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(54) Door comprising at least two door panels, as well as a door panel and holder for a pin of a hinge or roller for application in the door

(57) A door (1) has door panels (3,5) connected to each other so that they hinge and holders (9,11) in which there are pins (15) of the hinges (7) or rollers for guiding the door (1) in rails. The holders (9,11) are provided with projections (27,29,31,33) which co-operate with parts of the door panels (3,5). The projections (27,29,31,33) and the parts of the door panels (3,5) which co-operate with those projections have been designed in such a way that the forces exerted on the door panels (3,5) are transmitted through the projections (27,29,31,33) to the pins (15) and that the door panels' holders (9,11) can be removed in a direction at right angles to the pins (15).

A projection (27,29) of the holder (9,11) is situated preferably on the wall (21) of the hole (13) for the pin (15) and the part co-operating with that projection (27,29) is formed by an edge (35,37) of the door panel (3,5) where the projection (27,29) grips behind that edge (35,37), while another projection (31,33) is situated on the free outer end of the holder (9,11) and the part co-operating with that projection (31,33) is formed by the walls (39,41) defining a groove (47,49) in the door panel's main wall where the projection is situated in that groove.

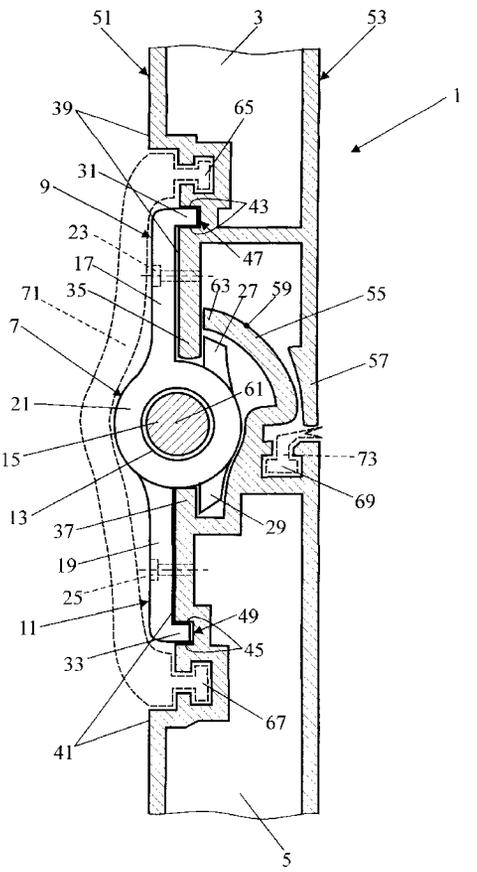

FIG. 1

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Description

BACKGROUND OF THE INVENTION:

Field of the invention

[0001] The invention relates to a door comprising at least two door panels hingedly connected to each other, and at least one holder in which there is a pin of a hinge or a roller, the holder being provided with at least one projection which co-operates with a part of one of the door panels and which is fastened to the door panel by means of fasteners, in which the projection and the part of the door panel co-operating with that projection have been designed in such a way that when forces are exerted on the door panel, these forces will be transmitted at least almost entirely through the projection to the pin and not or hardly through the fasteners. Such doors are much employed as rolling doors for the loading spaces of lorries and as rolling doors for industrial buildings. In these doors, the door panels are usually situated one above the other and extend horizontally where they are guided in rails at their sides.

Prior art

[0002] A door of the type described in the preamble is known from the German patent specification DE 42 29 786 A1. In this door, there are T-shaped projections on the hinge halves or on the roller holder situated in T-shaped recesses in the door panels. Because of these projections and the recesses co-operating with them, the forces on the door are transmitted entirely through these projections to the pin of the hinge or the roller. The hinge halves or the roller holders are shoved into the recesses from the door panels' sides and fastened by means of bolts. When assembled, the door panels are situated between guide rails on both sides, as a result of which the hinge halves and the roller holders cannot be removed without taking the door off the rails. This is a drawback with repairs in which a hinge, a roller holder or a door panel needs to be replaced.

