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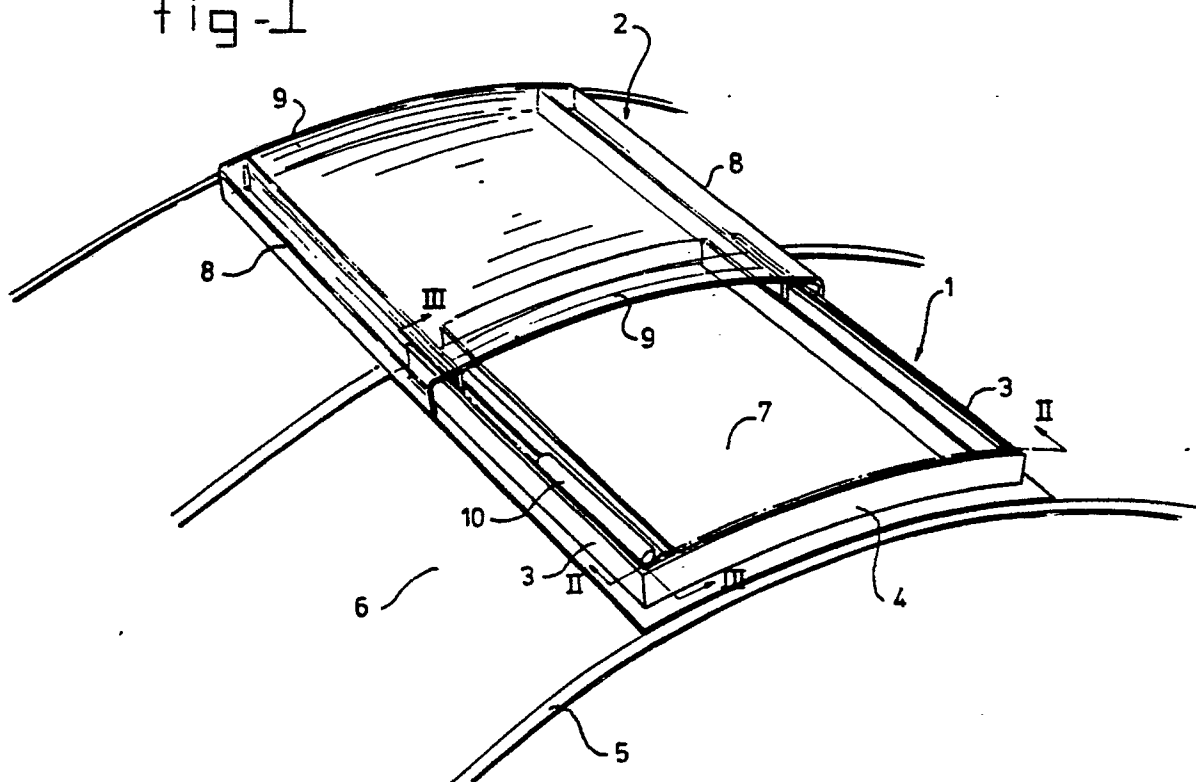
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(54) Hatch for a roof or roofing.

(57) The hatch (5) comprises a frame (1) and a panel (2) movable parallel to itself on the frame (1) be-

tween open and closed positions under the control of a drive mechanism (10).

fig-1



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HATCH FOR A ROOF OR ROOFING

The invention following relates to a hatch for a roof or roofing, provided with a panel and a frame in relation to which the panel can be opened or closed. This is primarily a hatch of the kind designed to function as a component of roofing in the form of a translucent or transparent canopy for a light street. These canopies are used in commercial and technical buildings and are also being used increasingly to protect public gathering places against the weather. Examples of this are shopping streets, pedestrian walkways, central facilities, squares and market places etc.

These canopies are built of a frame of relatively narrow sections in which translucent or transparent panels are mounted. Thanks to the relatively large transparent area obtained as a result, it is possible to provide virtually the same level of light as outside the canopy in the space protected by the canopy. In general, they form a striking part of a greater architectural whole. For this reason, it is important for the canopy to have an attractive external appearance.

In addition, the canopy must meet certain building requirements. Adequate ventilation provisions must for example be made. These provisions are also designed to ensure that in the event of fire, the combustion products cannot collect under the daylight construction such that the space covered is totally filled with smoke and toxic gases. For this reason it is stipulated that one or more ventilation arrangements must be present in the canopy which can be opened quickly and reliably.

