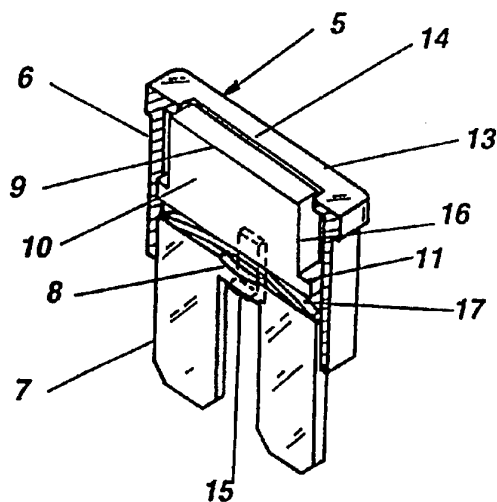
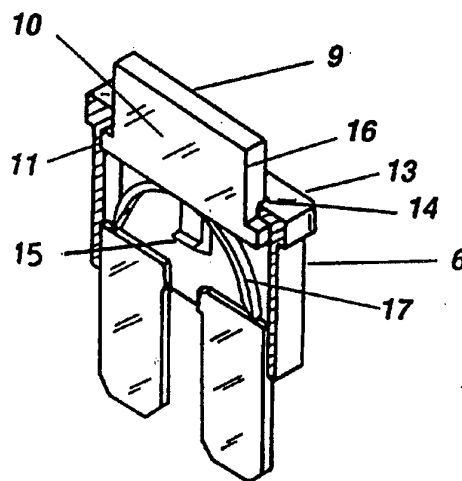




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(21) International Application Number: PCT/GB94/02762 (22) International Filing Date: 19 December 1994 (19.12.94) (30) Priority Data: 08/173,959 22 December 1993 (22.12.93) US (71) Applicants: JONDELIUS, Bjorn, Karl, Emil [SE/GB]; Riviere, Tewkesbury Road, Cheltenham, Gloucestershire GL51 9SG (GB). BALDERAS, Charles, Edward [US/US]; 23105 Galva Avenue, Torrence, CA 90505 (US). FENDRYCK, Jimmie, Charles [US/US]; 5122 Laurel Park Drive, Camrillo, CA 93012 (US). (71)(72) Applicant and Inventor: REYES, Daniel, Wayne [US/US]; 11728 Wilshire Boulevard, B-714 Los Angeles, CA 90025 (US). (74) Agent: HARDING, Richard, Patrick; A. R. Davies & Co., 27 Imperial Square, Cheltenham, Gloucestershire GL50 1RQ (GB).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, KE, KG, KP, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: IMPROVEMENTS IN OR RELATING TO FUSES



(57) Abstract

A vehicle fuse (5) comprises a transparent plastics housing (6) and a terminal element constituted by two conductive terminals (7) interconnected by a meltable link (8) within the housing (6). An indicating element (9) within the housing (6) is formed with a hooked projection (15) which engages below the meltable link (8), and a curved leaf spring (17) which is compressed by engagement of the projection (15) below the link (8) in the normal position (Fig. 3). When the link (8) melts due to a current overload, the projection (15) is released and the indicating element (9) is moved upwardly by the spring (17) so that it projects through an opening (14) in the housing (6) (Fig. 7), thus indicating that the fuse has blown. The gripping surfaces (10) of the indicating element (9) can then be grasped so as to enable an upward force to be exerted on the fuse (5) in order to remove the fuse from a fuse holder. Thus the indicating element (9) both indicates that the fuse has blown and also provides a means by which the fuse can be removed from the holder.

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"Improvements in or relating to Fuses"

This invention relates to fuses and is more particularly, but not exclusively, concerned with fuses for use in vehicles.

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As is well known electrical equipment provided in cars and other vehicles is commonly protected from electrical current overload by means of replaceable fuses. Such fuses are most often composed of a transparent housing and a terminal element consisting of two spaced conductive terminals interconnected by a meltable link within the housing. When the fuse is overloaded with current, the meltable link melts due to the heat generated by the current so as to interrupt the electrical supply to associated electrical equipment so that the equipment ceases to function. When such electrical equipment ceases to function for any reason, it is necessary for the associated fuse to be located and inspected to determine whether this is due to blowing of the fuse or failure of the equipment itself. Since a number of such fuses are generally provided within a fuse box, it can be frustrating and tedious to locate the appropriate fuse, to determine whether the fuse has blown and to replace the fuse if necessary. Generally each of the fuses appears and feels identical, so that, particularly where access is restricted or ambient light levels are low, a number of fuses must be removed and examined, often with the aid of additional lighting, before the blown fuse can be located and replaced. Furthermore it is often difficult to remove each fuse from the fuse box using only fingers due to the insufficient area of the fuse available to be gripped. This often means that a special fuse removable tool is required to remove each fuse from its holder, and such a fuse removal tool must

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be kept in a safe place if it is to be located in an emergency.

Various fuse arrangements have previously been proposed which incorporate an indicating element which, on melting of the link, is caused to be displaced to provide a visible indication that the link has melted. Examples of such prior fuse arrangements are disclosed in US 3665361, US 3696316, US 3783428, and US 3824520 . However none of these arrangements is satisfactory in overcoming the problems encountered in locating and replacing a blown fuse in a vehicle fuse box.

It is an object of the invention to provide an improved fuse which is particularly advantageous for use in a vehicle fuse box and which is easy to remove from its fuse holder.

The invention is defined in the accompanying claims.

15

In order that the invention may be more fully understood, reference will now be made, by way of example, to the accompanying drawings, in which:

Figures 1 and 2 are perspective views of conventional blade and cylinder fuses;

Figures 3 and 7 are cut-away perspective views of a blade fuse in accordance with the invention;

Figures 4, 5 and 6 illustrate various alternative embodiments of the fuse of Figures 3 and 7;

Figure 8 shows a fuse receptacle containing three fuses;

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Figures 9, 10 and 11 are perspective views, cut away where appropriate, of a further blade fuse in accordance with the invention;

Figures 12 to 16 are views, cut away where appropriate, of a still further blade fuse in accordance with the invention, including various alternative
5 embodiments;

Figures 17 to 21 are views, cut away where appropriate, of a still further blade fuse in accordance with the invention, including various alternative embodiments;

Figures 22 to 26 are views, cut away where appropriate, of a cylinder fuse
10 in accordance with the invention, including various alternative embodiments;

Figures 27, 28 and 29 are views, cut away where appropriate, of a further cylinder fuse in accordance with the invention, including an alternative embodiment;

Figures 30 to 33 are views, cut away where appropriate, of a still further cylinder fuse in accordance with the invention, including an alternative embodiment;
15 and

Figures 34 and 35 are perspective views of alternative configurations of blade and cylinder fuses.

