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(54) Ceiling recess cage.

(57) A spacer device is provided for use with a recessed light fitting to ensure a minimum spacing between the light fitting and any structural member located above or behind a panel mounting the light fitting. The device consists of a frame-like structure with two or more members (1, 2) which are movable relative to each other, e.g. by pivoting, to allow the device to be adjusted between a collapsed condition in which it can be introduced through the hole in the panel to an expanded condition. A spring can be included to ensure automatic expansion and the device can engage the hole to ensure correct positioning relative thereto.

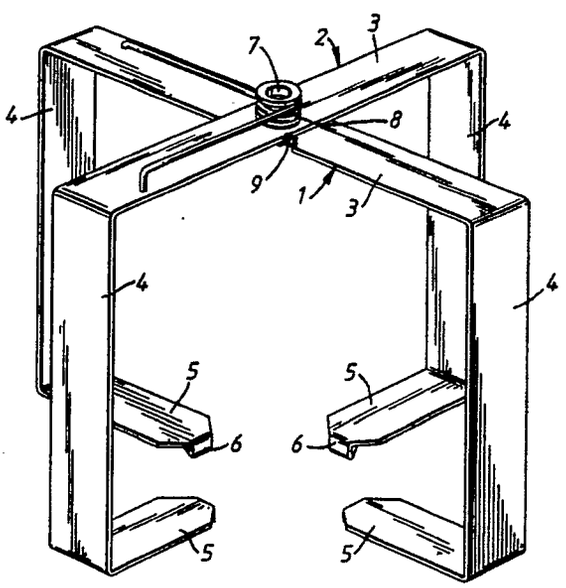

Fig.4.

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LIGHT FITTINGS

This invention relates to light fittings, and is concerned in particular with recessed light fittings, that is light fittings adapted to be mounted on a ceiling panel or the like with at least a substantial part of the fitting being accommodated in the space behind the panel remote from the area to be illuminated. Recessed light fittings are in common use and have the advantage that they are largely concealed from view, which means they can be very functional in external appearance without detracting from the aesthetic appeal when correctly installed.

The space behind a ceiling panel used to accommodate a recessed light fitting is often that space formed between the wooden joist supporting the ceiling and possibly also the floor of the room above. For reasons of safety a minimum air gap should be left between a recessed light fitting and any adjacent structure, object, superposed material, etc. in order to provide a heat insulating air gap and hence safe operating temperatures.

Some recessed light fittings are designed to enable them to be installed from below a ceiling through a hole formed in a ceiling panel, which can be very convenient, especially when access to the space above the ceiling panel is restricted or difficult. However, such light fittings can be installed inadvertently in such positions, e.g. closely adjacent a joist, so that the minimum air gap needed to ensure safety is not provided.

The present invention addresses the problem explained above and as a solution provides for use with a recessed light fitting a spacer device capable of insertion through a hole provided in a mounting panel to receive the light fitting, the device being arranged to expand into the space behind the mounting panel and thereby to form a cage-like structure for surrounding the light fitting to define a minimum distance between the light fitting and any adjacent surface.

By having a cage or frame-like structure the device does not seriously impede circulation of air within the space and cooling convection currents are maintained. However, the spacing device will ensure the correct minimum spacing between the light fitting and any laterally adjacent structural member, such as a joist, or any further floor panel (or perhaps roof space insulation material in the case of a top storey ceiling) located above the ceiling panel.

To facilitate installation and ensure its correct location the spacer device is preferably arranged to engage the edge of the hole. In this way it is easily ensured that the device is properly centered with respect to the hole and hence the light fitting.

The device may be arranged to expand from a collapsed or folded condition in a variety of different ways. For example it may be due to the inherent resilience of elements forming the device or by provision of additional spring means. Alternatively, insertion of the light fitting itself may cause the device to expand, which can provide the additional security that the light fitting can only be fully inserted if the device has been correctly expanded.

