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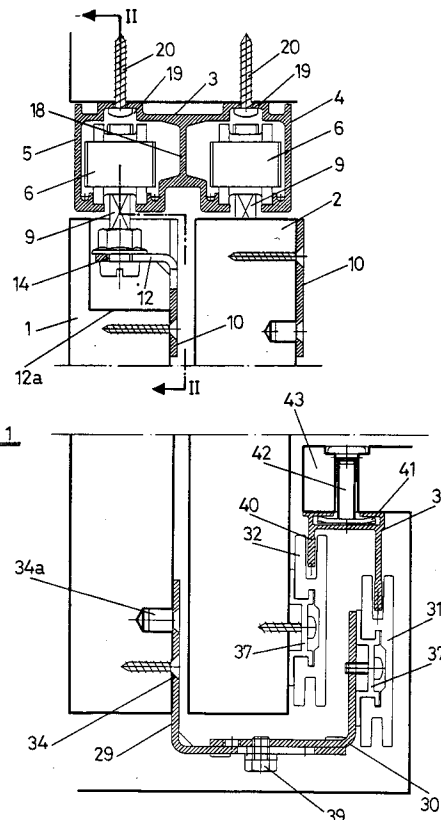
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**Mechanism for the mounting of sliding and folding doors.**

Mechanism for the mounting of sliding and folding doors, particularly doors consisting of at least two leaves (1 and 2, 1a and 2a), suspended by means of upper rail rolling elements (3, 3a) and which run on lower guides (33). The upper rails (3, 3a) consist of a shaped section that forms two rolling tracks (4 and 5) for sliding doors and a single rolling track for folding doors, along which move groups of carriages belonging to different door leaves. The carriages (6) making up the rolling elements have a vertical hole (8, 8a) for taking a suspension rod (9, 9a) for the leaves. The bottom of the leaves has runners (31) that slide along an inverted guide (33), fitted below the level of the gap closed by the door.



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This invention concerns a mechanism for the mounting of sliding and folding doors. The doors consist of two leaves that are suspended from upper rails by means of rolling elements, and are supported on lower guides. The rolling elements include a carriage consisting of a housing in which are mounted parallel axis wheels and a vertical intermediate suspension rod for the door leaves.

The mounting of sliding doors and folding doors is done by means of mechanisms of different design and assembly. The various components going to make up each mechanism are specially designed for the mounting of one or other kind of door. The mechanisms intended for running or sliding doors cannot be used for folding doors, and vice versa.

For the traditional design system, a high number of components are needed, many of them performing practically identical functions, but which are nevertheless designed to form part of a specific mechanism.

The object of this invention is to achieve a mechanism that can be used in almost its entirety for mounting both running doors and folding doors. Just a small number of different parts are needed so that, by choosing the right ones, a different door system can be created.

The invention's mechanism includes parts or components that have a traditional shape or design and others that are newly designed. With all these, a unit can be built that allows running or folding doors to be mounted. Certain parts are interchangeable and can be used for both systems, while others are specifically designed for a certain door mounting system.

In accordance with this invention, the upper rails consist of single shaped section that defines two parallel rolling tracks along which run the two groups of carriages belonging to the different leaves of the sliding door. For folding doors, a single-rail shaped section will be used.

The carriages making up the rolling elements have a vertical central hole that can be threaded to take the door-leaf suspension rod, which can be screwed upwards into it. Both the central hole and the rod need not be threaded, instead both elements having a transverse hole that can be aligned with each other and into which a blocking and suspension pin can be inserted.

Inside the rails are stops that limit the extreme closing position of the leaves. These also act as retaining elements for the leaves in order to prevent their being accidentally opened, a slight effort being necessary in order to release the rail from the retaining element and open the door.

These stops consists of a part that acts as the stop itself, the retaining element - preferably made of plastic - and a metal securing bridge.

Fitted to the bottom of the door leaves are runners that slide over an inverted guide mounted under the gap in which the doors close.

For sliding doors, the outermost leaves are attached at the bottom and on their internal surface to two brackets joined together to create a U-piece. This clasps the bottom edge of the outermost leaves and its outside arm bears the runners that slide along the inverted guides mentioned above. The innermost leaves, for their part, have their runners attached directly on their internal surface. This shape of U-piece allows its opening to be adjusted and it can be adapted to the size of the doors and the mounting of the whole assembly.