Referring to Figure 1 a conventional blade fuse 1 comprises a transparent
20 plastics housing 2 and a terminal element constituted by two conductive terminals 2A and 2B in the form of blades interconnected by a meltable link (not shown) within the housing 2. As is well known, the fuse 1 is fitted into a fuse holder so that the terminals 2A and 2B are held between conductive spring contacts so as to establish an electrical connection between the contacts and so as to mechanically hold the fuse

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in position. Figure 2 shows a conventional cylinder fuse 3 having a transparent plastics or glass housing 4 and two conductive terminals 4A and 4B interconnected within the housing 4 by a meltable link 4C. As is again well known, the terminals 4A and 4B of the fuse 3 are held between spring contacts of a fuse holder so as to establish an electrical connection between the contacts and so as to at the same time hold the fuse in position.

With both types of conventional fuse it can be difficult to determine whether a fuse has blown due to current overload, particularly if the fuse is one of a number of fuses within a fuse box and there is restricted access to the fuse box or the ambient light is at a low level, and it can additionally be difficult to remove the fuse from its holder to enable it to be inspected or replaced.

Various fuses in accordance with the invention, both of the blade type and the cylinder type, will now be described with reference to the drawings, all of these fuses being such that they provide a ready indication of when a fuse has blown so that it is possible to isolate a blown fuse both visually and by feel, and additionally providing means by which the fuse can be easily removed for inspection or replacement.

20

Figure 3 shows a blade fuse in accordance with the invention which has a generally similar external form to the conventional blade fuse of Figure 1 so that it can replace such a conventional fuse in a conventional fuse holder without any special adaptation of the fuse holder being required. The fuse 5 has a transparent plastics

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housing 6 which partially encapsulates the conductive terminals 7 in the form of blades which are interconnected by the meltable link 8 within the housing 6. An indicating element 9 within the housing 6 is formed with a hooked projection 15 which engages below the meltable link 8, and also a curved leaf spring 17 which engages the terminals 7 at its ends and is compressed by engagement of the projection 15 below the meltable link 8 in the normal position as shown in Figure 3, so that the indicating element 9 extending through an opening 14 in the housing 6 does not project above the top surface 13 of the housing 6. The indicating element 9 has two side gripping surfaces 10, and a stop flange 11 at each of its ends 16.

10

When the link 8 melts due to a current overload, the projection 15 is released and the indicating element 9 is moved upwardly by the spring 17 so as to project above the top surface 13 of the housing 6 as shown in Figure 7, thus indicating that the fuse has blown. Since the stop flanges 11 prevent the indicating element 9 being removed completely from the housing 6 through the opening 14, the gripping surfaces 10 of the indicating element 9 can be grasped so as to enable an upward force to be exerted on the fuse as a whole in order to remove the fuse 5 from the fuse holder. Thus the indicating element 9 both indicates that the fuse has blown, and also provides a means by which the fuse can be removed from the holder.

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Figure 8 shows a fuse receptacle 18 incorporating three such fuses 19, the first fuse being shown in the normal condition, the second fuse being shown with the indicating element 9 projecting above the top surface of the fuse housing so as to indicate that the fuse has blown, and the third fuse being of an alternative modified

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form having an elongated indicating element which may be manually pulled out an additional distance after the fuse has blown in order to provide extended gripping surfaces 12.

5 Various modifications of the above described fuse 5 are contemplated within the scope of the invention. For example, Figure 4 shows a modification of the indicating element provided with an upper flange 13A which overlies the top surface of the housing and which may assist removal of the fuse from the fuse holder. Figure 5 shows a modified housing 6 formed with an integral curved leaf spring 17A which
10 is used in place of the spring 17 to exert an upward bias on the indicating element. Figure 6 shows a further modification of the indicating element in which the stop flanges 11 are dispensed with, and instead the ends of the spring 17 perform a stop function to prevent the indicating element from being completely removed from the housing 6 through the opening 14.

15 Figures 9 and 10 show an alternative blade fuse 20 in the normal condition and the blown condition respectively. The fuse 20 has an indicating element 24 which is pivotally mounted on an axle 32 and provided with a hooked projection 30 which normally engages below the meltable link 22 so that an integral leaf spring 31
20 is compressed and the indicating element 24 does not project from the opening 28 in the normal condition. However, in the event of the fuse blowing, the projection 30 is released so as to enable the indicating element 24 to be pivoted upwardly by the spring 31 to project from the opening 28 above the top surface 27 of the housing 21. The side gripping surfaces 23 of the projecting part 25 of the indicating element 24

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may then be grasped in order to remove the fuse from its holder.

Figure 11 shows three such fuses 19 within a fuse receptacle 18, the fuses being shown in the normal condition, the blown condition, and, in an alternative
5 modified form, with extended gripping surfaces 26 provided by an indicating element which is capable of being manually pivoted into an upward position.

Figures 12 and 14 show a further alternative blade fuse 33 comprising a housing 34 which is movable with respect to the terminals 36 and the interconnecting
10 meltable link 37 in order to provide an indication that the fuse has blown. The housing 34 is provided with two integral pins 42 which extend through slots 40 in the terminals 36, as well as being provided with a projection 38 which extends below the meltable link 37 and a curved leaf spring 39 which is compressed when the housing 34 is in the normal position. In the event of the fuse blowing, the projection 38 is
15 released and the housing 34 is caused by the spring 39 to move upwardly relative to the terminals 36, as shown in Figure 14, so that the raised position of the top surface 43 of the housing 34 provides an indication that the fuse has blown. Figure 15 shows three such fuses 19 within a fuse receptacle 18, the fuses being shown in the normal condition, the blown condition, and, in an alternative embodiment, with a housing
20 which is able to be manually pulled outwardly by a further distance to reveal extended gripping surfaces 35 which assist in removal of the fuse from the receptacle.

Various modifications of such a fuse are possible within the scope of the invention. For example, as shown in Figure 13, the pins 42 may be integral with the

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terminals 36 and the slots 40 for the pins 42 may be formed in the housing 34. Figure 16 shows a contact with an elongated slot 41 for the pin 42 in order to permit the housing to be pulled outwardly by an additional distance after the fuse has blown in the modification already referred to with reference to Figure 15.

5

Figures 17 and 19 show an alternative blade fuse 44 according to the invention which comprises a fixed housing part 45 and a movable housing part 46. The housing part 45 is fixed in relation to the terminals 48, and the movable housing part 46 is provided with a pin 50 which engages within an elongated slot 52 in the fixed housing part 45. In addition the movable housing part 46 is formed with a projection 51 which normally engages below the meltable link 49, and a curved leaf spring 54 which is compressed between the tops of the terminals 48 and the housing part 46 in the normal condition. In the event of the fuse blowing the projection 51 is released and the housing part 46 is caused by the spring 54 to be moved upwardly so that the top surface 55 of the housing part 46 indicates that the fuse has blown, as shown in Figure 19.