A full understanding of the invention will be had from consideration of the following more detailed description which is given by way of example and with reference to the accompanying drawings, in which:-

Figure 1 is a front elevation showing a first embodiment of a spacer device according to the invention;

Figure 2 is a side elevation of the spacer device;

Figure 3 is a plan view of the spacer device;

Figure 4 is a perspective view of the spacer device;

Figures 5A, 5B and 5C illustrate successive steps in the procedure for fitting the spacer device on a ceiling panel prior to installation of a recessed light fitting;

Figure 6 shows in perspective a modified form of the spacer device of Figure 1;

Figure 7 is a sketch showing the spacer device of Figure 6 during insertion through the hole in a ceiling panel;

Figure 8 is a schematic section showing the light fitting and spacer device of Figure 6 fully installed;

Figure 9 is an underneath perspective view showing another embodiment of a spacer device;

Figure 10 illustrates the spacer device of Figure 9 during insertion;

Figure 11 is a view showing the device of Figure 9 and light fitting correctly installed;

Figure 12 shows in cross-section another form of spacer device embodying the invention;

Figure 13 illustrates the device of Figure 12 and light fitting fully installed;

Figure 14 is a side elevation of yet another embodiment of a spacer device;

Figure 15 shows the device of Figure 14 mounted on a ceiling panel; and

Figure 16 is a view corresponding to Figure 15 and including the light fitting.

The spacer device shown in Figure 1 consists of a cage made up from two substantially identical metal members 1, 2 each having a cross arm 3 from the ends of which extend parallel legs 4. The

ends of the legs remote from the cross arm are connected to inturned feet 5 which terminate in spiked hooks 6. The cross arms 3 are connected at their centres by a pivot pin 7 which also mounts a torsion spring 8 having rectilinear end portions which are engaged with the respective members 1, 2 by having their ends hooked through holes in the cross arms. The cross arm of one member 1 has a pair of bent up lugs 9 which form stops and by abutting the edges of the cross arm of the other member 2 limit the relative pivoting movement of the members under the influence of the torsion spring 8 to the position shown in Figs. 1-4.

When the cage is to be installed through a hole previously formed in a ceiling panel for instance, the two members are rotated against the spring bias to take up a generally planar position as shown in Figure 5A. It will be appreciated that by suitably dimensioning the members 1, 2 they could be made to fold completely one into the other. The collapsed cage is inserted upwardly through the hole in the panel, with a rotational manipulation of the cage as depicted in Figure 5B. The cage is then released for expansion under the action of the torsion spring 8, whereby it returns to the Figure 1 condition, and the hooks 6 are engaged with the edge of the hole by pressing their spikes into the panel material to fix the cage securely into position. The light fitting can then be mounted in the normal fashion to be received within the surrounding cage which defines a minimum air gap between the light fitting and any adjacent surface.

Whereas the cage of Figure 1 has been described as comprising only two members 1, 2, three or even more members could be used, preferably with uniform spacing between them when the cage is correctly expanded. The device shown in Figure 6 has three such members and in this case does not comprise a spring which means the cage, after insertion through the hole in the manner shown in Figure 7, must be expanded manually to the condition shown in Figure 8, which also shows the light fitting 10 and its ceiling ring 11 installed. Instead of being spiked, the hooks 6 engage around the edge of the panel, which is acceptable since the free ends of the hooks on the underside of the panel are covered by the ceiling ring 11.

A spacer cage fabricated from resilient strips 15 is shown in a collapsed condition in Figure 9. There are three elongate strips 15 with upturned end portions 16. The strips are pivoted together at their centres and have slightly different lengths to enable them to be folded to a substantially planar collapsed condition as shown in Figure 9, which is advantageous for packaging purposes. When the cage is to be installed the strips are rotated to define six uniformly spaced radial arms. The centre of the resulting spider is pushed up through the hole in the ceiling panel causing the arms to deflect downwardly and inwardly, as shown in Figure 10. The bent end portions 16 constitute hooks which engage the edge of the hole, and in this position of the cage the arms are bowed to extend outwardly beyond the edge of the hole above the panel as may be seen in Figure 11. As in the case of the previous embodiment, the hooked ends 16 are hidden from sight by the ceiling ring 11 of the light fitting 10.

The spacer device of Figure 12 is incorporated with the ceiling ring 11 of the light fitting. Fastened to the ring are a number, e.g. 6, upwardly extending legs 20 which are pivoted or include integral hinges at lower end points 21. The legs include knee portions 22 near the hinge points. The legs are arranged to extend essentially parallel to the ceiling ring axis, as depicted in Figure 11, when the device is to be introduced into the hole in a ceiling panel. In this condition the knee portions 22 protrude radially inwardly of the ring 11 so that upon subsequent insertion of the light fitting this fitting engages the knee portions and cams them outwardly thereby causing the legs to turn at the hinge points 21 and assume the upwardly and outwardly inclined positions shown in Figure 13. Although not shown, the legs 20 could be provided with inturned ends at their upper extremities to provide cage elements extending over the light fitting.

