FUSE, MORE ESPECIALLY A
WEAK-CURRENT FUSE FOR MOTOR
VEHICLES OR THE LIKE

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Filed: Sept. 11, 1972

Appl. No.: 288,221

U.S. Cl. 337/206, 337/265
Int. Cl. H01H 85/30
Field of Search 337/206, 265, 417, 185; 240/1.3

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ABSTRACT
Especially weak-current fuse comprising an electrical conductor with fusing point and surrounded by current insulating material changing its shape for sensible indicating fuse break on the outside.

5 Claims, 9 Drawing Figures
FUSE, MORE ESPECIALLY A WEAK-CURRENT FUSE FOR MOTOR VEHICLES OR THE LIKE

The present invention relates to a fuse, more especially a peak-current fuse for motor vehicles or the like, of the type designated in the preamble to the Main Claim.

Previously known fuses of this type are for the most part designed in such a way that a fusing of the conductor is indicated optically either in that this is visible or can be made so, or through a special device indicating the fuse break, possibly even acoustically.

These kinds of indication are often both sufficient and satisfactory. However, in regard to car fuses, by way of example, the fuses and their mode of arrangement raise big problems. Partly the fuse box has to be mounted as invisible as possible and partly fuses which are as cheap as possible are to be used. For reasons of cost, a special indicating mechanism does not come into the question. The fuse box is often to be found under the dashboard, where it is not easily accessible and is usually protected by a foldable cover, in order to prevent any falling out of the mostly loosely seated fuses, when, for example, bangs with a knee against it. For checking purposes, one has to remove the lid, to assume an uncomfortable position and often resort to a source of light. Furthermore, the shape and arrangement of the known fuse can be considered to be disadvantageous. The points of contact can cause considerable current losses, by way of example through contaminants.

The task of the present invention is more especially the elimination of the aforesaid disadvantages and the provision of a fuse which is particularly suitable for motor vehicles and fields where similar problems are posed.

This task is substantially solved in that a fuse of the aforesaid type has the feature indicated in the characterising part of the Main Claim. Through the provision of the fuse of the invention, it is no longer disadvantageous if the fuse box is arranged under the dashboard. For purposes of checking the fuse, one merely needs to feel with the finger tips along the outwardly directed surfaces of the fuses. An uneven surface is easy to ascertain, whereby one knows that the respective fuse is burnt out.

Further characteristics and advantages of the invention emerge from the following description and enclosed drawings, in which:

FIG. 1 shows a fuse of the invention in a side view;

FIG. 2 shows a view from the right in FIG. 1;

FIG. 3 shows a part of a fuse box in accordance with the invention, in front view;

FIG. 4 shows a section along the section line IV—IV of FIG. 3;

FIG. 5 shows a distribution strip appertaining to the box and insertable into this latter, in top plane view;

FIG. 6 shows a section along the section line VI—VI of FIG. 5;

FIG. 7 shows a section along the section line VII—VII of FIG. 5;

FIG. 8 shows a view from above in FIG. 5; and

FIG. 9 shows a modified embodiment of fuse, fuse box and contact rail.

In the drawings, 1 designates an electrical conductor in the shape of a U-shaped metal strip, which, with the exception of its free legs, is surrounded on all sides by a body 2, which consists at least partially of current-insulating material. Strip and body can, in accordance with the invention, be different in design and arrangement and be manufactured from different substances which is described hereinafter in the form of exemplified embodiments.

General to all exemplified embodiments is the fact that the strip has in known manner, at least one point, such a cross section that the current voltage and intensity normally provided pass through this point, without heating it noticeably, but that this point fuses upon a considerably larger flow of current. It is furthermore common that the said point abuts against a body part or is surrounded by one such, which indicates a fuse break.

The aforesaid point lies, by way of example, in the web of the U-shaped strip and has a comparatively short or long extent. The web or at least the aforesaid point lies near a body surface. The body consists, at least in the region of this point, preferably of thermostatic plastic. Upon a fuse break, the nearby body surface is heated and thereby becomes uneven, which is easy to ascertain, in that one feels with the fingertips along this body surface.

The body can have any desired shape, as can the metal strip, whose place can also be taken by one or more metal wires having the same function.

The conductor 1 or at least the fusing points thereof can also be surrounded by a substance, by way of example in the shape of a layer or a jacket, which, upon heating, bursts the respective outer body region by virtue of the greater (fairly large?) -co-efficient of thermal expansion. In such a case or on principle, the body can consist at least partially of material having a good crack formation capacity, such as glass or ceramics. Particularly in the case of glass it is easy to select suitable sorts for the respective temperature margins. Such material can advantageously be brought together with a body of a different material, for example plastic, with a less good or no cracking capacity. The type of cracking can be predetermined either by suitable design of the body or of the body part having a good cracking capacity, for example by arrangement of cracking lines in the form of grooves or the like, and/or through corresponding design of the conductor in the region of the fusing point, by way of example by fashioning the conductor into (as?) thin wires, along which the aforesaid body region bursts.

The conductor or at least the fusing point thereof can, however also be provided with a substance which, upon heating, changes its colour. In this connection, this substance has to be visible from the outside. Such a substance can also bring about a change of colour of the nearby body region. As a third alternative, the body can at least partially consist of material which, upon heating, changes its colour. These embodiments can also be combined with a surface deformation.