The inverted guides mentioned above consist of an inverted C-shape with side arms of different lengths, the shorter arm being the one that runs closer to the doors. The outside of the central arm of this C-shape forms a longitudinal groove with a central hole. It mounts by sliding on inverted pivot heads secured on their outside to the floor of the gap in which the doors are to close.

When the doors are foldable, the leaves are jointed to each other by means of traditional hinges. In the same way, the door leaves link with the carriage containing the rolling elements and with the lower guide runners via hinges of traditional design and support parts that are specially designed. The support part consists of a flat bar bent into an L-shape for bearing the lower runners. The shorter arm of this L-shape is laterally extended by a section to which the adjacent arm of the corresponding hinge connects, while the runner that slides in the inverted guide is mounted to the longer arm of the L-shape. The connection between carriage and hinge linking with it is achieved by means of flat bar bent into a bracket shape, one arm of which is traversed by the suspension rod while the other arm is secured to the corresponding hinge member. The rod freely traverses the hole in the rolling element carriage and is connected to it by a transverse pin, as stated above. All the features stated here, as well as others belonging to the invention, as included in the patent claims, will be more easily understood with the description given below referring to the attached diagrams. These show one possible way of carrying this assembly and are intended to provide an example only rather than being restrictive.

In the diagrams:

Figure 1 is a vertical cross-section of a running door, designed along the lines of the invention.

Figure 2 is a longitudinal cross-section taken along the line of intersection II-II in figure 1.

Figure 3 is a cross-section according to the line of intersection III-III in figure 2.

Figure 4 is a cross-section of the carriage housing, taken along the line of intersection IV-IV in

figure 2, showing a different way of carrying this out.

Figure 5 is a plan view of the stop that appears mounted on the rail in figure 2.

Figure 6 is a section along the line of intersection VI-VI in figure 5.

Figures 7 to 10 show front and plan views of the brackets making up the U-piece that is secured to the lower part of the outside leaves of the door.

Figure 11 is a schematic plan view of a folding door fitted with the mechanisms of this invention.

Figure 12 is a vertical section, similar to figure 1, of the folding door in figure 11.

Figure 13 is a side view of the bracket suspended from the rolling elements in figure 12.

Figure 14 shows perspective view of the runners' bearer piece in figure 12.

In figure 1, the numbers 1 and 2 refer to the two leaves of a sliding door. These leaves are suspended from an upper shaped section 3 that forms two rails numbered 4 and 5. Running along the inside of these two rails are carriages 6 making up the rolling elements for sliding the doors 1 and 2.

The carriages 6, figure 2, include a housing in which are mounted two parallel axis wheels 7. Between these two wheels is a central vertical hole 8 in which is inserted, from below, an intermediate rod 9 from which the leaves 1 and 2 are suspended by means of an intermediate plate 10. The vertical hole 8 of the carriage 6, and the central rod 9, can be secured together by means of screwing. Alternatively, the hole and the rod need not be threaded, in which case they both contain a transverse hole 8a, figures 4 and 12, so that a blocking pin can be inserted. If the rod 9 is threaded, it can have an unthreaded polygonal-shape intermediate section 11 so that it can be gripped with a spanner.

As can be seen in figures 2 and 3, plate 10 has a roughly rectangular shape with a central section 12 bent into a right angle from one of its longitudinal edges. On each side of this central section is a tab 13. Along the bending line of the section 12 is a notch 14 for the passage and proper positioning of the central rod 9, this notch aligning with the plate 10 via a window 15 sized to allow the head of the rod 9 to pass through. Moreover, the plate 10 has holes 17 to allow securing screws for leaves 1 and 2 to pass through and, as can be seen in figures 1 and 2, is also carries pivots 17a for it to be centred.

As shown in figure 1, the central section of the plate 10 is housed in a recess 12a made in the leaves 1 and 2 of the door along their upper edge. This system of mounting allows the height of the leaves 1 and 2 to be adjusted so that their upper

edge is set as close to the upper rail 3 as is wished.

As can be seen better in figure 1, the shaped piece 3 has a roughly rectangular outline, with an intermediate transverse partition 18 that defines two longitudinal gaps, each of which has a longitudinal slot for the passage of the central rod 9. The upper opposite side has a longitudinal recess 19 containing drilled holes for securing screws 20 to pass.

Rails 4 and 5 are fitted with internal stops 21, figure 2, that limit the passage of the carriages 6. As can be seen better in figures 5 and 6, the stops 21 consist of a body 22 with a projecting arm 23. The stops are secured by means of a bridge 24, screws 25 traversing the body 22, and nuts 26 that are housed in that body. The ends of the side arms 27 of the bridges 24 are toothed 28.