In practice, parts of the canopy intended for such purpose are designed as hingeable flaps operated by a linear actuator such as a screw rod or jack driven by a pressurized fluid. A disadvantage of this known ventilation arrangement is that it disturbs, to varying degrees, the architecturally designed external appearance of the canopy. The drive mechanisms are located on the inside of the flap to be driven. This means that the mechanisms are protected from the effects of the weather: on the other hand they are also visible by the public. The unattractiveness of these designs is further increased by the drive mechanisms inevitably becoming dirty.

Finally, an important disadvantage of the known ventilation arrangements is that their operation, once they are opened, can be adversely affected by the weather conditions, with particular reference to wind. Indeed, with an unfavourable wind direction it is possible for the ventilation arrangement to have no venting action. In such a case, the wind blows inwards, as it were, and harmful gases and smoke are forced downwards as

a result, instead of being vented.

It is an object of the present invention to provide an arrangement of the type stated at the outset which fits in with the canopy in an architecturally attractive manner and at the same time ensures a good venting action.

This objective is achieved by the ability of the panel to slide parallel to itself, provided with the aid of the frame. In the opened condition, the panel lies totally outside the ventilation opening formed in this way, thereby ensuring a good venting action. It should be remembered that the known hingeable flaps always block or screen off the ventilation opening to a greater or lesser extent at the sides, and this can have an adverse effect on the venting action.

The hatch according to the invention can be designed in such a way that the frame consists of frame sections assembled according to the form of the panel. By means of the frame sections, the hatch can be fixed in a simple manner to the frame of the canopy, similarly consisting of sections. The cross-section and spacing of the frame sections should preferably be such as to coincide totally with the sections forming part of the canopy. Thus the external appearance of the canopy is affected as little as possible.

The form of the hatch according to the invention can be chosen at will. In most cases, however, the panel and the frame will be rectangular, whereby the panel, on two of its parallel edges, is supported and slides on two parallel frame sections. An aesthetically pleasing design can be obtained if in each case one supporting edge of the panel and the associated frame section are coupled by means of a sliding guide consisting of two rails sliding in relation to one another with the aid of rollers or castors, the length of the rails being no greater than that of the corresponding side of the rectangle. When the hatch is in the closed state, no part, which includes any slide part, now projects outside the contours of the hatch. As a result, the guide is also well screened against the effects of the weather. This cannot now get dirty, so that even if the hatch has not been opened for some time, the hatch will still operate correctly.

To obtain a favourable venting action on the part of the opened hatch, it should preferably be designed in such a way that the frame sections each have a standing section flange, these section flanges being fixed to one another at right angles so that the section flanges run vertically on the area surrounded by the frame section, to form a peripheral standing edge around the hatch opening. When the wind blows against the opening, the

standing edge thus obtained around the opened hatch opening produces a draught reliably directed outwards as a result of the chimney effect. As a result, even with the most widely differing wind directions, a good venting action is assured at all times through the opened hatch.

The hatch should preferably be designed such that the two sliding edges of the panel are each provided with a panel section having a supporting flange running to the inside of the panel, these supporting flanges each being parallel at some distance apart within the associated standing flanges of the frame sections. If, in each case, one rail of the sliding guide is connected to the standing flange of the frame section and the other rail is connected to the supporting flange of the panel section, the sliding guide of the panel is well screened, and is not drawn into view.

A further advantage is obtained if the panel is adjustable in relation to the frame by means of a linear drive mechanism, the direction of operation of which runs parallel to the sliding direction of the panel. By designing in such a way that the linear drive mechanism is coupled with a supporting flange of the panel section on the side of the supporting flange away from the associated standing section flange of the frame on one side and with a fixing flange of the frame section extending in essence parallel to the panel in an inward direction on the other side, the panel drive is also well screened, is not drawn into view and does not take up much space.

The hatch according to the invention can be designed very well as an emergency device, i.e. such that the hatch opens automatically in the event of energy failure. This can be achieved by the linear drive mechanism being a gas spring, the piston rod of which in the closed state is pushed in by the panel and in the panel open state is extended, and whereby means are provided to close the panel and to hold it closed against the pressure of the gas spring. The means of keeping pressed in can be designed in different ways. They can, for example, consist of an electro-magnetically operated bolt which releases the gas spring in the event of power failure such that the hatch is opened.

The free stroke of a gas spring is insufficient to move the panel over a long distance. For this reason, provision should preferably be made such that the piston rod bears a cable pulley at the end, over which a cable is directed such that the two parts of the cable run either side of the gas spring, one cable part being fixed to the supporting flange of the panel section, and the other cable part coupled to the associated frame section and sliding under under pretensioning. Thanks to the pulley action obtained with this design, the panel can be moved over a relatively large distance, even with a

limited free length of stroke on the part of the gas spring.