The embodiments described in the foregoing and shown in the drawings are naturally only to be considered as non-restrictive examples and can be modified at will within the scope of the following Patent Claims.

The present invention relates, furthermore, to a fuse or distribution box, which is illustrated in FIG. 3 to 8.
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The box 10 can be designed as a parallelepiped and preferably be provided with suitable fastening members (not shown). Preferably plastic, for example bakelite, comes into the question as the material.

Near the upper box surface in FIGS. 3 and 4 a channel 11 extends parallel to the aforesaid surface over the substantial box length, whereby preferably only the right-hand longitudinal side thereof in FIG. 4 leads freely outwardly. Arranged in spaced apart relation somewhat underneath this channel and parallel to this, on the same level are several narrower channels 12, which also lead freely outwardly on the left-hand side of the box in FIG. 4. The width, and above all the design of the channels 12 corresponds to the shape of the fuses used, whereby preferably the fuses described above are used. The channels 11 and 12 are connected to each other via channels 13 which are arranged at a right angle to these and which preferably extend downwardly somewhat beyond the channels 12. Underneath the channels 12, the channels 12 can have a slighter depth than above the same, where they preferably have the same depth as the channel 11. The lower section of the channels 13 is provided for the reception of the detent of a terminal to be described in more detail hereinafter. Directly above the channel 11 there penetrate into the box from the left in FIG. 4, narrow channels 14, which are connected to a part of the channel 11. The channels 14 are provided for the reception of punch-outs 24 to be described in more detail hereinafter.

Somewhat underneath the horizontal dot-dash lines in FIGS. 3 and 4, the box has a corresponding, but mirror symmetrical arrangement of channels 11 to 14 (not shown). The channels 12, forming pairs, situated respectively on one side of the plane of symmetry made evident in the drawings by the aforesaid dot-dash line, are provided for the reception of the poles pertaining to a fuse.

Arranged, in at least one channel 12 on each side of the plane of symmetry is a terminal of known type which is connected to a cable (not shown) leaving the box in FIG. 4 to the left and leading to a source of current. Even if certain channels 12 are not to be connected to a source of current, it can, however, be advantageous merely to arrange a terminal in these. Inserted into each channel 11 is a distribution strip 20 which consists of a strip part 21 and tongues 22 arranged on one longitudinal edge thereof and projecting at right angles. The strip part has a number of punch-outs 23 and 24. The punch-outs consist of tabs which are bent-out in the same direction as the tongues and which are provided for penetration into the channels 14, in order by that means to lock the distribution strip in relation to the box. The punch-outs 23 are on the other side (hand ?) bent-out into rectangular ribs or the like, which extend in the box from the channel 11 through the upper section of the channels 13 and somewhat into the channels 12, so that a good contact with terminals or fuse poles arranged in these is produced. The ribs or the like 23 can advantageously decrease height-wise in the direction of the tongues 22 in order to ensure a good introduction of the fuse poles or the like.

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The tongues 22 have such an outforming that terminals or the like of known type can be pushed onto these. By this means, it is possible to connect, in a simple manner, for example two current-consuming members to one fuse. Naturally also several tongues can be provided at one point for this purpose. One can also make use of individual strip elements which can be associated with one or several channels 12. Alternatively the strip body or other parts can consist of current-insulating material, in order to obtain the same effect. A box can also have more than two correlated channel arrangements, in order to accommodate several rows of fuses. Finally the tongues 22 can be designed in any desired manner and connection members other than terminals can, of course, come into the question.

A further advantageous embodiment can be seen from FIG. 9. In this connection the electrical conductor 1 preferably does not emerge from the body 2, but has, between its legs and a body inner wall 25, a gap, into which tongues 26 having preferably tapered ends can be introduced. It can be advantageous to provide the free ends of the conductor with somewhat bent-out tongues 27, which engages into offsets 28 in that body, whereby the conductor is introduced from above in the drawings through an aperture 29 finally receiving the conductor. This aperture is subsequently filled with material, which lets the previously described effect of the invention make its appearance.

The tongues 26 are preferably provided shortly beneath the offsets 28 with standing-back punch-outs 30 which engage into offsets 31 of a box 32 and thus lock the tongues 26. The lower end of the tongues is connected to one, or via a common base, to several legs 33. The legs of the conductor 1 can also penetrate into the box 32 and there butt against the shorter tongues 26 not protruding from the box, whereby if necessary an undulated leaf spring ensures an advantageous contact pressure.

1 claim:

1. A weak current fuse especially adapted for use in motor vehicles which consists of:
a. an electrical conductor having a section which will fuse when the current flowing through the conductor exceeds a certain amount and
b. a mass of essentially non-conductive material in direct contact with said section of the electrical conductor, said mass of material having the property of changing its shape under the influence of the heat which is generated when said section of the conductor fuses, said change in shape being sufficiently great that it can be readily detected by passing ones fingers over said fuse.

2. A fuse according to claim 1 wherein said conductor is in the form of a U-shaped metal strip.

3. A fuse according to claim 1 wherein said mass of material includes a thermoplastic material.

4. A fuse according to claim 1 wherein said mass of material is composed of glass.

5. A fuse according to claim 1 wherein said mass of material is composed of ceramic material.

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