The spacer device of Figures 14 to 16 has a central hub 24 with several elongate spokes 25 pivoted to the hub. Each of the spokes is linked by an arm to an expander 26 which is arranged to push out the spokes generally in similar manner to the principle used for expanding a conventional umbrella. The device is inserted through the hole in a ceiling panel in a collapsed condition. The expander is then forced up into locked engagement with the hub 24. The free ends of the spokes have hooks 28 which are engaged with the edge of the hole, after which the expansion of the cage results in the spokes being bowed to define a frame of dome-like configuration. The light fitting 10 and its ceiling ring may then be installed as shown in Figure 16.

The spokes 25 may include hinged segments 29 adjacent the hooks so that the segments extend radially outwardly from the edge of the hole above the panel.

It will be understood that spacer devices embodying the invention can also take other forms besides those specifically described without departing from the fundamental inventive concept of providing a frame structure to ensure a recess of predetermined minimum dimensions to receive a recessed light fitting.

Claims

1. A spacer device for use with a recessed light fitting which is inserted through and mounted within a hole provided in a mounting panel, the device comprising a plurality of members (1, 2, 15, 20, 25) movable relative to each other to allow the device to be inserted through the hole in the panel and to expand into the space behind the panel thereby to form a cage like structure for surrounding the light fitting (10) to define a minimum distance between the light fitting and any adjacent surface.

2. A spacer device as claimed in claim 1, wherein the device includes means for engaging the edge of the hole for positioning the device on the panel.

3. A spacer device as claimed in claim 2, wherein the engagement means comprises hook means (6, 28) at free ends of said members.

4. A spacer device as claimed in claim 1, 2 or 3, wherein the device includes spring means acting on the members (1, 2) to bias the members to the expanded position.

5. A spacer device as claimed as claim 4, wherein the members (1, 2) are pivotally connected and the spring means comprises a torsion spring (8).

6. A spacer device as claimed in claim 4 or 5, wherein the members 1, 2) have stop means (9) for limiting their relative pivotal movement.

7. A spacer device as claimed in claim 4, 5 or 6, wherein each member comprises a cross arm (3) for defining a cage element generally parallel to and spaced behind the panel, a leg (4) extending from each end of the cross arm, and a foot portion (5) connected to the end of each leg opposite the cross arm for lying against the panel.

8. A spacer device as claimed in claim 1, 2 or 3, wherein the members are elongated and resilient (15, 25) and are arranged to be bowed to form a dome shaped cage when the device is expanded.

9. A spacer device as claimed in claim 8, wherein the members (15) are pivoted together whereby they may be substantially aligned for insertion through the hole.

10. A spacer device as claimed in claim 8, wherein the members (25) are pivoted to a hub (24) and have means connected thereto for expanding the device from a collapsed condition wherein the members are substantially parallel.

11. A spacer device as claimed in claim 1, 2 or 3, wherein the members (20) are connected to a ring (11) adapted to fit in the hole in the panel and are movable from positions not extending radially outwardly beyond the ring to an expanded position in which the members diverge from each other away from the ring.

12. A spacer device as claimed in claim 11, wherein the members (20) have portions (22) projecting inwardly of the ring (11) for camming the members to the expanded position by insertion of the light fitting.