According to a preferred design, it is also possible for the other cable part to be diverted over a cable pulley fixed to the frame section, the end diverted over the cable pulley being secured to a tensioning device, the tensioning device being a cylinder with a piston to which the cable is secured, the said piston being forced by pressurized fluid in a direction away from the cable pulley. If, for whatever reason, the fluid pressure in the cable cylinder should fail, the hatch opens automatically.

Finally it is possible for one pair of parallel sections of the panel and frame to be curved in each case. The panel can then be designed to slide parallel to the straight sections. It is also conceivable, however, for the panel to slide along to the curved sections.

The invention is explained in greater detail below with the aid of a typical design.

Figure 1 shows a perspective view of the hatch according to the invention as applied to a translucent canopy.

Figure 2 shows a view according to II-II in Figure 1, with the hatch in the closed state.

Figure 3 shows a view according to III-III with the hatch in the closed state.

Figure 4 shows a view in accordance with Figure 3 of the hatch in the opened state.

Figure 5 shows a modification of Figure 3.

The hatch according to the invention illustrated in Figure 1 consists of a frame 1 and a panel 2 which slides in relation to it. The frame 1 consists of two straight frame sections 3 and two curved frame sections 4 welded at right angles to one another. The frame sections 4 are each connected to a supporting arch 5 of the translucent canopy. Between these supporting arches 5, translucent panels 6 are fitted in the known manner. At the height of the hatch according to the invention, a hole is made in the relevant panel 6, being the size of the space surrounded by sections 3, 4, whereby a hatch opening 7 is formed.

The panel 2 also consists of two straight sections 8 and a curved section 9. These, in accordance with the form of the frame 1, are welded to one another at right angles. A transparent or translucent piece of sheet material of the same sort as the panels 6 can be applied between the sections 8, 9. Given this matching of material and the fact that the curved sections 4, 5 virtually coincide, the hatch according to the invention forms virtually no disturbance in the canopy construction. This is also assisted by the concealed position of the linear drive mechanism 10, housed in section 3.

As illustrated in figure 2, the sections 3 (and also the sections 4) have a fixing flange 11 and a standing flange 12. By means of the fixing flange

11, the sections 4 can be secured to the post 5 of the canopy. The standing flanges 12 of the straight sections 3 are secured by means of a rail guide 13 to the supporting flanges 14 of the straight panel sections 8. These panel sections 8 also have a further covering flange 15 which extends outside the standing flange 12 of the straight sections 3. In this way, good screening of the guide structure is obtained. In addition, the transparent sheet 16 is secured to the frame profiles 8.

A cap 17 is also secured to the facing edges of the fixing flanges 11 of the straight sections 3, a space being formed under the cap in which a drive mechanism 18 is fitted. It is possible for such a drive mechanism 18 to be provided in both sections 3, but it is also conceivable for only one drive mechanism to be provided, as illustrated in figure 2.

In figures 3 and 4, the drive mechanism 18 is shown in greater detail. Panel 2 is shown in the closed state in figure 3 and in the opened state in figure 4. The drive mechanism comprises a gas spring 19, the housing of which is secured to the fixing flange 11 of the straight frame section 3 by support 20 on one side and by support 21 on the other. The piston rod of the gas spring 19 bears a cable pulley at its end. A cable 23 is run over this cable pulley, one end being secured to the support 21 and the other end run over a pulley 24 fixed to the support 20. The end of the cable 23 thus diverted is directed into the housing 25 of a cable jack, and secured to the piston 26 inside it. Pressurized fluid is fed via inlet 27 to the housing 25 of the cable cylinder by which the cable 23 is pretensioned. In this situation the gas spring 19 is thus held in the retracted state, panel 2 being closed.

If the pressure is removed, the piston 26 in the housing 25 can move right into the state illustrated in figure 4. As a result, the piston rod of the gas spring 19 can be moved outwards, taking the cable 23 with it. As panel 2 is secured by means of carrier 28 to this cable 23, the hatch 2 is thus pushed to its opened state. In this way, in spite of the limited length of travel of the gas spring, panel 2 is nonetheless pushed open over a relatively large distance.

