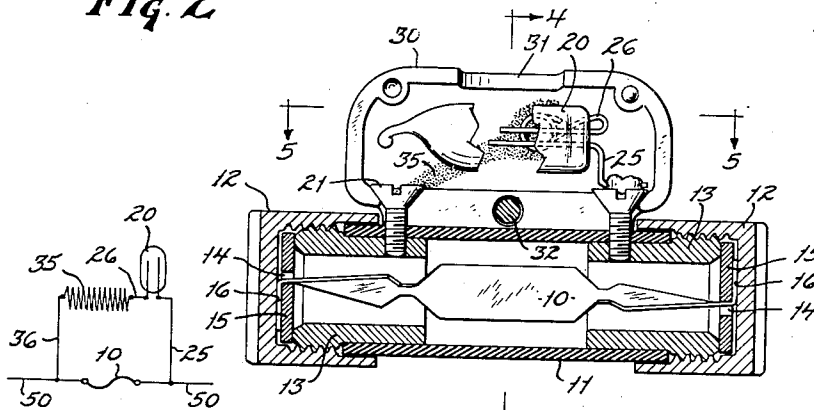


Fig. 3

Fig. 6

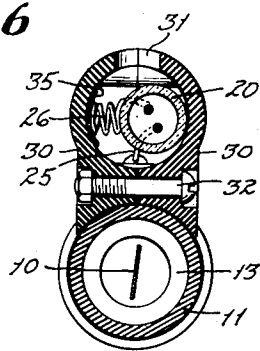


Fig. 4

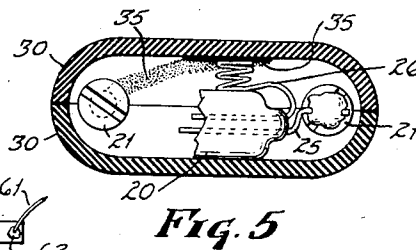


Fig. 5

Fig. 9

INVENTOR.
LESTER L. STOFFEL
BY
Bates, Golrick, & Teare
ATTORNEYS

UNITED STATES PATENT OFFICE

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RESISTOR

Lester L. Stoffel, Lakewood, Ohio, assignor to
Ohio Carbon Company, Cleveland, Ohio, a corporation of Ohio

Application April 8, 1937, Serial No. 135,759

1 Claim. (Cl. 201—63)

This invention relates to resistors that are adapted to be used in connection with indicators for determining the flow of current through an electrical circuit. Indicators of this type may be used in conjunction with fuses, electrical heating appliances, switch boxes, or in any arrangement wherein an electrically illuminated device is utilized as an indicator for the electrical condition of a circuit. Indicating lamps of the character described usually require a resistor in the lamp circuit but inasmuch as the resistors seldom exceed one-half inch in length and one-quarter inch in width, the practice heretofore has been to utilize a carbon-coated strip to the ends of which connecting leads have been attached. Considerable difficulty has been experienced however in making a rigid connection between the leads and the resistor strip, particularly where the practice has been to attach the wires to the strip by means of eyelets.

An object of my invention is to incorporate a resistor in the circuit of the indicator so as to eliminate the need for attaching connecting leads to it by means of eyelets or other equivalent devices. As applied to an indicator for a fuse, for example, my invention is well adapted for use not only in connection with a lamp housing that is made a permanent part of the fuse but also for those which are detachably connected to a fuse. In the latter instance, the housing may be affixed to existing fuses without any modification in the construction thereof.

A further object of my invention is to provide means for connecting leads to a resistor which will obviate the necessity for using any mechanical fastener such as an eyelet which will operate to hold the leads in rigid electrical connection to the resistor.

In the drawing I have illustrated my invention only in connection with fuses but it is to be understood that it is equally well adapted for use with other appliances.

Referring now to the drawing, Fig. 1 is a top plan view of a fuse embodying my invention where the lamp housing is made a permanent part of the fuse construction; Fig. 2 is a side elevation of a fuse shown in Fig. 1; Fig. 3 is a vertical section on an enlarged scale taken on the line 3—3 in Fig. 1; Figs. 4 and 5 are sections taken on planes indicated by the correspondingly numbered lines in Fig. 3; Fig. 6 is a wiring diagram; Fig. 7 is a top plan view of a fuse which is equipped with a detachable lamp housing; Fig. 8 is a side elevation partly in section of the fuse that is shown in Fig. 7, and Fig. 9 is a top plan

view of a resistor having leads attached thereto in accordance with my invention.

In the drawing, a conventional fuse is indicated as having a fuse element 10 which is suspended within a casing 11 of insulating material. The casing in turn is closed at its ends by metallic caps 12 which are internally threaded to receive metallic sleeves 13. The fuse element may be held in suspended position by extending the end portions thereof through openings 14 in washers 15, and then bending the ends as at 16 so as to make a firm electrical contact with the inner walls of the caps; thus, as the caps are threaded onto the sleeves, the fuse is locked into place and the casing is simultaneously sealed.