Various modifications of such a fuse are possible within the scope of the invention. For example, as shown in Figure 18, the movable housing part may be provided with an extended top surface 55A which overlies the top of the fixed housing part. Furthermore the fixed housing part may be provided with an extended slot 53, as shown in Figure 21, so that, after the fuse has blown, the movable housing part may be pulled upwardly an additional distance. Figure 20 shows three fuses 19 within a fuse receptacle 18, the fuses being shown in the normal condition, the blown

20

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condition, and, in the modification of Figure 21, with the movable housing part pulled out an additional distance to reveal extended gripping surfaces 47.

A cylinder fuse 56 according to the invention will now be described with
5 reference to Figures 22 and 25. The fuse 56 comprises a cylindrical housing 57 terminated at its ends by conductive terminals 58 in the form of end caps which are interconnected within the housing by a meltable link 59. An indicating element 60 within the housing 57 extends through an opening 65 in the housing 57 and is provided with a projection 67 which engages below the meltable link 59, as well as
10 a curved leaf spring 68 which is compressed when the fuse is in the normal condition. The indicating element 60 has side gripping surfaces 61 and end surfaces 66 formed with stop flanges 62 which prevent the indicating element 60 from being removed completely from the housing 57 through the opening 65. In the event that the fuse is blown, the projection 67 is released so that the indicating element 60 is moved by
15 the spring 68 so as to project through the opening 65 above the outer surface 64 of the housing 57 as shown in Figure 25.

Figure 26 shows three fuses 71 within a fuse receptacle 69 with the fuse terminals being clamped between spring contacts 70 which establish the required
20 electrical connections and mechanically hold the fuses 71 in position. In Figure 26 the first fuse is shown in the normal condition, the second fuse is shown in the blown condition, and the third fuse is a modified form of fuse permitting the indicating element to be pulled outwardly an additional distance after it has blown to provide extended gripping surfaces 63.

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Various modifications of such a fuse are possible within the scope of the invention. For example, as shown in Figure 23, the spring 68A may be formed as part of the housing 57, rather than as part of the indicating element as described with reference to Figures 22 and 25. Furthermore, as shown in Figure 24, the indicating
5 element may be formed with extended spring end parts 67A which take the place of the stop flanges 62.

An alternative cylinder fuse 72 according to the invention will now be described with reference to Figures 27 and 28. In this case the indicating element 75
10 is pivotally mounted within the housing 73 on an axle 83 and is provided with a projection 81 which engages beneath the meltable link 74, and a leaf spring 82 which is compressed in the normal condition. In the event that the fuse is blown, the projection 81 is released and the indicating element 75 is pivoted upwardly by the spring 82 so that the projecting part 76 of the indicating element 75 provides an
15 indication that the fuse has blown and in addition provides gripping surfaces 84 which may be manually grasped to remove the fuse from its holder. Figure 29 shows three fuses 71 within a fuse receptacle 69, the fuses being shown respectively in the normal condition, in the blown condition in which the indicating element 75 projects above the outer surface 78 of the fuse housing 73, and, in a modified embodiment, in an
20 extended position in which the indicating element has been manually pivoted further out of the housing 73 to form extended gripping surfaces 86.

A further cylinder fuse 88 according to the invention will now be described with reference to Figures 30 and 31. In this case the fuse 88 comprises a housing 85

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which is connected to the conductive terminals 89 by two leaf springs 92 in such a way as to allow limited movement of the housing 85 relative to the terminals 89. In addition the housing 85 is provided with a projection 91 which engages beneath the meltable link 90 and is pressed against the meltable link 90 by the springs 92. In the event that the fuse is blown the projection 91 is released and the housing 85 is moved by the springs 92 relative to the terminals 89 as shown in Figure 31 to provide an indication that the fuse has blown. Figure 33 shows three fuses 71 within a fuse receptacle 69, the first fuse being shown in the normal condition, the second fuse being shown in the blown condition indicated by raising of the housing 85 relative to the terminals 89, and the third fuse being shown in a further raised condition which is provided, in a modified embodiment, by manually pulling the housing upward by an additional distance relative to the terminals 89 to provide extended gripping surfaces 86 to assist in removal of the fuse. Figure 32 shows a terminal in the form of an end cap having an elongated opening 87 which can be used in this modified embodiment to permit additional manual upward movement of the housing.

It will be appreciated that, although blade fuses and cylinder fuses of particular external shapes have been described above, fuses of other external shapes are also contemplated within the scope of the invention. For example, Figure 34 shows a blade fuse 93 of modified shape, and Figure 35 shows a cylinder fuse 94 of modified shape, both of these shapes allowing the fuses to be made in a less expensive manner without unduly prejudicing the ability of the fuse to be removed from its holder.

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Various other modifications are possible within the scope of the invention. For example, a cylinder fuse may be provided in which a portion of the housing is pivotal to indicate that the fuse has blown, and further embodiments are possible in which the indicating element is of a different shape to the various indicating elements
5 already described or pivots on a different axis, or is made of a flexible material, such as a strap or cord, which can be pulled out of the housing.

All the above described fuse arrangements in accordance with the invention possess the advantage that they enable a blown fuse to be located quickly and easily
10 amongst a number of such fuses within a fuse box, even in restricted areas and under low light conditions, and without the necessity for each individual fuse to be removed for inspection. Furthermore they permit removal of a blown fuse for replacement in a straightforward manner without requiring use of a special removal tool.

15 However the invention also covers an arrangement in which an indicating element as such is not provided, and the fuse, whether of the blade type or the cylinder type, is of conventional form except that the fuse housing is provided with an integral handle, such as is shown in broken lines 95 in Figure 34, which is adapted to be grasped to remove the fuse from its fuse holder. Alternatively an indicating
20 element, which indicates that the fuse has blown, but which is not adapted to be grasped for removal of the fuse, may be provided in addition to such a handle.

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CLAIMS

1. A fuse comprising a terminal element consisting of two spaced conductive terminals (7; 36; 48; 58; 89) interconnected by a meltable conductive link (8; 22; 37; 49; 59; 74; 90), and an indicating element (9; 23; 34; 46; 60; 75; 85) which is normally held in a non-indicating position by engagement with the link but which, on melting of the link due to current overload, is released so as to be moved by spring biasing means (17; 31; 39; 54; 68; 82; 92) into a projecting indicating position in which it provides a ready indication that the link has melted, characterised in that the indicating element is adapted to be manually grasped to remove the fuse from a fuse holder after melting of the link, stop means (11; 32; 42; 50; 62; 83; 92) being provided to prevent detachment of the indicating element from the remainder of the fuse when so grasped.
2. A fuse according to claim 1, wherein the indicating element (9; 23; 60; 75) is positioned with respect to an opening (14; 28; 65; 79) in a fuse housing (6; 21; 57; 73) so that, on melting of the link (8; 22; 59; 74) due to current overload, the indicating element is caused by the spring biasing means (17; 31; 68; 82) to project through the opening to provide an indication that the link has melted.
3. A fuse according to claim 2, wherein the indicating element (23; 75) is pivotally coupled to the fuse housing (21; 73) so that, on melting of the link (22; 74) due to current overload, the indicating element is pivoted by the spring biasing means (31; 82) into its indicating position.