Summary of the invention

[0003] An objective of the invention is to provide a door of the type described in the preamble in which the hinges and/or the roller holder and/or the door panels can be replaced in a simple manner. For this purpose, the door according to the invention is characterized in that the projection and the part of the door panel co-operating with that projection have a form such that in the absence of the fasteners the holder can be removed from the door panel in a direction at least nearly at right angles to the pin. By making it possible to detach the holder in a direction at right angles to the pin of the hinge or roller, it is not necessary to take the door off the rails in order to remove the holder. Because of this, the door panels can also be removed from the door in a simple manner.

[0004] One embodiment of the door according to the invention is characterized in that the holder, in addition to the projection mentioned above, is provided with an additional projection and, furthermore, is provided with a hole, in which the pin is situated, the hole being defined by a wall, and the holder comprises a plate which is fastened to the wall of the hole, where one of the projections is situated on or near the wall, and the part co-operating with that projection forms an edge of the door panel, and the projection grips behind that edge to transmit force components at least nearly at right angles to the door panel's main wall, and where the other projection is situated near the free outer end of the plate, and the part co-operating with that projection forms the walls defining a groove in the door panel's main wall, and the projection is situated in that groove to transmit force components at least nearly parallel to the door panel's main wall. In this way an advantageous construction is obtained which is simple to detach in a direction at right angles to the pin of the hinge or of the roller and which at least almost entirely transmits the forces on the door through the projections to the pin.

[0005] A further embodiment of the door is characterized in that the pin is situated at least partially inside the principal planes defining the door panels. Because of this, a smoother inner wall of the door is obtained as a result of which there is less chance that, while opening and closing, the door will catch on goods in the space behind.

[0006] Still a further embodiment is characterized in that the pin forms a hinge pin on which there is a roller. By attaching the rollers for guiding the door in rails to the hinge pins, no extra holders are needed for fitting the rollers to the door panels.

[0007] In order to prevent fingers from being caught between the door panels while closing the door, a further embodiment is characterized in that of the door panels' ends which are turned towards each other, one is provided with a projecting curved wall and the other is provided with a projecting edge which co-operates with the curved wall thus providing a safeguard against catching fingers.

[0008] In order to prevent dirt, which has got in between the curved wall and the edge of the safeguard against catching fingers, from leading to jamming of the door panels still another embodiment is characterized in that the curved wall along with the projecting edge form a self-parting construction.

[0009] This self-parting construction is characterized preferably in that the distance from a point on the wall to the hinge pivot point becomes smaller as said point is situated closer to the free outer end of the wall. Because of this, the distance between the wall and the edge increases as the door panels hinge from out of a parallel position with respect to each other, as a result of which any dirt present will not be a problem.

[0010] The invention also relates to a door panel and a holder for a pin of a hinge or roller for application in a door according to the invention.

Brief description of the drawings

[0011] The invention will be elucidated more fully below by means of drawings in which an example of the embodiment of the door according to the invention is shown. Displayed are:

Figure 1: a vertical section of a detail of the door at a hinge;
Figure 2: a rear view of the door at the detail shown in figure 1;
Figure 3: a vertical section of the lower end of the door;
Figure 4: a rear view of the lower end of the door shown in figure 3; and
Figure 5: a cross section of a door panel.

Detailed description of the drawings

[0012] In figure 1 a vertical section of a detail of the door at a hinge is shown. The door 1 has a number of door panels 3, 5 which are connected to each other by means of hinges 7. The hinge 7 has two holders 9 and 11, which are coupled to the door panels 3 and 5. Each holder 9, 11 is provided with a hole 13 in which there is a pin 15 of the hinge. Furthermore, each holder 9, 11 has a plate 17, 19, which is fastened to the wall 21 of the hole 13. The hinge pin in this embodiment is a loose pin 15, but may, for example, also be a pin which is part of one of the two holders. The holders 9, 11 are fastened to the door panels 3, 5 by means of fasteners, executed here as bolts 23, 25.