To indicate the condition of the fuse, provision is made for mounting a glow lamp 20 upon the fuse casing and for connecting the lamp electrically across the fuse terminals. This may be accomplished by means of threaded members 21 which extend through openings in the casings 11, and which engage threaded openings in the sleeves 13. One lead 25 of the lamp may be soldered to one of the fasteners 21, while the other lead 26 may be electrically connected through the resistor to the other member 21. A divided casing 30 of electrical insulating material may then house the lamp and resistor, and may have a window 31 through which the condition of the lamp may be observed. The casing halves may in turn be fastened together by means of a bolt and nut as indicated at 32.

The resistor 35 which I have devised for use in the lamp circuit embodies a conductive high resistive material, which is preferably applied to the inner wall of the casing 30 along a line that extends between the member 21 and the lamp lead 26. The material may comprise a carbonaceous mixture, which heretofore has been commonly used for resistor construction formed in the consistency of a paint and applied preferably with a brush. Electrical contact between the resistor and the threaded member 21 is obtained by applying the material on that part of the housing cavity, which is engaged by the head of the member 21, while contact with the lead 26 may be obtained by coiling the end of the lead and utilizing a housing which fits snugly around the lamp, as a result of which, pressure contact is made between the coiled part of the lead 26 and the resistive material when the casing halves are clamped together. This arrangement obviates the necessity for utilizing a mechanical connection between the lead and the resistive material.

The modification of Figs. 7 and 8 illustrates a

detachable lamp casing, which embodies the same construction of lamp resistor and lamp housing as that illustrated in connection with the fuse construction of Fig. 3. Accordingly, the

5 parts which are similar in construction are designated with the same reference characters. The modification differs however from that form heretofore described, in that the bolts 21 terminate short of the casing 11 and are attached to straps 40 which in turn are adapted to be
10 slipped over the ends of the fuse caps. The straps may comprise strips of conductive material that are shaped to hook over the ends of the fuse caps, as is shown particularly in Fig. 8.
15 Such arrangement enables electrical contact to be made with the fuse caps without interfering with the connection that is normally made between the caps and the spring clips on the fuse box panel.

20 In Fig. 6 the wiring diagram shows the circuit arrangement wherein the line in which the fuse is connected is designated 50 and the fuse element is designated 10. The lamp 20 is connected across the line in series with the resistor
25 35 as a by-pass around the element 10 through the lines 25, 26 and 36. The resistivity of the resistor is such that current will flow more readily to the fuse element so long as it is not ruptured during which time the glow lamp will not
30 be illuminated. When the fuse element is ruptured, however, then the current will flow through the lamp and illuminate it thereby producing a visible indicator by means of which the damaged fuse can readily be detected. I have
35 found for example that a resistor having a resistance of 100,000 ohms will work satisfactorily for a 110/220-volt line.

40 An advantage of my invention is the fact that I have eliminated the necessity for making mechanical connections to resistors of extremely small size and have thereby greatly reduced the cost of manufacture and facilitated the assembly operation. While I have illustrated the resistor as being applied in the form of a coated or paint-

ed strip to the lamp housing, I may, if desired, apply the strip to any supporting surface that is adjacent to the leads with which it is to be connected.

While I have shown the resistor leads as being 5 connected to the resistor by frictional engagement, I may if desired, attach the leads to the resistor by cementitious electrically conductive material. In such case, the resistor may be made in strip form as at 60 as is shown in Fig. 9 with
10 the leads 61 projecting from the ends thereof. In this case, the leads are brought into contact with the resistive material and then the binding agent is applied thereto as is indicated at 62. The
15 binding agent may comprise a thermal setting resistive material of any well known type, although in some instances a cold setting resistive material may be employed to good advantage. As an example the binding agent may comprise
20 finely divided carbon or finely divided metal, such as copper, either of which is mixed with a phenolic condensation product in finely divided form in the presence of acetone; the mixture being made to a consistency of a paint whereby
25 it may be applied to an article either by a brush or a spray gun.

I claim:—

In a cartridge fuse having a fuse element and current conducting caps electrically connected to the element, a lamp housing associated with the
30 fuse, a lamp within the housing and having leads extending therefrom, means for electrically connecting the leads to the respective caps, a strip of resistive material attached to the inner wall of the housing, one of the leads having the end
35 portion thereof formed in the shape of a spring and bearing against the lamp and said resistive material, so as substantially to hold the lamp against movement within the housing and to
40 make an electrical contact with the resistive material, means for connecting the other lead to one of the caps, and means for connecting the resistive material to the other of said caps.

LESTER L. STOFFEL.