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4. A fuse according to claim 2 or 3, wherein the stop means comprises flange means (11; 62) on the indicating element (9; 60) which engages the housing wall adjacent the opening (14; 65) to prevent the indicating element from being withdrawn through the opening.

5

5. A fuse according to claim 1, wherein the indicating element is constituted by a fuse housing (34; 85) which, on melting of the link (37; 90) due to current overload, is moved by the spring biasing means (39; 92) relative to the terminal element into the indicating position in which the housing projects from its normal position.

10

6. A fuse according to claim 5, wherein the indicating element (34) and the terminal element are interconnected by a pin (42) on one of the elements engaging within a slot (40) in the other element so as to permit movement of the indicating element relative to the terminal element on melting of the link (37) due to a current overload.

15

7. A fuse according to claim 1, wherein the indicating element is constituted by a movable housing part (46) which, together with a fixed housing part (45), constitutes a fuse housing and which, on melting of the link (49) due to current overload, is moved by the spring biasing means (54) relative to the fixed housing part (45) into the indicating position in which the movable housing part (46) projects from its normal position.

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8. A fuse according to claim 7, wherein the movable housing part (46) and the fixed housing part (45) are interconnected by a pin (50) on one housing part engaging within a slot (52) in the other housing part so as to permit movement of the movable housing part (46) relative to the fixed housing part (45) on melting of the link (49) due to a current overload.

9. A fuse according to any preceding claim, wherein the spring biasing means is a leaf spring (17; 31; 39; 54; 68; 82; 92) acting between the indicating element and the terminal element.

10

10. A fuse according to any preceding claim, wherein the indicating element is manually movable from its indicating position into an extended gripping position in which it can be easily grasped for removal of the fuse from the fuse holder.

11. A fuse comprising a terminal element consisting of two spaced conductive terminals interconnected by a meltable conductive link, characterised in that it is provided with a handle (95) which is adapted to be manually grasped to remove the fuse from a fuse holder.

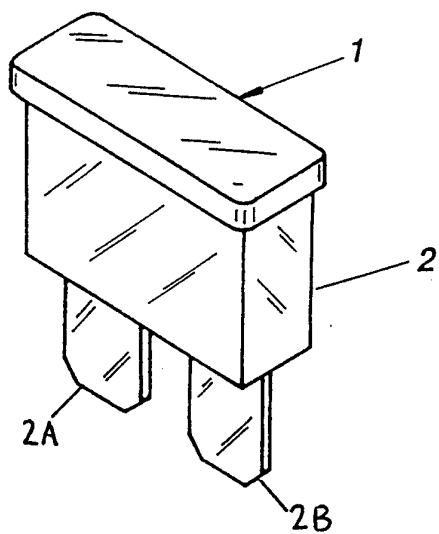


FIGURE 1

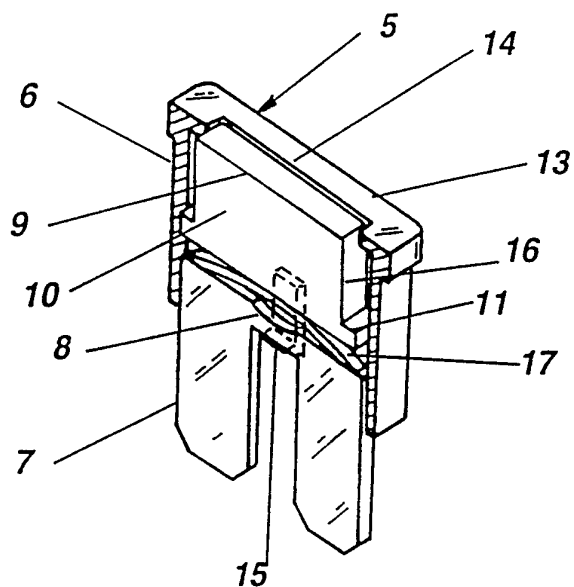


FIGURE 3

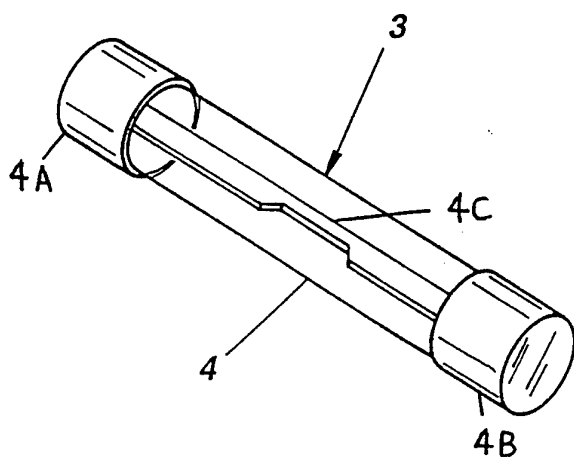


FIGURE 2

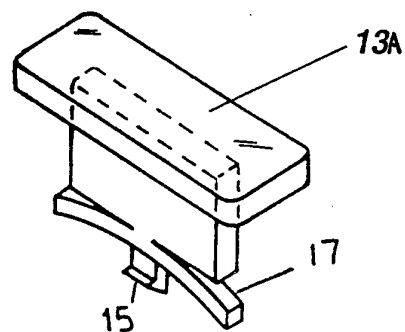


FIGURE 4

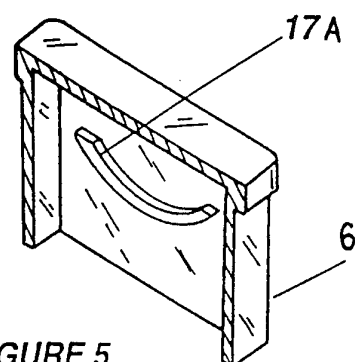


FIGURE 5

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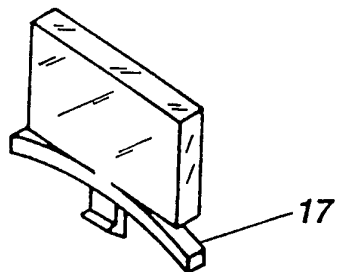