[0013] During operation, forces can act on the door, for example, -in the event that the door is part of a lorry- by shifting loads colliding against the door or by an external force, for example, in a collision. There are also vertical forces affecting a door panel due to the dead weight of the door panels above. All these forces have components parallel to and perpendicular to the door panels' main walls. In order to be able to transmit these force components through a hinge pin to a nearby door panel or through a roller pin to rails on either side of the door, the holders 9, 11 are provided with projections 27, 29, 31, 33.

[0014] One of the projections 27, 29 is situated on the wall 21 of the hole 13 and co-operates with a part of the door panel 3, 5 formed by an edge 35, 37. The projection 27, 29 grips behind the edge 35, 37 to transmit force components at right angles to a main wall 39, 41 of the door panel 3, 5. The other projection 31, 33 is situated at the free outer end of the plate 17, 19 and co-operates with a part of the door panel 3, 5 formed by the walls 43, 45 defining a groove 47, 49 in the main wall 39, 41. Moreover, the projection 31, 33 is situated in the groove 47, 49 to transmit force components parallel to the main wall 39, 41 of the door panel 3, 5. Because of the projections 27, 29, 31, 33 large forces can be transmitted and the bolts 23, 25, which fasten the holders 9, 11 to the door panels 3, 5, do not have to be executed in a heavy-duty form.

[0015] The pin 15 of the hinge 7 is situated partially inside the principal planes 51 and 53 defining the door panels 3 and 5, as a result of which an almost smooth surface of the inner side of the door 1 is obtained.

[0016] Of the door panels' ends which are turned towards each other, one is provided with a projecting curved wall 55 and the other is provided with a projecting edge 57, which co-operates with the curved wall 55 forming a safeguard against catching fingers. The curved wall 55 forms a self-parting construction with the projecting edge 57 in which the distance from an arbitrary point 59 on the wall 55 to the hinge pivot point 61 becomes smaller as said point 59 is situated closer to the free outer end 63 of the wall 55.

[0017] Furthermore, there are recesses 65, 67 and 69 in the door panels 3 and 5 in which the rubber covers 71 and 73 (shown by broken lines) grip with their projections. Rubber cover 71 covers the hinge 7 and rubber cover 73 seals a gap between the door panels 3 and 5.

[0018] In figure 2 a rear view of the detail shown in figure 1 is displayed. The rubber cover 71 has been omitted for clarity. A roller 75 is situated on the pin 15 for guiding the door 1 in rails. Each holder 9, 11 is fastened to the door panels 3, 5 with three bolts 23 and 25.

[0019] In figure 3 a vertical section of the lower end of the door 1 is shown. The lowermost door panel 5 is provided with an additional holder 77 at the lower end in which there is a pin 79 of an additional roller. A rubber profile 81 with a rubber buffer stop 83 is clipped in the lowermost end with which the door 1 can rest on a floor when closed.

[0020] In figure 4 a rear view of the lower end of the door 1 is shown. The holder 77 is fastened to the door panel 5 by means of bolts 85, 87, where the bolts are then fitted in the holes 85 and 87. The roller 89 extends beyond the side edge of the door panel 5 and serves to guide the lowermost door panel 5 in the rails.

[0021] Finally, a cross section of a door panel 3 of the door is shown in figure 5. All the door panels of the door are identical to each other which is advantageous in their manufacture and assembly.

[0022] Although the invention has been elucidated in the foregoing by means of drawings, it should be established that the invention in no way is limited to the embodiment shown in the drawings. The invention applies to all embodiments deviating from the embodiment shown in the drawings within the framework defined by the claims. Instead of bolts the holders may also be fastened to the door panels by other means, for example, rivets.