According to the variant illustrated in figure 5, it is also possible to provide for the gas spring 19 in the extended state to hold the panel closed. If, in this design, a pressurized fluid is supplied through inlet 27, piston 26 in figure 5 moves to the right, and as a result the carrier 28 with the cable is pulled to the left and panel 2 is opened. The piston rod is thus forced into its retracted state: when the fluid pressure rises, the gas spring then automatically brings the panel to the closed state.

Claims

1. A hatch for a roof or roofing provided with a panel and a frame in relation to which the panel can be brought to the opened and closed state, characterised by a drive mechanism for opening or closing the sliding panel, the panel sliding parallel to itself in relation to the frame.
2. A hatch as claimed in claim 1, characterised in that the frame consists of frame sections made in accordance with the form of the panel.
3. A hatch as claimed in claim 2, characterised in that the panel and the frame are rectangular, and the panel on two of its parallel sides is supported and slides on two parallel frame sections.
4. A hatch as claimed in claim 3, characterised in that in each case a supporting edge of the panel and the associated frame section are connected by means of a sliding guide consisting of two rails sliding in relation to one another with the aid of rollers or castors, the length of the rails being not more than that of the associated side of the rectangle.
5. A hatch as claimed in claim 4, characterised in that the frame sections each have a standing section flange, such section flanges in each case being fixed to one another at right angles such that the section flanges run vertically on the area enclosed by the frame sections to form a peripheral standing edge around the hatch opening.
6. A hatch as claimed in claim 5, characterised in that the two sliding supporting edges of the panel are each provided with a panel section with a supporting flange running towards the inside of the panel, these supporting flanges each being parallel at a distance within the associated standing flanges of the frame sections.
7. A hatch as claimed in claim 6, characterised in that in each case one rail of the sliding guide is connected to a standing section flange of a frame section and its other rail is connected to the supporting flange of the panel section.
8. A hatch as claimed in claim 7, characterised in that each panel profile has a covering flange extending outside the supporting flange and parallel to it, such that the associated standing section flange is located between it.
9. A hatch as claimed in any of claims 6 to 8, characterised in that the panel is adjustable in relation to the frame by means of a linear drive mechanism the direction of operation of which runs parallel to the sliding direction of the panel.
10. A hatch as claimed in claim 9, characterised in that the linear drive mechanism is coupled on one side with a supporting flange of the panel section on the side of the supporting flange away from the associated standing section flange of the frame, and on the other side with a fixing flange of the

frame section essentially extending inwards parallel to the panel.

11. A hatch as claimed in claim 10, characterised in that the linear drive mechanism is a gas spring of which the piston rod in the closed state is pressed in by the panel and with the panel in the open state is extended, and in which means are provided to close the panel and to keep it closed against the pressure of the gas spring.

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12. A hatch as claimed in claim 10, characterised in that the linear drive mechanism is a gas spring of which the piston rod in the closed state is pressed in by the panel and with the panel in the open state is extended, and in which means are provided to open the panel against the pressure of the gas spring.

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13. A hatch as claimed in claim 11 or claim 12, characterised in that the piston rod at its end bears a cable pulley over which a cable is run such that both parts of the cable run to either side of the gas spring, one cable part is secured to the supporting flange of the panel section, and the other cable part is coupled to the associated frame section, sliding under pretension.

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14. A hatch as claimed in claim 13, characterised in that the other cable part is directed over a cable pulley secured to the frame section and the end diverted over the cable pulley is secured to a tensioning device.

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15. A hatch as claimed in claim 14, characterised in that the tensioning device is a cylinder with a piston to which the cable is secured, such piston being pressed by pressurized fluid in a direction away from the cable pulley.

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16. A hatch as claimed in any of claims 10 to 15, characterised in that in each case a removable cover extends from the ends of the fixing flanges of the frame profiles turned towards one another, this cover, forming a space for the driving element, running close to the supporting flange of the panel section.

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17. A hatch as claimed in any preceding claim, characterised in that in each case one pair of parallel sections of the panel and frame is curved.