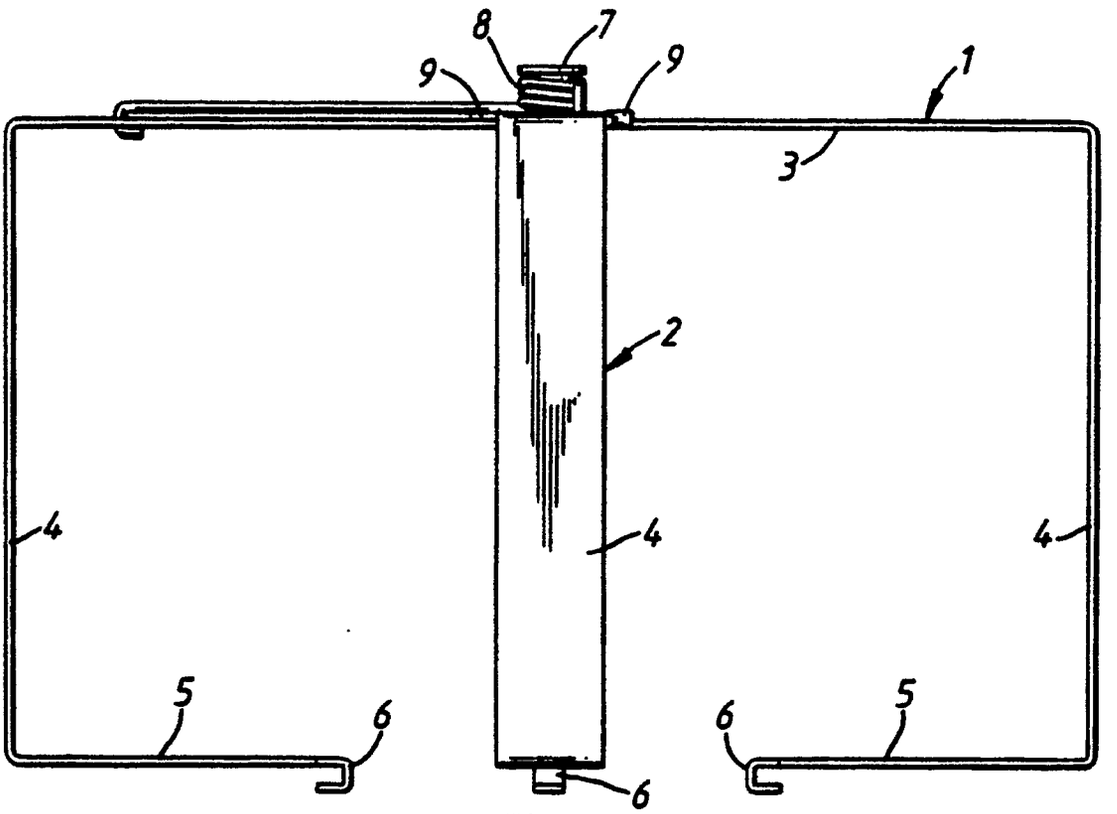

Fig.1.

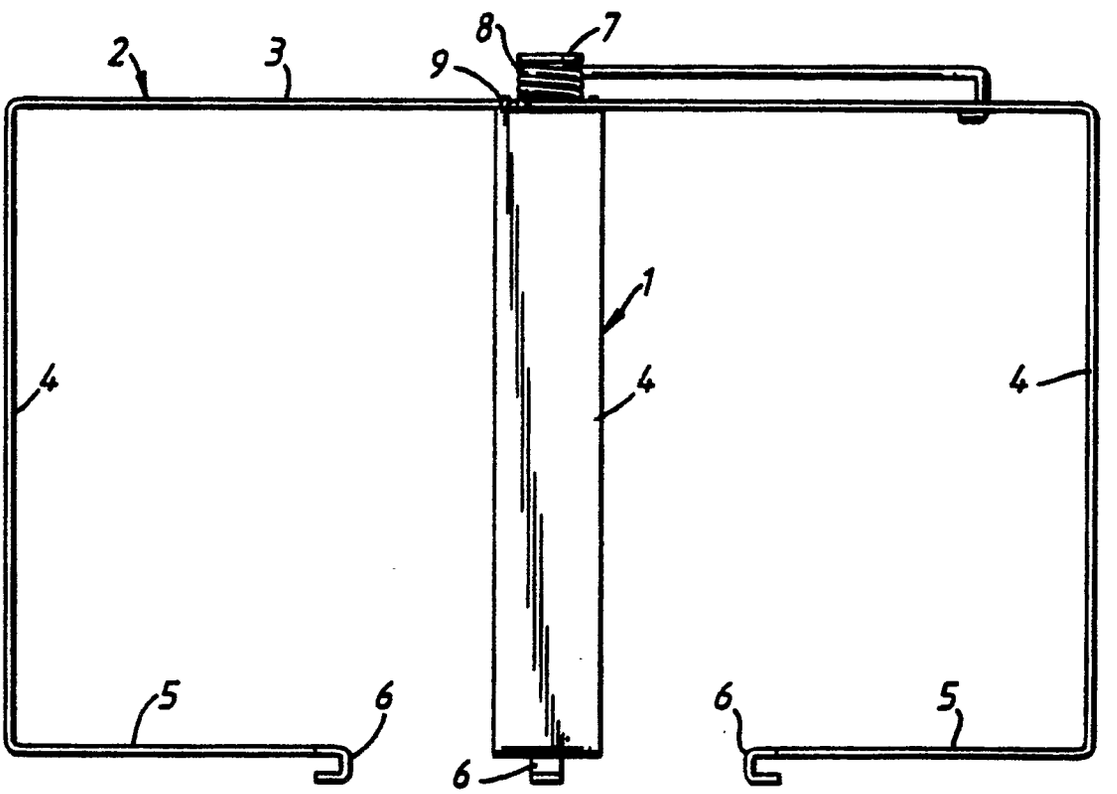

Fig.2.