Claims

1. Door comprising at least two door panels (3, 5) hingedly connected to each other, and at least one holder (9, 11, 77) in which there is a pin (15, 79) of a hinge (7) or a roller (75. 89), the holder being provided with at least one projection (27, 29, 31, 33) which co-operates with a part (35, 37, 43, 45) of one of the door panels and which is fastened to the door panel by means of fasteners (23, 25), in which the projection (27, 29, 31, 33) and the part (35, 37, 43, 45) of the door panel (3, 5) co-operating with that projection have been designed in such a way that when forces are exerted on the door panel, these forces will be transmitted at least almost entirely through the projection to the pin (15, 79) and not or hardly through the fasteners (23, 25), characterized in that the projection (27, 29, 31, 33) and the part (35, 37, 43, 45) of the door panel (3, 5) co-operating with that projection have a form such that in the absence of the fasteners (23, 25) the holder (9, 11, 77) can be removed from the door panel in a direction that is at least nearly at right angles to the pin (15, 79).

2. Door according to claim 1, characterized in that the holder (9, 11, 77) in addition to the projection (27, 29) mentioned above is provided with an additional projection (31, 33) and, furthermore, is provided with a hole (13), in which the pin (15, 79) is situated, the hole being defined by a wall (21), and the holder (9, 11, 77) comprises a plate (17, 19) which is fastened to the wall (21) of the hole, where one of the projections (27, 29) is situated on or near the wall (21) of the hole and the part co-operating with that projection forms an edge (35, 37) of the door panel (3, 5), and the projection (27, 29) grips behind that edge (35, 37) to transmit force components at least nearly at right angles to the door panel's main wall (39, 41), and where the other projection (31, 33) is situated at least near the free outer end of the plate (17, 19) and the part co-operating with that projection forms the walls (43, 45) defining a groove (47, 49) in the door panel's main wall (39, 41), and the projection (31, 33) is situated in that groove (47, 49) to transmit force components at least nearly parallel to the door panel's main wall (39, 41).

3. Door according to claim 1 or 2, characterized in that the pin (15, 79) is situated at least partially inside the principal planes (51, 53) defining the door panels (3, 5).

4. Door according to claim 1, 2 or 3, characterized in that the pin (15) forms a hinge pin on which there is a roller (75).

5. Door according to one of the preceding claims, characterized in that of the door panels' ends which are turned towards each other, one is provided with a projecting curved wall (55) and the other is provided with a projecting edge (57) which co-operates with the curved wall (55) thus providing a safeguard against catching fingers.

6. Door according to claim 5, characterized in that the curved wall (55) along with the projecting edge (57) form a self-parting construction.

7. Door according to claim 6, characterized in that the distance from a point (59) on the wall (55) to the hinge pivot point (61) becomes smaller as said point (59) is situated closer to the free outer end (63) of the wall (55).

8. Door panel (3, 5) for application in a door (1) according to one of the preceding claims.

9. Holder (9, 11, 77) for a pin (15, 79) of a hinge (7) or roller (75, 89) for application in a door (1) according to one of the preceding claims 1 to 7 inclusive.