As can be seen in figure 2, the stops 21 are mounted in such a way that the arm 23 points towards the carriage 6. When the door is in the closed position, the carriage 6 will knock against the body 22, while the adjacent wheel 7 couples with the arm 23, which acts as a retaining element to prevent the door from accidentally opening. When the screws 25, resting on the bottom of the rail, are pressed they exert a downward pressure on the bridge 24, which will rest with its teeth on the track of the rails.

Of the two leaves making up the running door shown in figure 1, leaf number 1 occupies the outside position. Secured to the inner surface of the bottom of this leaf is a U-piece consisting of two brackets 29 and 30. The first bracket is secured to leaf 1 and the second carries the runners 31 which, along with the runners 32 secured directly to the inner door 2, slide along the inverted guide 33.

Bracket 29 is shown in figures 7 and 8, and bracket 30 in figures 9 and 10. The vertical arm of bracket 29 is provided with holes 34 for the passage of the leaf 1 securing elements and the centring pivots 34a, while the other arm has a longitudinal slot. The vertical arm of bracket 30 has two holes 36 for securing a base 37 to which is mounted the runner 31. Its horizontal arm has a threaded hole 38 which fits over the slot 35 of bracket 29 to take a union screw 39, figure 1. This allows the slot 35 to vary the separation between the brackets in order to adjust the distance to the guide 33.

Figure 1 shows a transverse cross-section of the guide 33, which consists of an inverted C-shape with side arms of different lengths. The shorter arm, number 40, is the one that is closer to the door leaves 1 and 2. The outside of the central arm of this guide 33 forms a longitudinal groove 41 with a central slot, along its whole length. The head of pivots 42 slide along this groove, these pivots

being fixed underneath in an inverted position in the bottom 43 of the enclosure or gap that is closed by the doors. Figure 11 shows the two coplanar leaves 1a and 2a linked by hinges 43 in order to form a folding door. Number 3a is the shaped single rail section along which runs the rolling element carriages 6. The leaf links with the side of the gap by means of a hinge 45 of a known design. In the same way, leaf 2a links with the corresponding carriage by means of hinge 46.

Figure 12 shows a vertical cross-section of shaped section 3a of figure 11, which forms a single rail along which run the carriages 6. In this case the intermediate vertical rod 9a, and also the central hole in the carriage 6, are unthreaded, both elements having a transverse hole 8a that can be aligned to take a securing pin 47. The plate 10 of the mechanism in figures 1 and 2 is replaced by a bracket 48, figure 13, whose horizontal arm has a hole 49 for the rod 9a to pass. Its other arm has holes 50 for securing the hinge 46. At the bottom, the runners 31 are mounted via the base 37 to a piece 51 which is connected to a lower hinge 46. As shown in figure 14, this piece 51 consists of a flat bar bent into an L-shape, the shorter arm being extended laterally by a section 52 to which is secured the hinge 46. The longer arm 53 is provided with holes 54 for securing the base 37 on which is mounted the runner 31. This runner slides along the inverted guide 55.

With the arrangement described above, the shaped section creating the rail and the suspension pieces for the door and the runner mounting can be changed in order to mount a running or folding door, traditional hinges being used in the latter case.