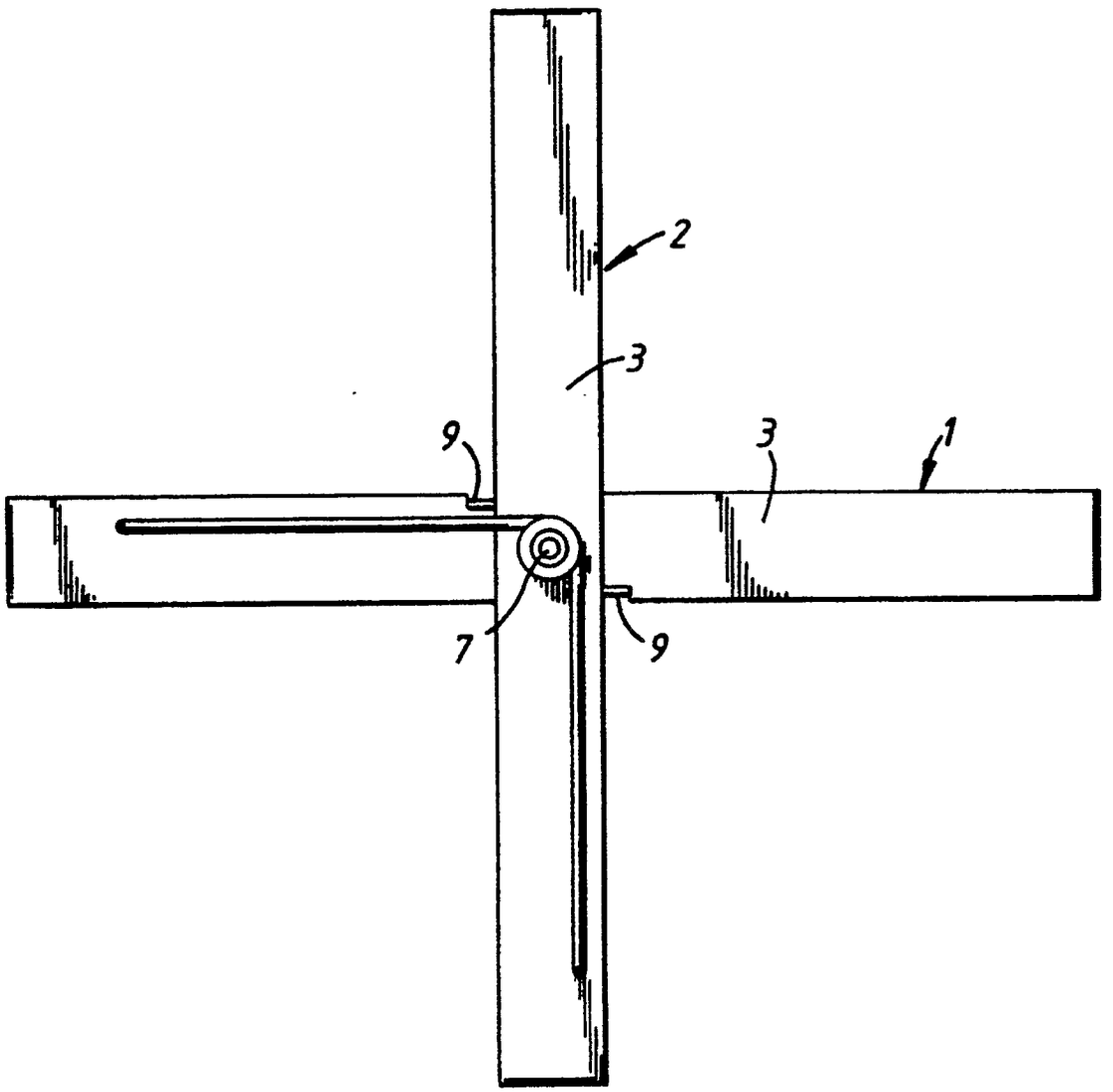

Fig.3.