FIGURE 6

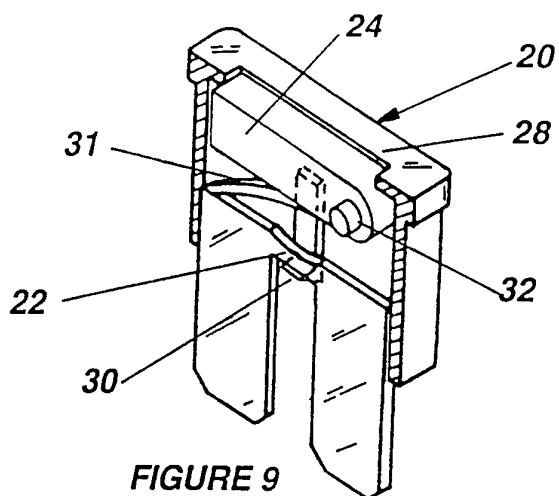


FIGURE 9

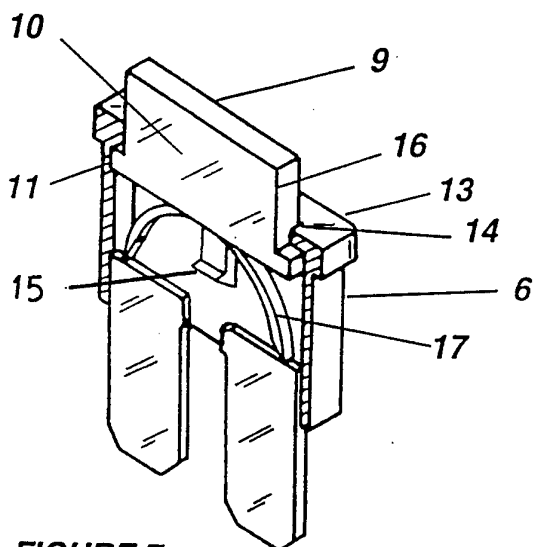


FIGURE 7

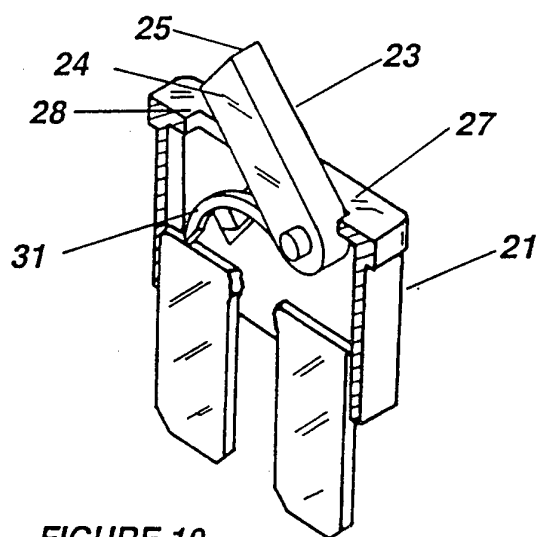


FIGURE 10

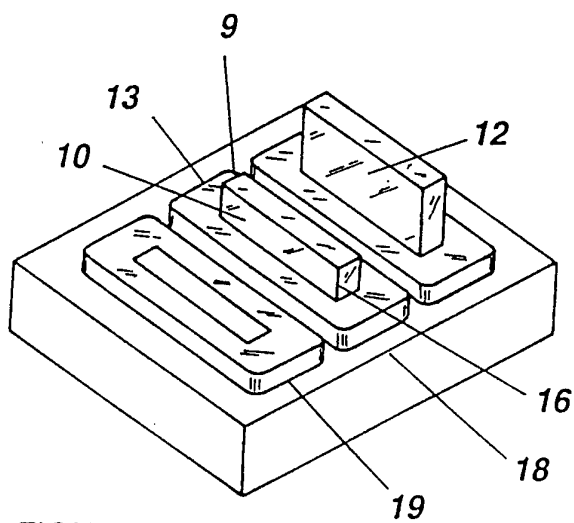


FIGURE 8

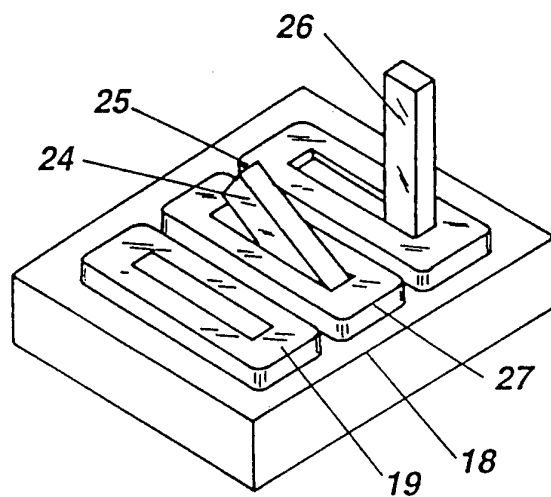
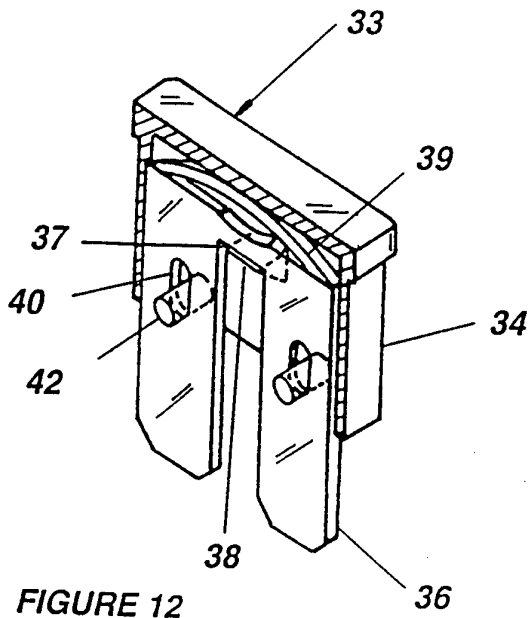
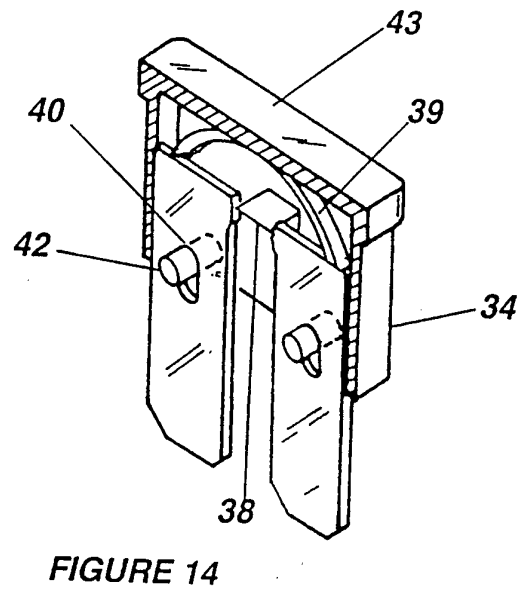
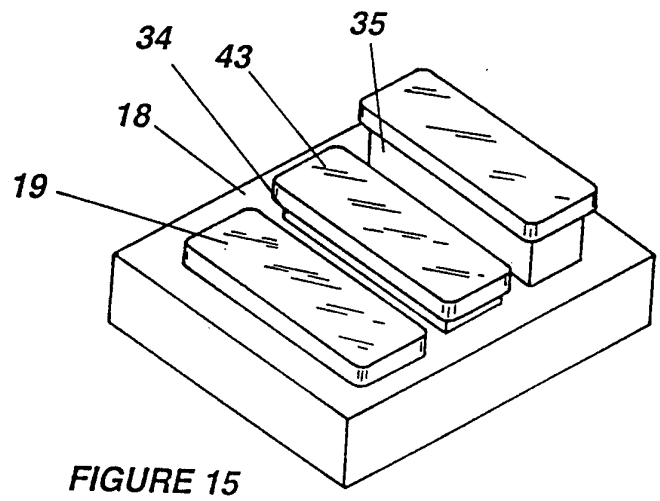
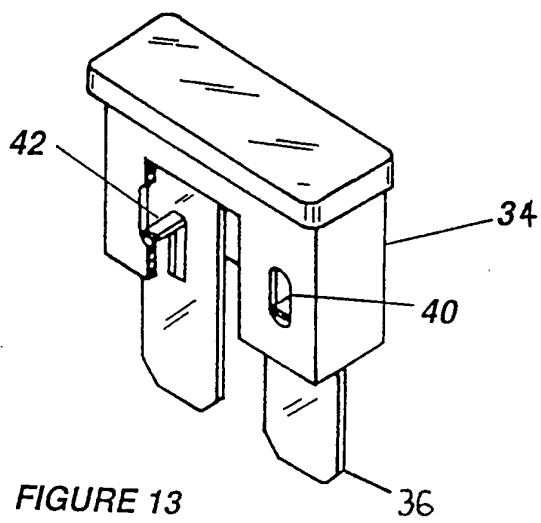
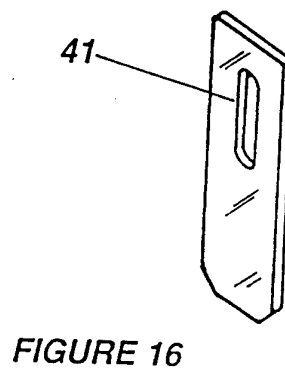