### Claims

1. Mechanism for the mounting of sliding and folding doors, particularly doors consisting of at least two sliding or folding leaves, which are suspended by means of upper rail rolling elements fitted with stops that limit the travel of the leaves, while the bottom of the leaves run on guides. Included are the rolling elements, a carriage consisting of a housing containing parallel axis wheels and an intermediate vertical suspension rod for the door leaves, characterized by the fact that the upper rails are created by a shaped section that forms two rolling tracks for sliding doors and a single rolling track for folding doors. Along these move groups of carriages belonging to different door leaves, whose carriages have a central vertical hole into which the suspension rod of the door leaves is inserted from below and secured by means of screwing or by a transverse rod, with a plate being suspended from the rod and fixed to the door leaves by means of screws and centring lugs. The mechanism is also characterized by the fact that the bottom of the door leaves are fitted with runners that slide along an inverted guide, mounted below the level of the gap closed by the door.
2. Mechanism as per patent claim 1, characterized by the fact that the shaped section forming the two upper rails has a roughly rectangular cross-section, one of its larger sides having a central recess and two symmetrical openings located one on each side of the recess. The inside of the shape is subdivided into two rails by means of a longitudinal partition that runs between the base of the recess and the larger opposite side. The inside of this larger opposite side has two longitudinal channels, one in each rail, with holes in the base for securing screws to pass.
3. Mechanism as per patent claim 1, characterized by the vertical rod from which the doors are suspended having three consecutive sections of equal radius, the two outer ones being threaded and a middle one having a polygonal shape.
4. Mechanism as per patent claim 1, characterized by the vertical central hole of the rails and the section of the vertical rod that is securable to this hole having a smooth surface and being traversed by a transverse hole of smaller dimension, which can be aligned with the rod and rail in order to take a securing pin.
5. Mechanism as per patent claim 1, characterized by the fact that the upper part of the plates suspended from the rods has a section bent into a right angle, fitted with a notch that, via each plate, aligns to receive the sliding head of the suspension rod, whose section is housed in a recess shaped in the door leaves from their upper edge.
6. Mechanism as per patent claims 1 to 3, characterized by the fact that, when the doors are sliding, the bottom of the outermost leaves, on their inside surfaces, have two brackets fixed and joined together to make a U-piece. This clasps the lower edge of the innermost leaves and on its outer arm carries the runners that slide on the above-mentioned inverted guides, while the innermost leaves are secured directly to the runners on their inner surface.

7. Mechanism as per patent claim 5, characterized by the inverted guides consisting of an inverted C-shape, with side arms of different lengths, the short arm being the one that runs closer to the doors, with the outside of the central arm forming a longitudinal recess with a central opening, mounted by sliding over the inverted pivot heads externally secured to the floor of the gap closed by the doors.

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8. Mechanism as per patent claim 1, characterized by the fact that the stops limiting the travel of the leaves consist of an impact body and a securing bridge, both traversed perpendicularly by vertical fixing screws. From this body extends a longitudinally projecting arm pointing towards the rolling elements in order to retain them when they reach their limiting positions along the rail. The bridge is fitted with toothed edges for resting on the tracks of the rail.

