July 4, 1939. L. P. LYON 2,164,658

FUSE INDICATOR AND PULLER

Filed July 2, 1936

Fig. 1

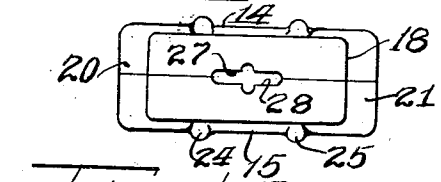


Fig. 3

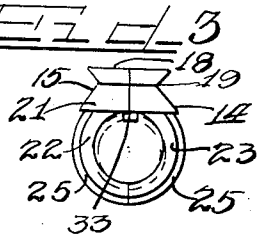


Fig. 2

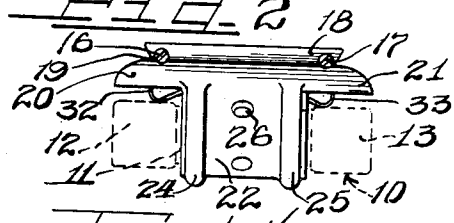


Fig. 4

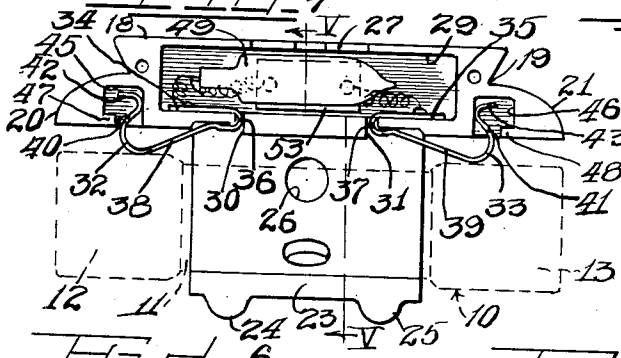


Fig. 5

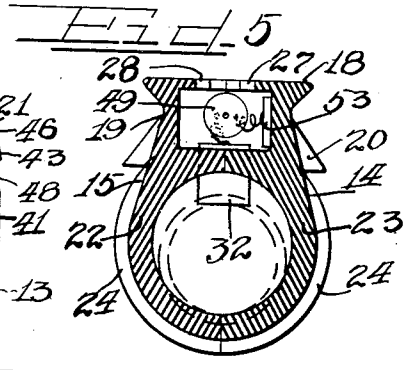


Fig. 6

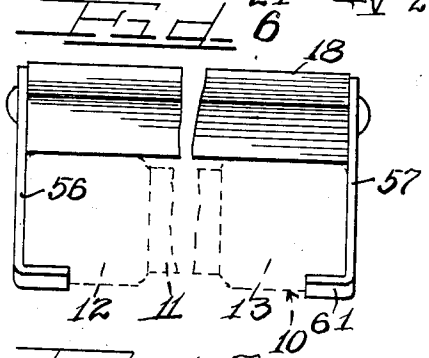


Fig. 9

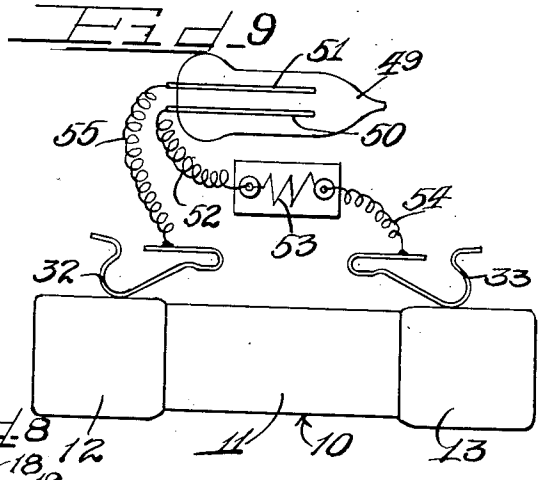


Fig. 7

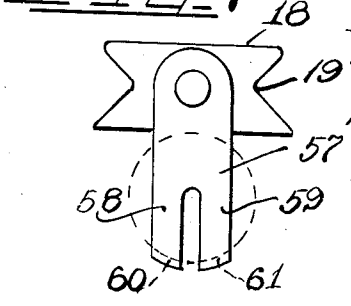
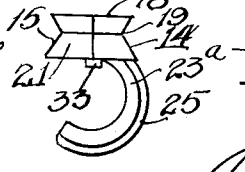


Fig. 8



Inventor

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2,164,658

FUSE INDICATOR AND PULLER

Leon P. Lyon, Miami Beach, Fla.

Application July 2, 1936, Serial No. 88,589

1 Claim. (Cl. 200—121)

The present invention relates in general to an attachment for a fuse, and is more specifically concerned with a combined fuse indicator and puller for use with fuses of the type commonly known as cartridge fuses.

Cartridge fuses of the type commonly used for protecting electrical circuits in general comprise a tubular body of insulating material, such as fiber or the like, within which the fusible element is contained. The fuse element is connected at its respective ends to terminal caps which are fitted over the tubular body and secured thereto by appropriate means. These fuses, as a rule, are made in two types, namely, non-indicating and indicating.