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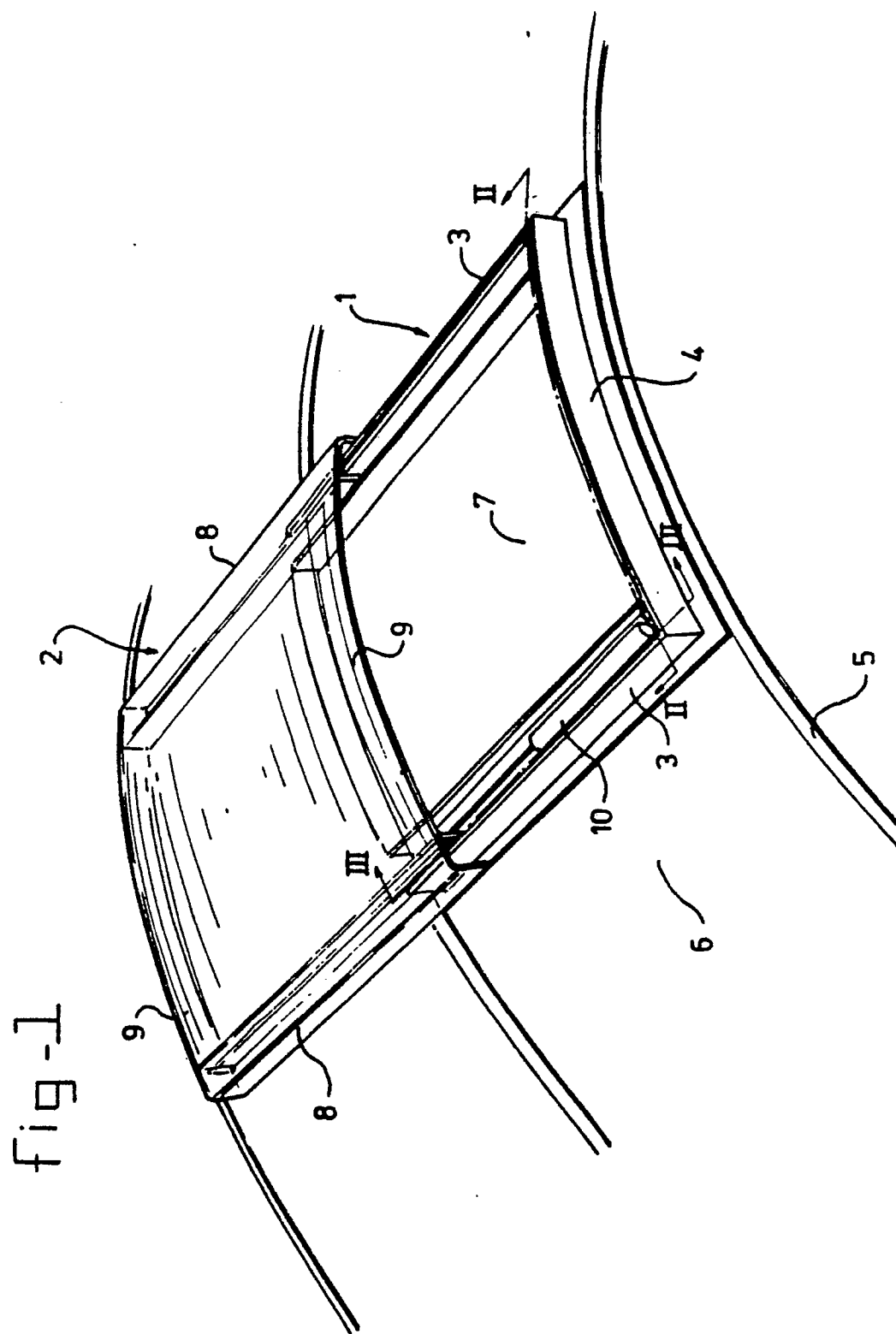