FIGURE 11



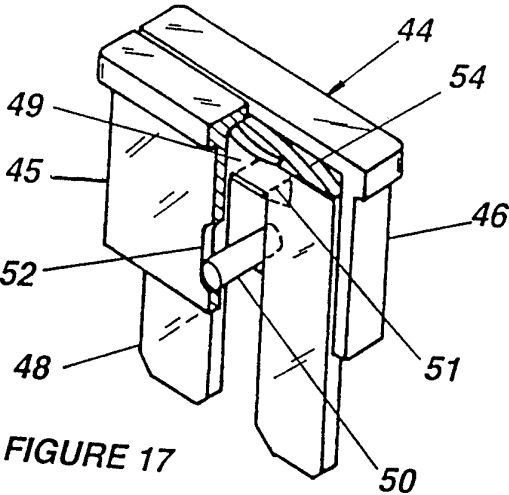


FIGURE 17

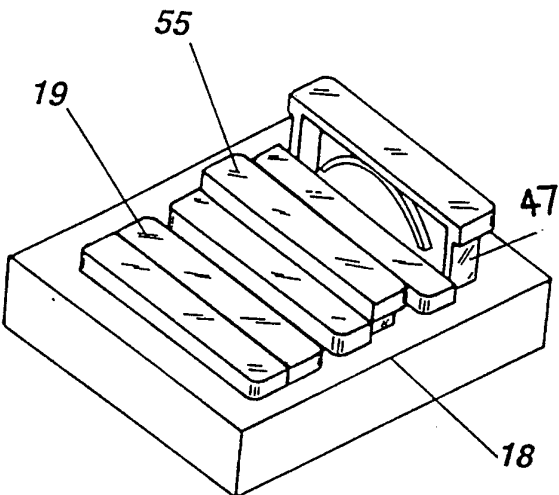


FIGURE 20

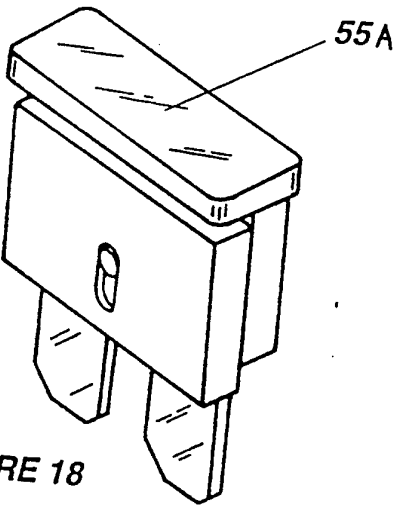


FIGURE 18

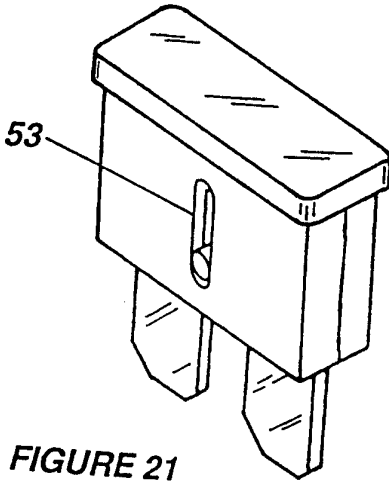


FIGURE 21

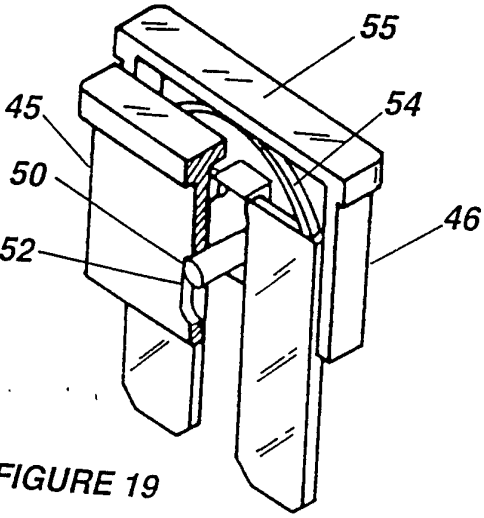


FIGURE 19

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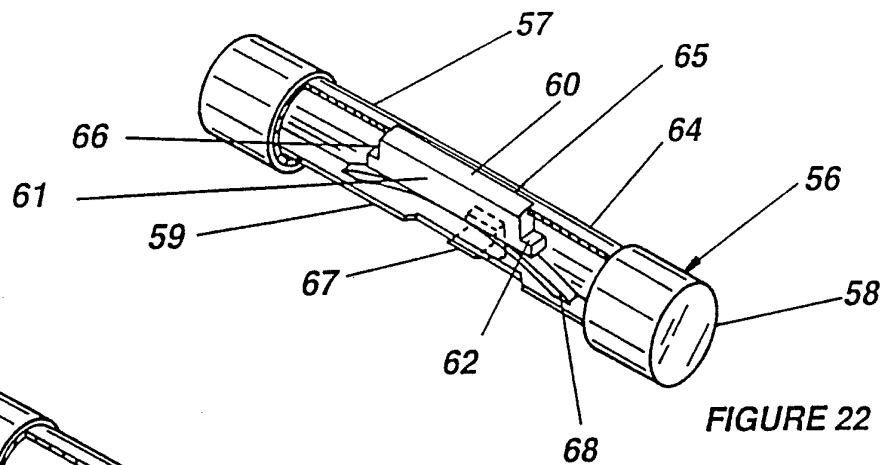