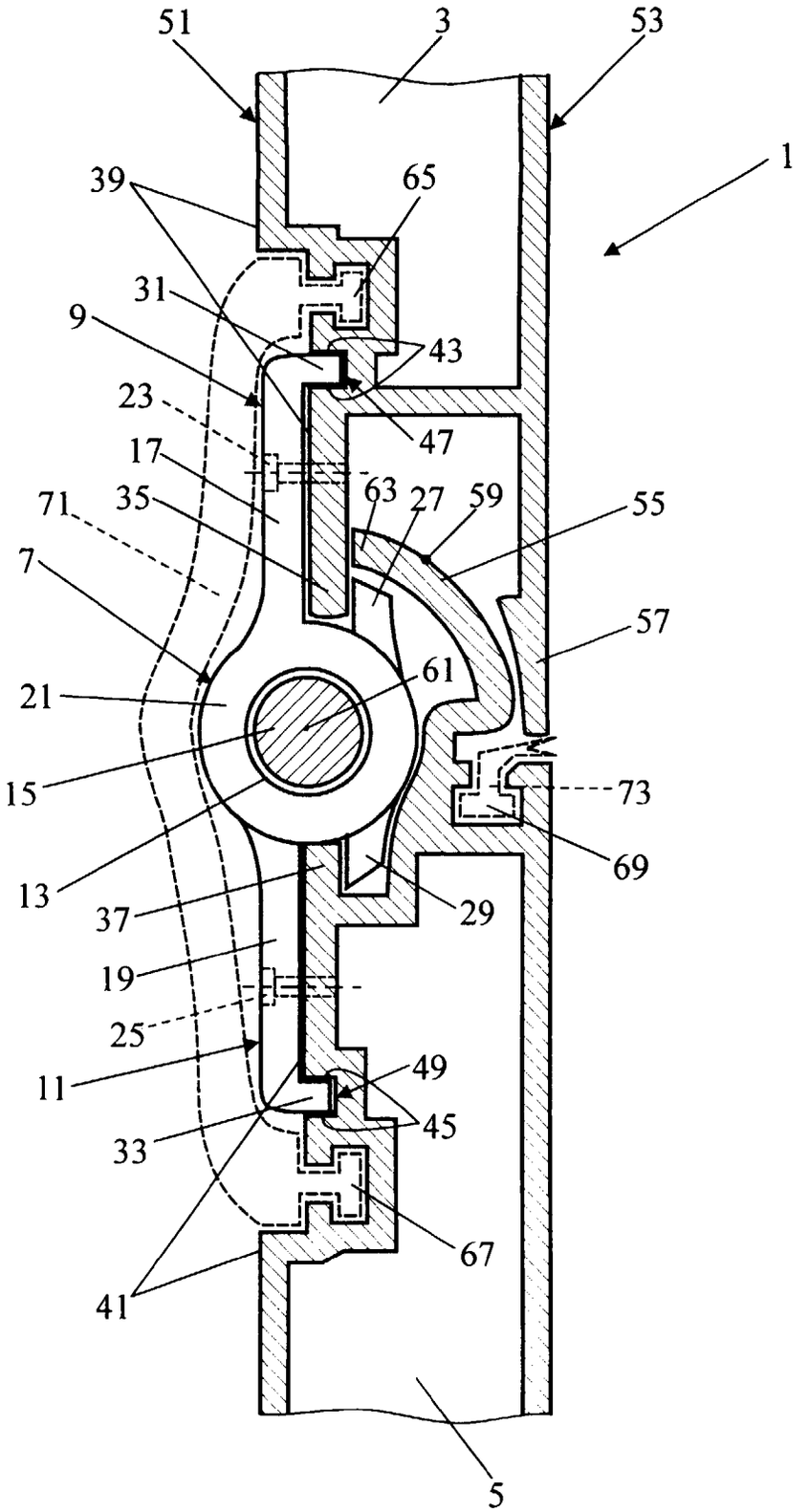
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FIG. 1