fig - 3

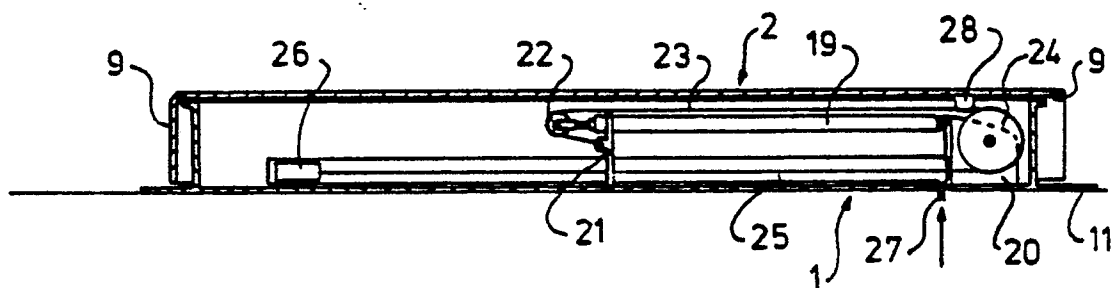


fig - 4

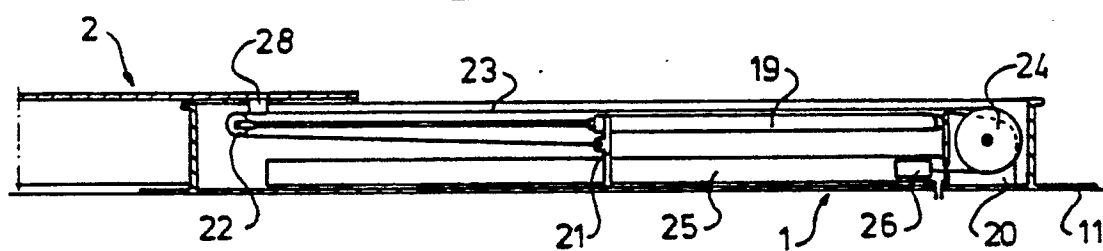


fig - 2

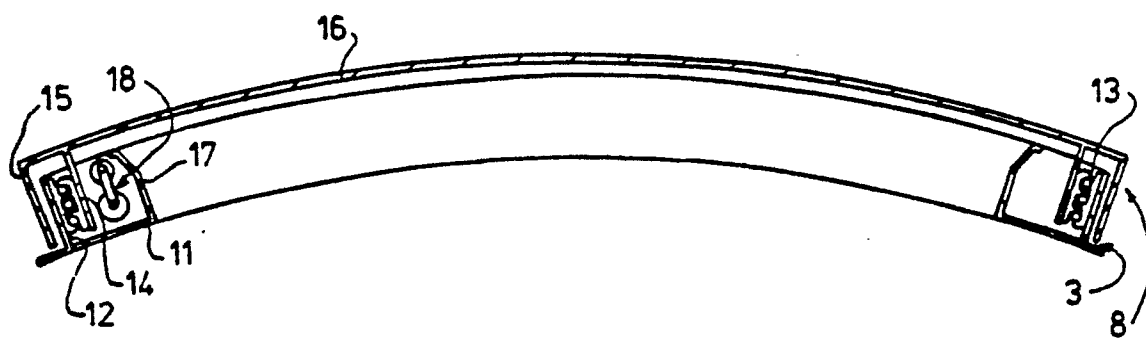
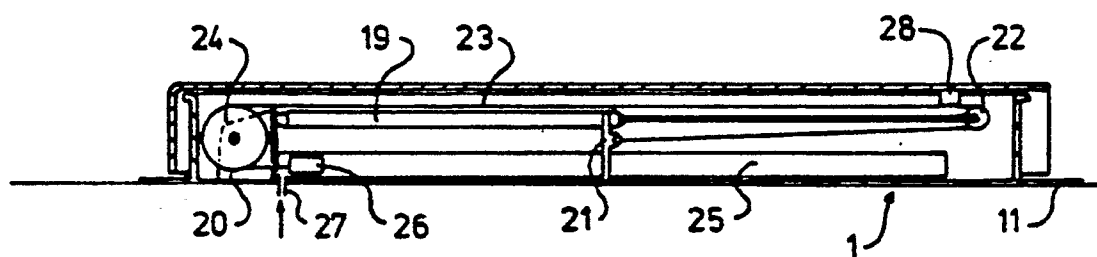


fig - 5





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EUROPEAN SEARCH REPORT

Application Number

EP 90 30 7063

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	DE-U-8 606 789 (SCHUPPAN) * Claims 1,2,3,4,8,9; figures 1,2,4,7 * ---	1-9	E 04 D 13/035 E 05 F 15/06
Y	CH-A- 577 093 (HÖGANÄS) * Column 2, lines 20-68; column 3, lines 1-34; figures 1,2,3,4,5 * ---	1-9	
A	DE-B-2 407 586 (BRAAS) * Claim 1; column 3, lines 35-53; column 4, lines 1,9-26; figures 1-4 * ---	1-4,10,11	
A	EP-A-0 314 201 (COLT INTERNATIONAL) * Column 1, lines 40-48; column 2, lines 44-49; column 3, lines 2-7; figure 1 * ---	11	
A	US-A-3 949 620 (ZEHNDER) * Column 2, lines 61-68; column 3, lines 1-35; figures 7-10 * ---	11-15	
A	DE-A-3 416 535 (RADECK) * Figure 1 * -----	1,17	TECHNICAL FIELDS SEARCHED (Int. Cl.5) E 04 D E 06 B A 62 C E 05 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 03-10-1990	Examiner HENDRICKX X.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			