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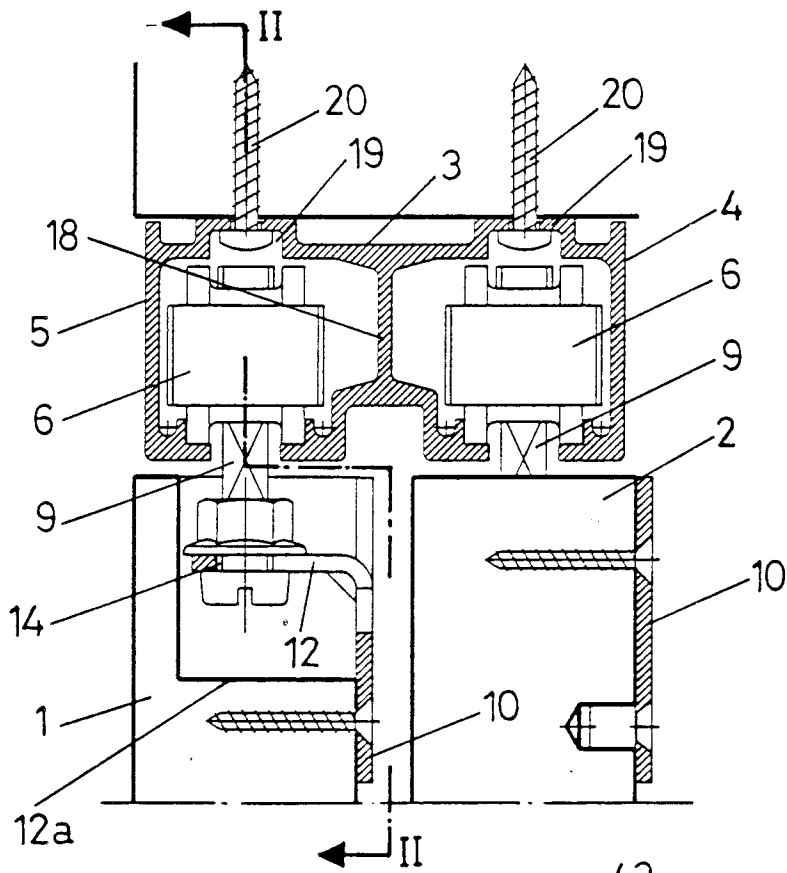
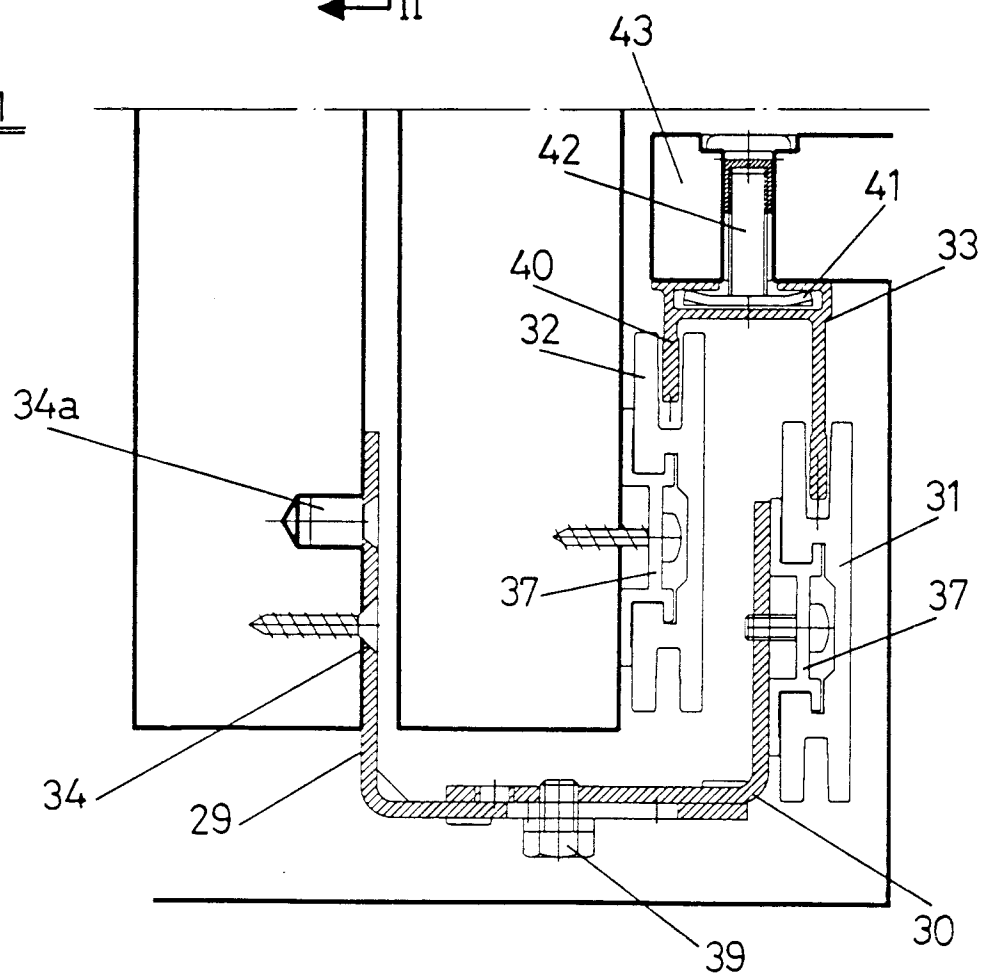