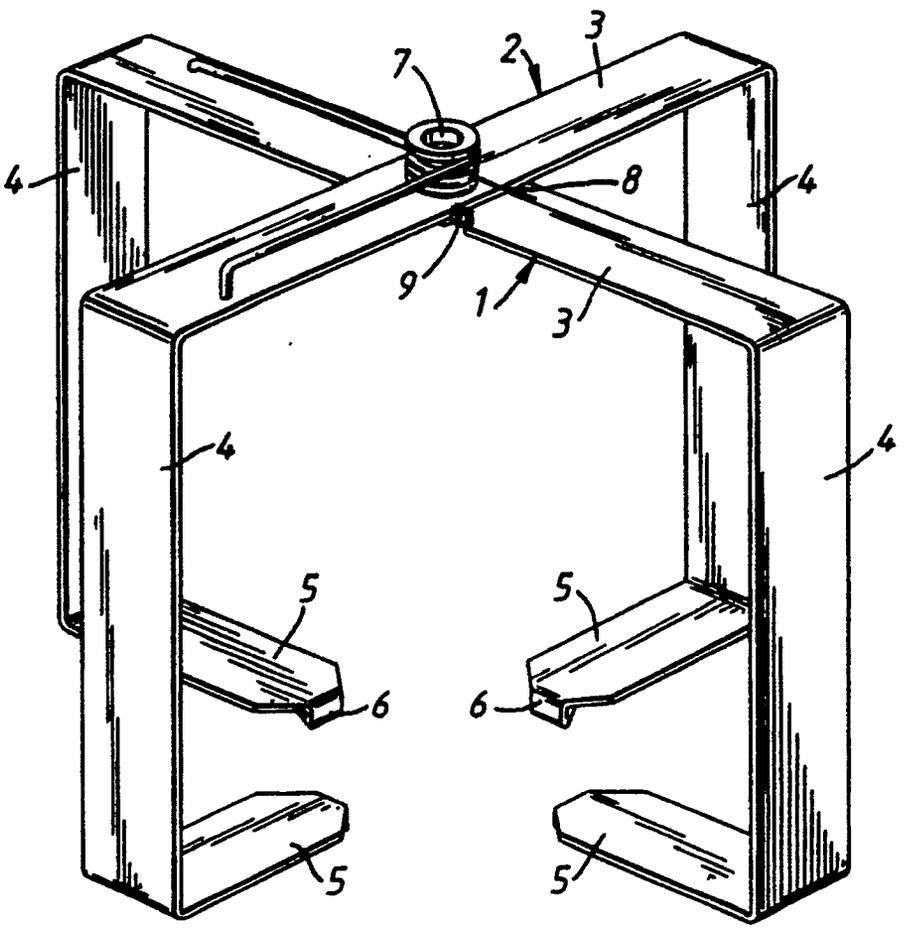

Fig.4.

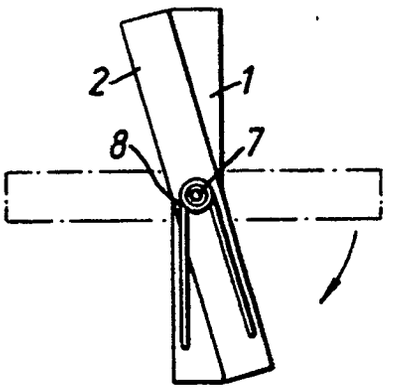

Fig.5A.

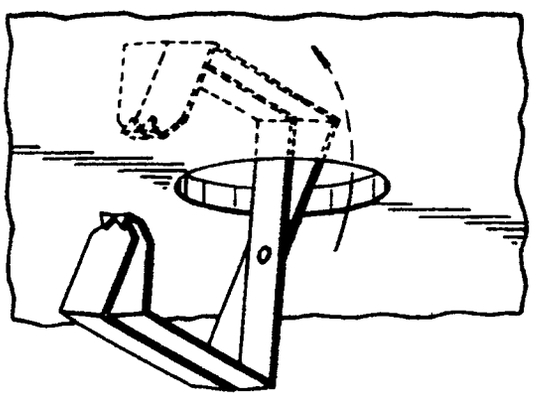

Fig.5B.

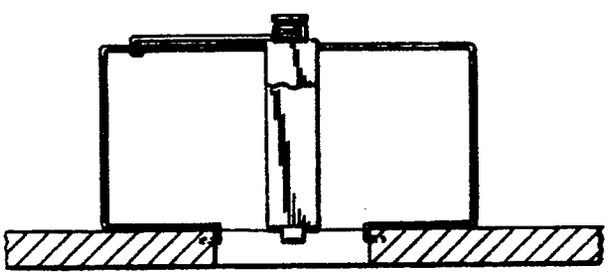

Fig.5C.