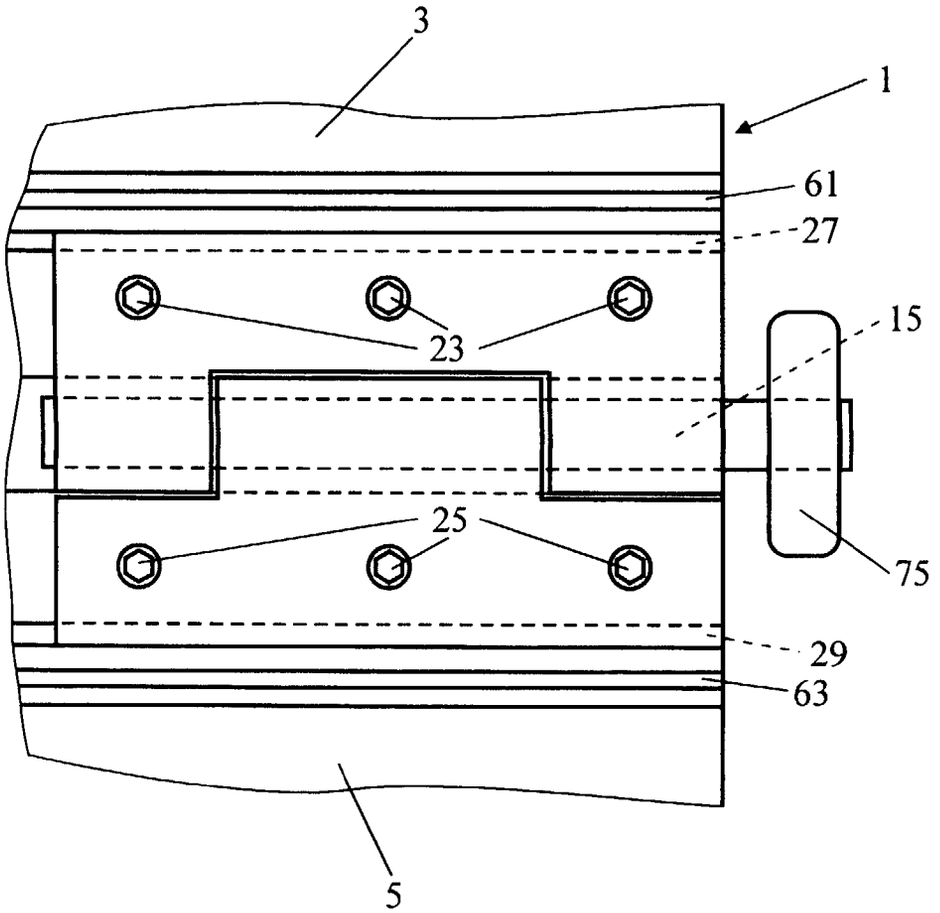

FIG. 2

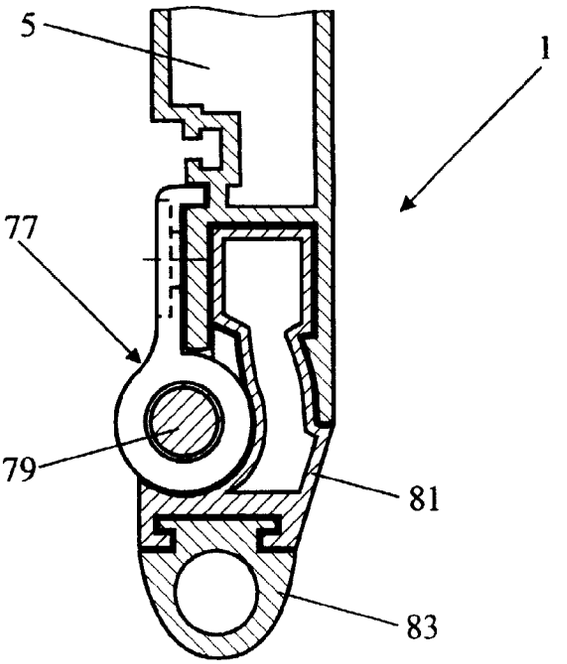

FIG. 3

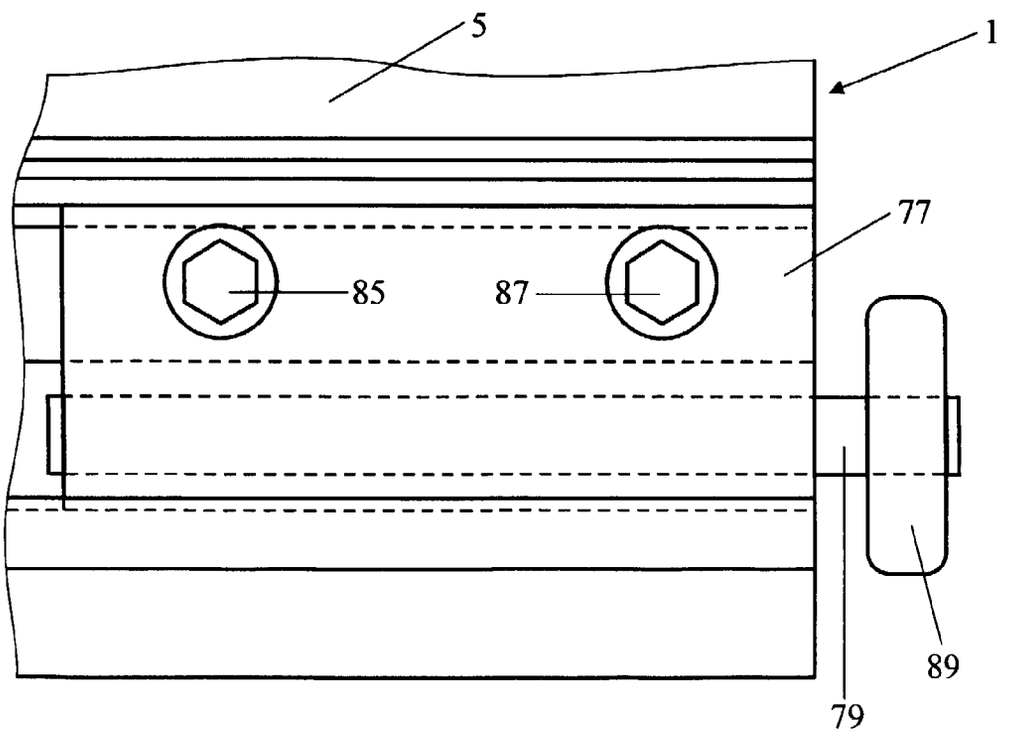

FIG. 4

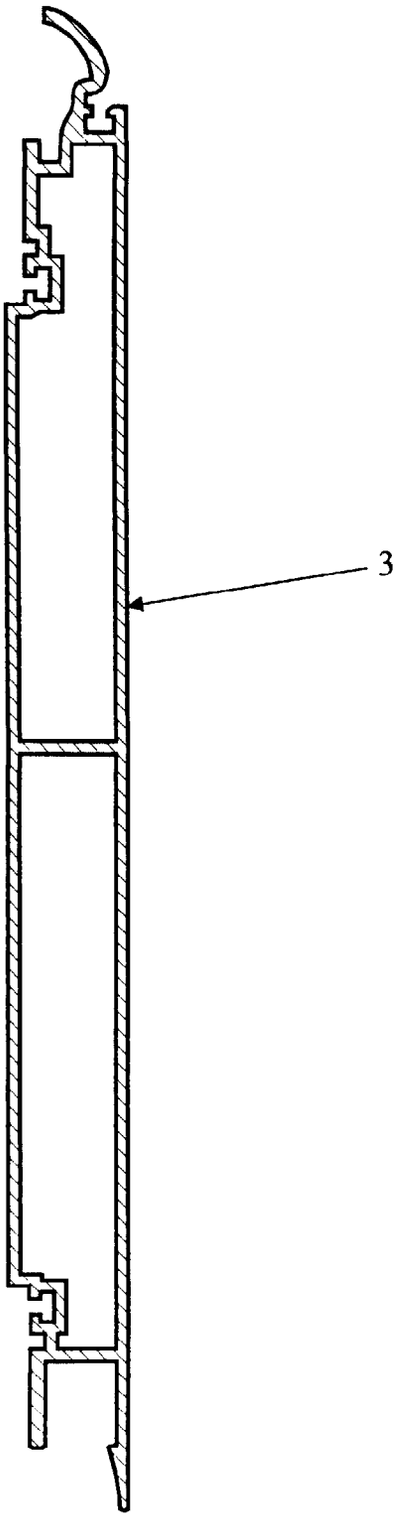

FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 20 0219

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.6)
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Y	WO 92 14900 A (CLOPAY CORPORATION) 3 September 1992 * page 3, line 4 - line 16 * * page 4, paragraph 2 * * page 6, line 3 - line 11 * * page 22, line 19 - page 24, line 6 * * page 27, paragraph 2 - page 28, paragraph 1 * * figures * * page 13, paragraph 2 - page 16, paragraph 1 *	1,2,8,9	
A	DE 94 03 956 U (LUCAS BERND) 20 July 1995 * page 6, paragraph 7 - page 9, paragraph 3; figures *	1-5,8,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 May 1999	Depoorter, F

CATEGORY OF CITED DOCUMENTS

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