In the first type, it will be readily apparent that it is more or less difficult to determine whether or not the fuse is blown. The second type, which is indicating, contains in its usual construction a label having a small circle thereon. When the fuse is blown, a black spot appears in this circle. While this fuse theoretically provides satisfactory means for indicating the condition of the fuse, in practice it is oftentimes very difficult, if not impossible, to readily detect when the fuse is blown, as the label often becomes torn off or the indicator is damaged in handling, thus making it difficult to know just where to look for the black spot.

Having the foregoing difficulties in mind, it is an object of the present invention to provide a more reliable and positive indicator which is separate and apart from the fuse proper, and which may be readily attached to and detached from a fuse with which it is desired to use the same.

Another objectionable feature of the cartridge fuse is that in order to insert it in the clips of a fuse block or remove it therefrom, there is danger of contacting live parts of the circuit with the result that serious electrical shock may be received.

With a view to protecting a person changing a fuse from the live parts of the circuit, it is contemplated to embody the indicator of the present invention in a fuse puller that is so constructed as to provide a handle or gripping portion upon which a good firm grip of the fingers may be obtained, this handle having a skirt of insulating material of such proportions as to effectively shield the live parts of the fuse and circuit against contact by the fingers, when the fuse is being inserted into or removed from its clips.

A further object of the invention is to provide novel means for removably attaching the fuse puller and indicator of the present invention to a cartridge fuse.

It is also an object of the invention to provide a fuse puller and indicator which may be easily attached to a fuse without the use of tools, and which when so attached will in no way interfere with the use of the fuse for its usual and customary purpose.

Still another object is to provide a device of this character which may be repeatedly used and transferred from one fuse to another.

Other objects and features of the invention will more fully appear from the following detailed description, taken in connection with the drawing which illustrates several embodiments thereof, and in which:

Figure 1 is a plan view of a preferred form of device embodying the features of the present invention;

Figure 2 is an elevational view of the same, showing the device applied to a cartridge fuse;

Figure 3 is an end view of the same;

Figure 4 is an enlarged elevational view of the device, one of the complementary sections of the body shell being removed to disclose the cooperative relationship of the contacts and indicating mechanisms;

Figure 5 is an enlarged transverse sectional view through the device, parts being shown in elevation, taken substantially on the line V—V of Figure 4;

Figure 6 is an enlarged fragmentary elevational view of a modified form of construction;

Figure 7 is an end view of the same;

Figure 8 is an end view showing another modified form of construction; and

Figure 9 is a schematic diagram of the electrical connections between the respective elements of the indicating mechanism.

As shown on the drawing:

Referring to the illustrated embodiments of the present invention, Figures 2 and 6 show the fuse indicator and puller as applied to a cartridge fuse, generally indicated at **10**, this fuse being of the usual construction having a main tubular body portion **11** and end terminal caps **12** and **13**.

The preferred form of the invention, as illustrated in Figures 1 to 5, inclusive, comprise a shell-like body composed of a pair of complementary sections **14** and **15** which are secured together in confronting relationship as by screws **16** and **17**.

The shell body may be constructed of any suitable insulating material, such as Bakelite,

porcelain, glass or other suitable material having proper strength and insulating properties. The two sections of the shell are separately formed and when they are combined, they cooperatively form a finger grip portion or handle 18 which is rectangular in shape. The side of this handle is grooved or beveled, as shown at 19, so that a good grip may be secured thereon with the fingers. The handle portion is extended at the lower portion of the bevel 19 to form a skirt which defines insulating shields 20 and 21 at the ends of the handle. These shields extend outwardly over the fuse caps 12 and 13 and serve to protect a person's fingers from coming in contact with live parts of the fuse, when the handle is gripped.

In the preferred embodiment of the invention, the shell is provided with integrally formed laterally disposed arcuate extensions 22 and 23. These extensions are semi-circular and cooperate to form a ring-shaped sleeve adapted to longitudinally receive the cartridge fuse to which the device is attached. Each of the extensions 22 and 23 is provided with spaced ribs, as shown at 24 and 25, which serve to strengthen this portion of the shell. Since the ring sleeve surrounds the body of the fuse, which under operating conditions may become somewhat heated, the sleeve is provided with a plurality of openings, such as shown at 26, which aid in keeping the sleeve cool.

The uppermost surface of the handle sections is in each case provided with a cut-out portion 27 and 28 which cooperate to form a window, when the sections are secured in assembled relation.

Referring to Figure 4, it will be observed that the interior of each section is provided with a main interior cavity 29 which cooperates with a similar cavity in the other section to provide space for the indicating mechanism. At the bottom of the main cavity, there is provided spaced openings 30 and 31 for receiving therethrough the inner ends of contact members 32 and 33. The inner ends of these contact members are deflected, as shown at 34 and 35, to form U-shaped portions 36 and 37, the legs of which are clamped over the adjacent portions of the shell wall. These contacts are respectively provided with downwardly inclined sections 38 and 39 and terminate in upwardly extending end portions 40 and 41 which respectively are outwardly deflected to form stop engaging projecting portions 42 and 43.