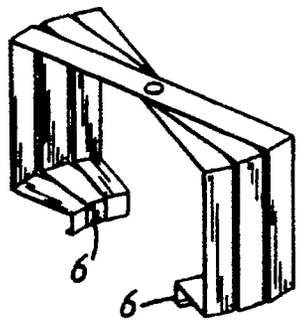

Fig.6.

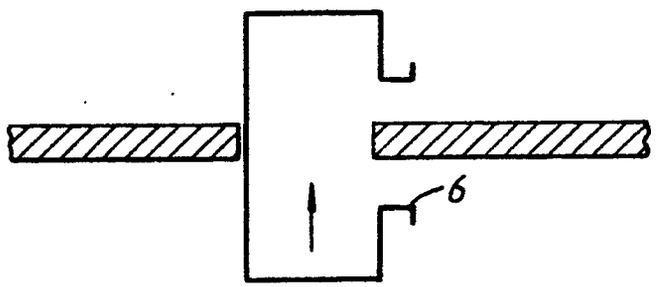

Fig.7.

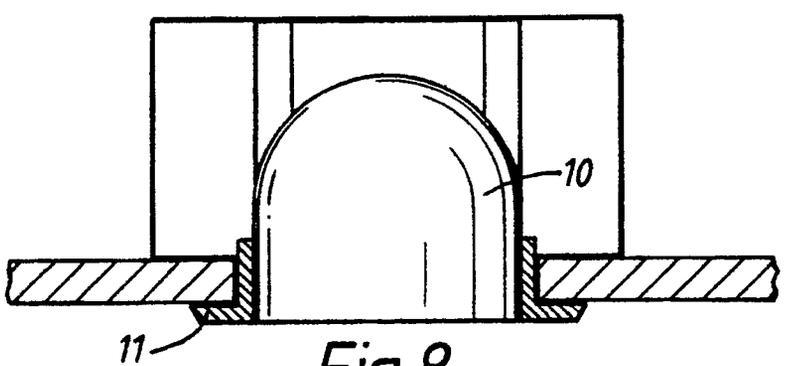

Fig.8.

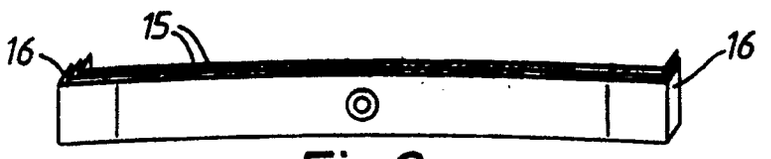

Fig.9.

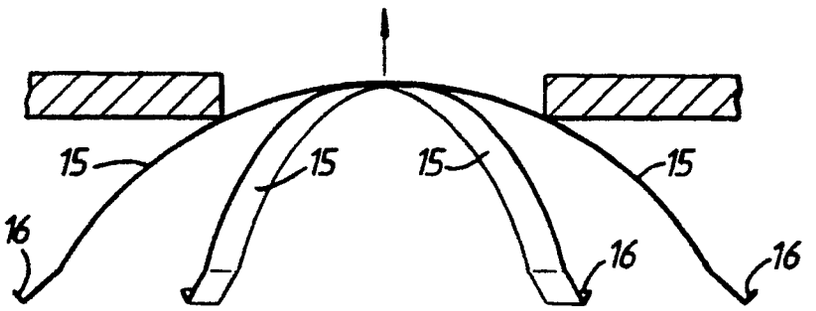

Fig.10.

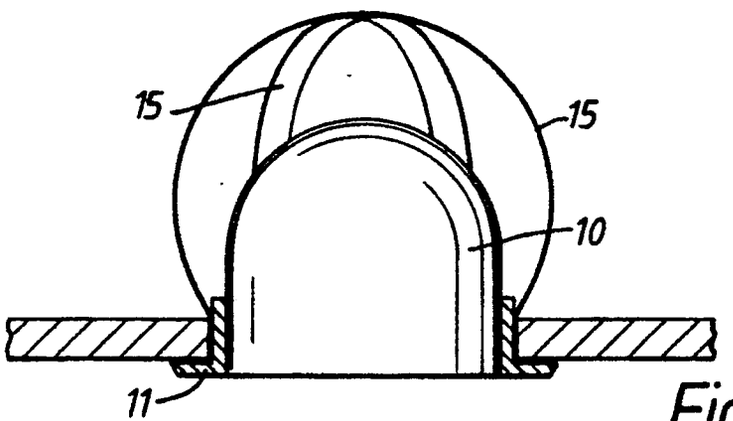

Fig.11.