FIGURE 22

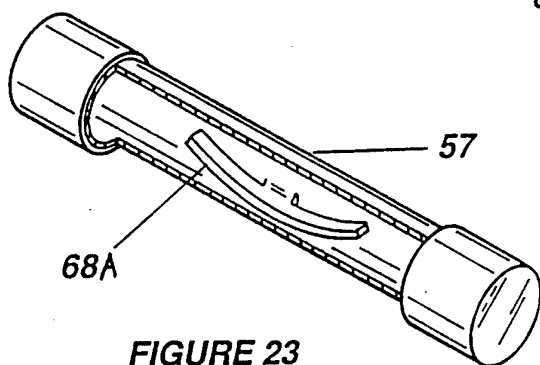


FIGURE 23

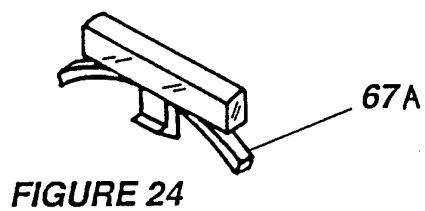


FIGURE 24

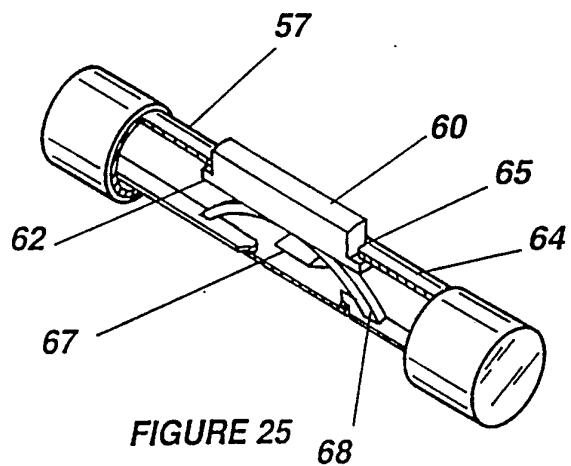


FIGURE 25

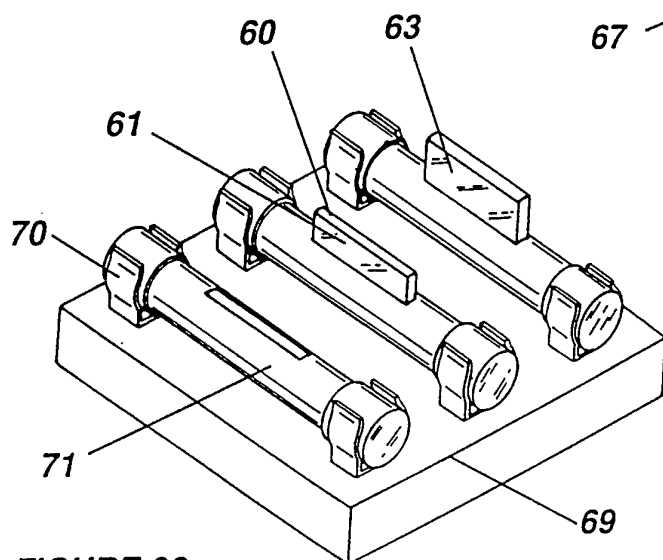


FIGURE 26

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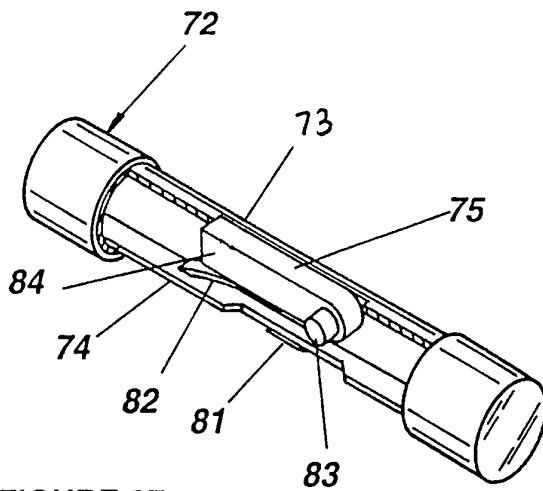