The free ends of the contact members 32 and 33 extend into small cavities 45 and 46 at the respective ends of the shell structure. These cavities are opened towards the lower portion of the housing and define inwardly projecting ledges 47 and 48 which form stops which are engaged by the deflected ends 42 and 43 of the contacts. With this arrangement, downward movement of the free ends of the contacts, these contacts being made of spring material, is limited, but upward movement of the free ends of these contacts is permitted until the free ends engage the upper surface of the cavities 45 and 46.

It will therefore be apparent that when a fuse is longitudinally inserted into the sleeve, as shown in Figure 2, the contacts 32 and 33 will be resiliently depressed, and when the fuse is in proper position, these contacts will respectively engage the terminal cap portions 12 and 13 of the fuse. The spring contacts, in addition, will tend to push the body of the fuse against the supporting sleeve and retain the fuse in proper position, but at the same time enabling the fuse to be readily removed for replacement by another fuse.

The main cavity of the shell contains a small electric lamp 49 which is disposed beneath the window in the handle. This lamp is of the glow type containing spaced electrodes 50 and 51 disposed in an atmosphere of ionizable gas, such as neon. This lamp has one of its terminals connected as by a conductor 52 to one terminal of a resistor 53 which has its other terminal connected by a conductor 54 to the contact 33. The other terminal of the lamp is connected by a conductor 55 to the contact 32.

The resistor 53, which may be from 50,000 to 200,000 ohms, will prevent lighting of the lamp 49 when the fuse is carrying current. However, in the event that the fuse should become opened, due to the flow of abnormal current therethrough, then the lamp with the resistor in series is automatically put into the circuit, with the result that the lamp 49 will glow and indicate through the window 27 to an observer, that the fuse has burnt out and should be replaced.

The fuse may be readily removed from the clips of the fuse block by grasping the handle 18 and by exerting a sufficient pull thereon to move the terminal caps 12 and 13 out of the associated fuse block clips. This may be done without fear of contacting live parts of the circuit. The fuse having thus been removed, it is very easily removed from the device and a new one inserted in its place. Operation of the circuit may then be re-established by inserting the new fuse in the fuse block.

The modified form of the invention, as shown in Figures 6 and 7, is of similar construction to the preferred form, except that in the modified form, instead of using spring clips, such as 32 and 33, metal clips 56 and 57 are provided at the ends of the shell. These clips are each at its lower end formed with spaced finger portions 58 and 59 for engagement with the associated terminal cap of the fuse. Instead of using a sleeve, as in the preferred form, for supporting the fuse and holding the device in attached position, the modified form deflects the fingers of the terminal clips inwardly to form right-angularly disposed projections 60 and 61 which extend axially of the fuse caps and support the fuse so that it cannot be removed from the clips when the fuse is pulled out of the clips of a fuse block. However, the fuse having been removed from the fuse block, the fuse may be readily removed from the clips on the device by moving the fuse laterally relative to the clips 56 and 57. The electrical connections of the elements composing the indicating mechanism are the same as in the preferred form of the invention.

The device of the present invention may conveniently be constructed as shown in Figure 8. This construction is similar to that shown in Figures 1 to 5, inclusive, except that instead of making the sleeve as a ring, as heretofore described, one of the sections forming the sleeve is extended so as to be slightly more than semi-circular and form a hook 23a. This arrangement enables the device to be attached to the fuse without the necessity of removing the fuse from its clips.

It will be appreciated that although the preferred and modified forms of the invention are referred to as a fuse "puller", it may be used with equal facility to test a fuse, remove it from its clips and insert a fuse into its clips.

From the foregoing description, it will be ap-

parent that the herein described invention provides an improved combination fuse puller or fuse inserter and indicator which will give a positive indication as to the condition of the fuse; which may be utilized for removing or inserting a fuse without fear of contacting live parts of the circuit; a device which may be removably attached to a cartridge fuse irrespective of whether this fuse is of the indicating or non-indicating type; a device which will not interfere with the use of the fuse for its usual and customary purpose; and which may be repeatedly used and transferred from one fuse to another.

Now, it is of course, to be understood that although I have described in detail several embodiments of my invention, the invention is not to be thus limited, but only insofar as defined by the scope and spirit of the appended claim.

I claim as my invention:

A detachable fuse puller and indicator for a cartridge type fuse comprising an elongated body portion of insulating material and of substantially the same length as the fuse, an integrally formed curved member extending from said body and intermediate the ends thereof to engage the body of the fuse, means on said body to yieldingly retain the fuse in position in the puller while the fuse is being pulled, said means comprising a pair of reversely curved and oppositely directed contact strips of springy material extending below the underside of the body and towards the opposite ends thereof, said strips each having one end thereof secured within said body and having the free end curved upwardly towards said body, means to guard the free ends of said strips comprising sockets formed in said body and arranged receiving the free ends of said strips, means in the sockets engageable with the free end of a strip to limit outward movement of said end, and an indicator in said body in conductive connection with said pair of strips.

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