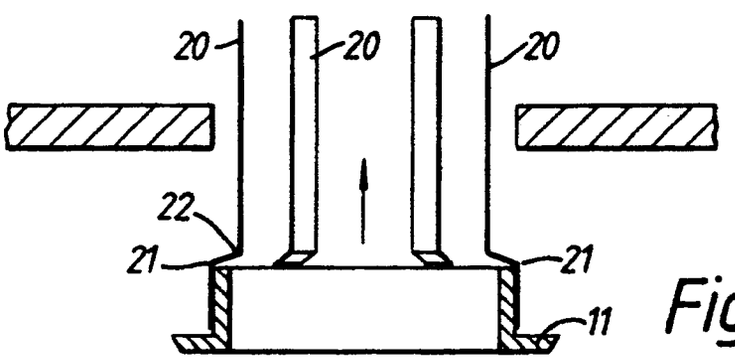

Fig.12.

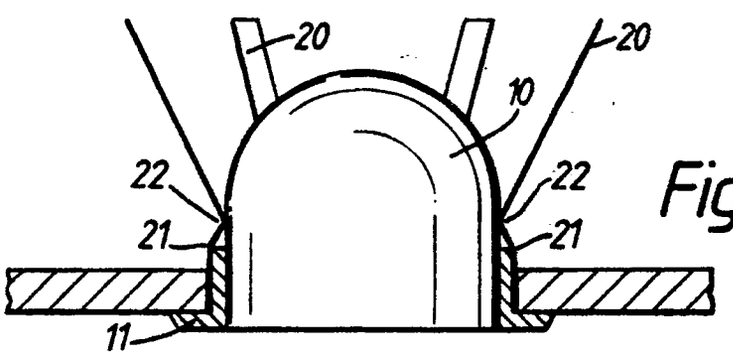

Fig.13.

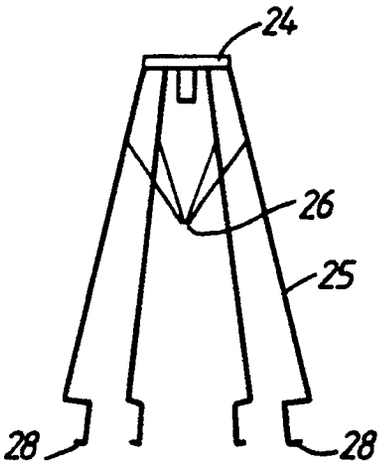

Fig.14.

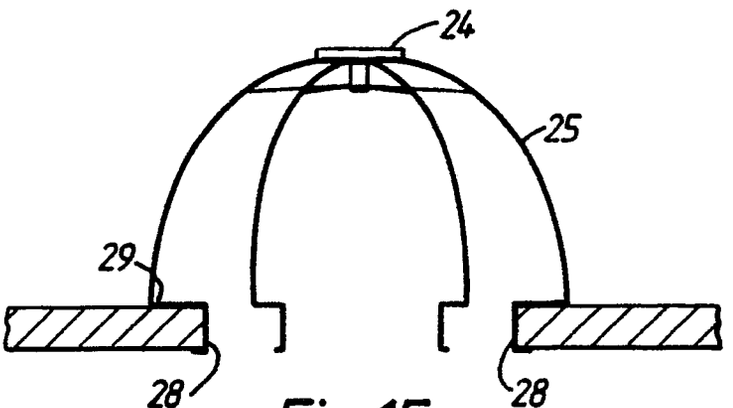

Fig.15.

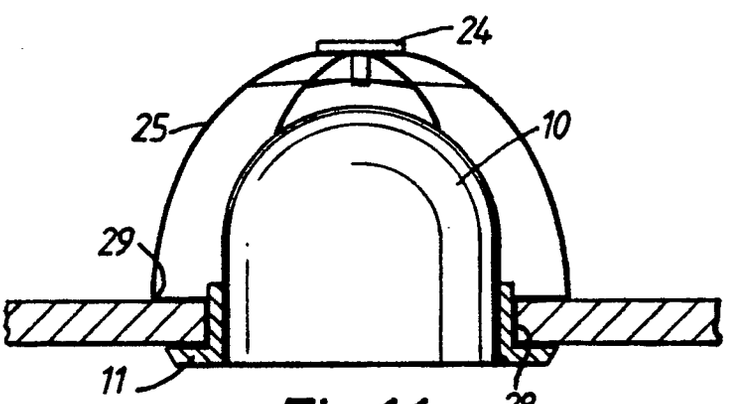

Fig.16.