FIGURE 27

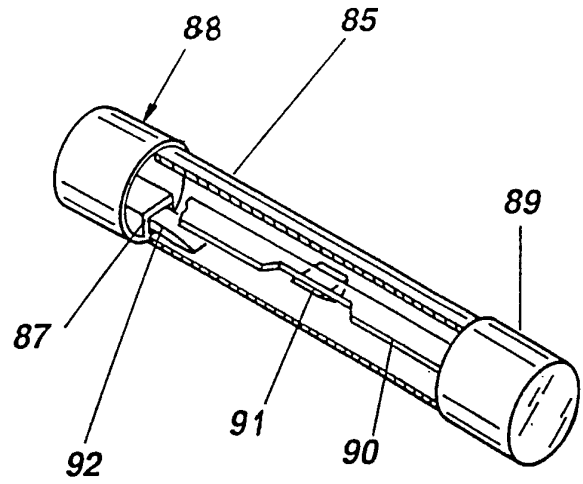


FIGURE 30

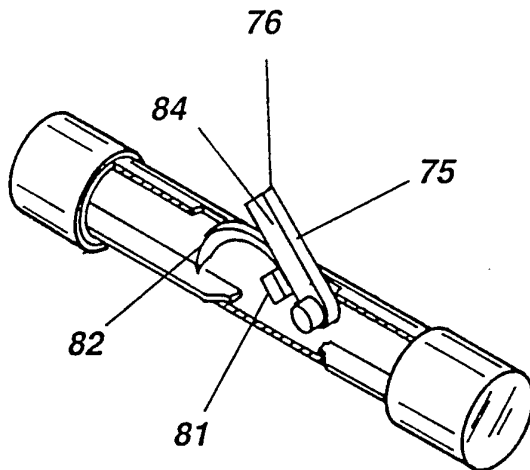


FIGURE 28

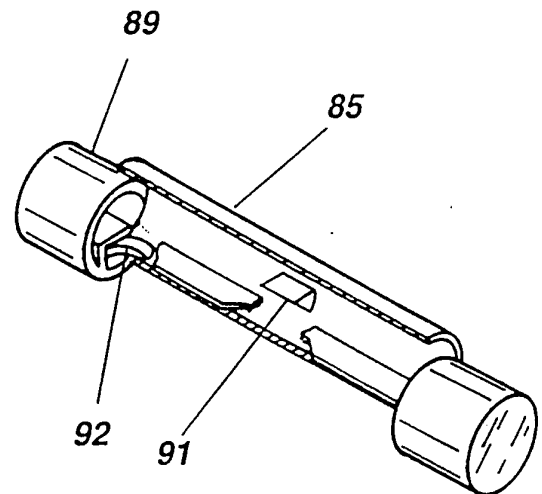


FIGURE 31

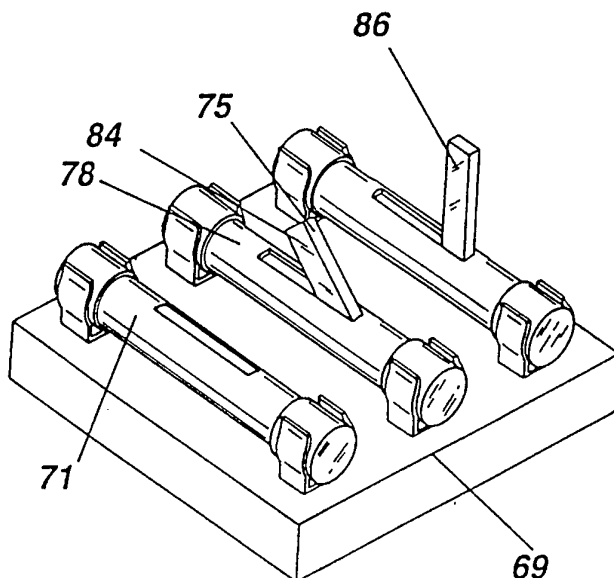


FIGURE 29

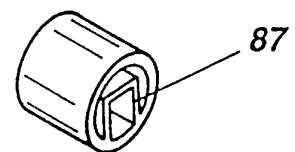
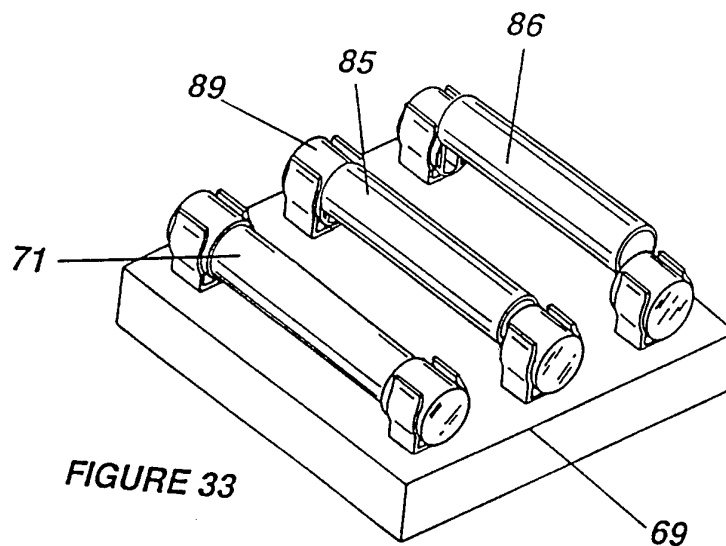
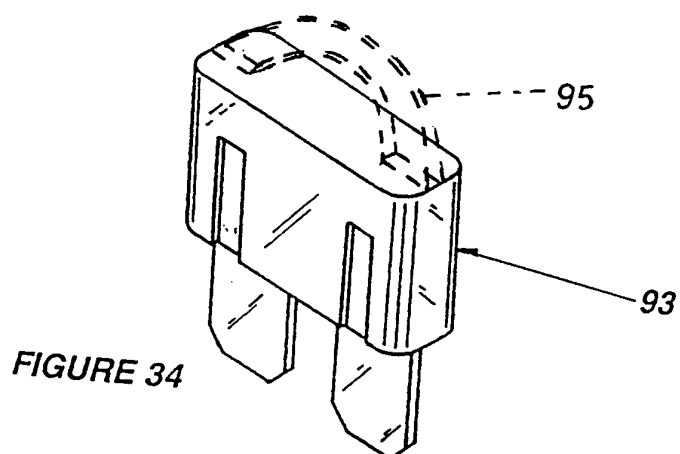
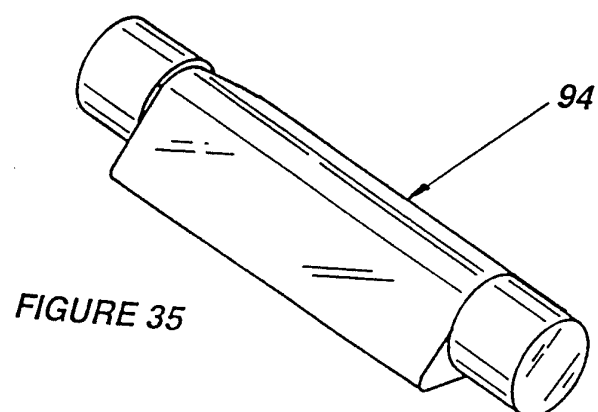


FIGURE 32

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INTERNATIONAL SEARCH REPORT

Internat'l Application No

PCT/GB 94/02762

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01H85/30 H01H85/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP,A,0 420 351 (INVER) 3 April 1991 see column 1, line 1 - column 4, line 25 see claims 1-6; figures 1-4 ---	1-4,9
Y	CH,A,85 305 (GARDY) 16 September 1920 see the whole document ---	1,2,4,9
Y	GB,A,569 761 (ELECTRICAL COMPONENTS LIMITED) 1945 see the whole document ---	3
Y	US,A,1 700 356 (GILLIAM) 29 January 1929 see the whole document ---	1-4,7
Y	US,A,1 488 263 (MANDRA) 25 March 1924 see the whole document ---	1-4,7
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

23 March 1995

Date of mailing of the international search report

19. 04. 95

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INTERNATIONAL SEARCH REPORT

Internat. Application No
PCT/GB 94/02762

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A,3 775 724 (MAMRICK) 27 November 1973 see column 2, line 41 - line 46; figure 1 ---	11
A	US,A,3 742 414 (GITTIN) 26 June 1973 see column 7, line 44 - line 46 ---	1,5
A	US,A,1 382 989 (LEE) 28 June 1921 see the whole document ---	1-3
A	US,A,3 308 257 (THOMPSON) 7 March 1967 -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 94/02762

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0420351	03-04-91	NONE	
CH-A-85305		NONE	
GB-A-569761		NONE	
US-A-1700356	29-01-29	NONE	
US-A-1488263	25-03-24	NONE	
US-A-3775724	27-11-73	CA-A- 1008905	19-04-77
US-A-3742414	26-06-73	CA-A- 941921	12-02-74
		CA-A- 972799	12-08-75
		US-A- 3612953	12-10-71
US-A-1382989	28-06-21	NONE	
US-A-3308257	07-03-67	NONE	