FIG. 1



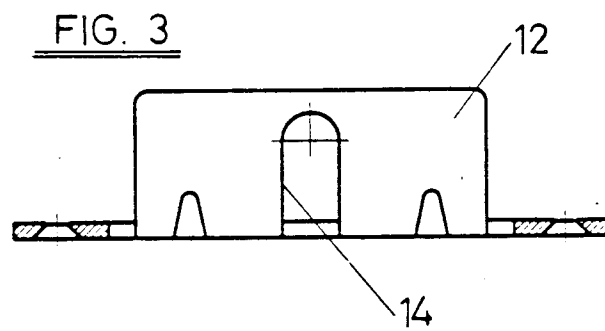
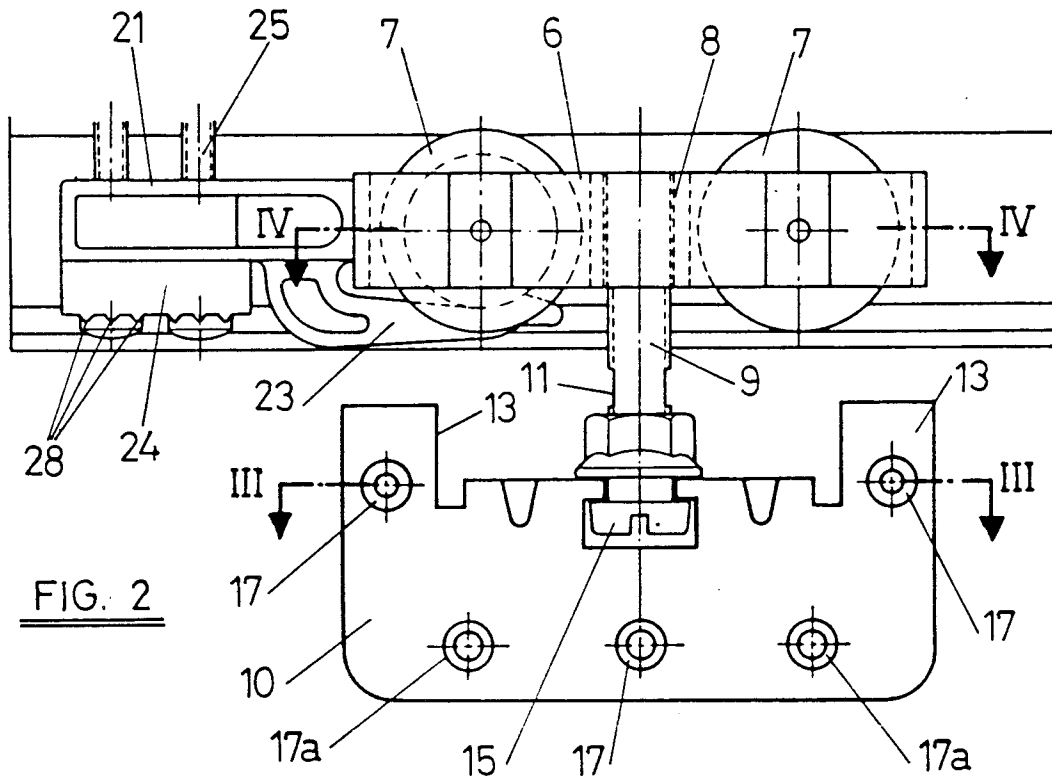


FIG. 4

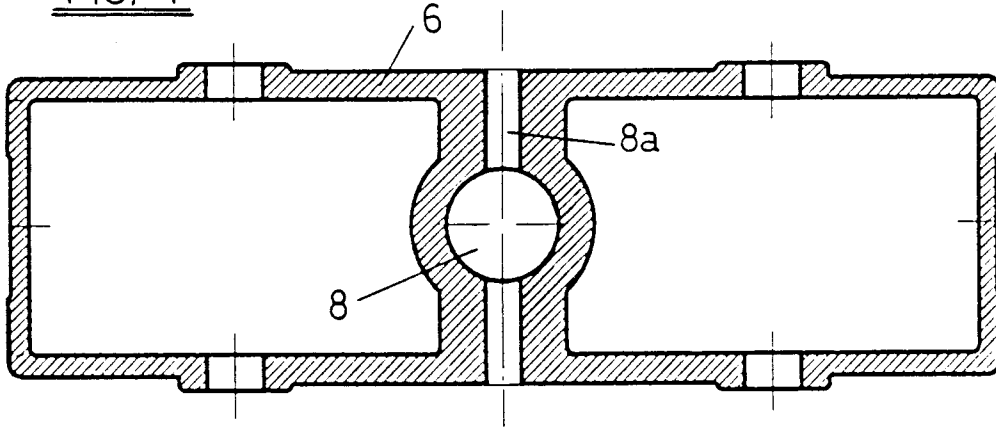


FIG. 5

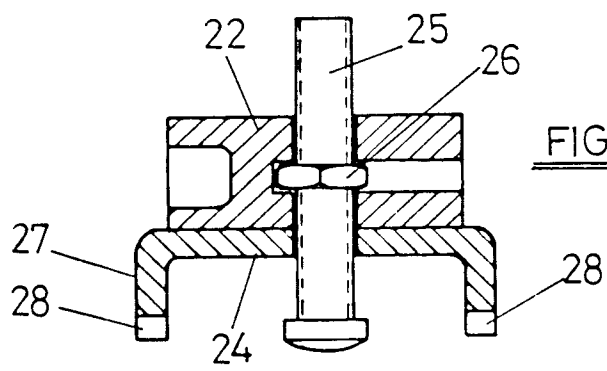
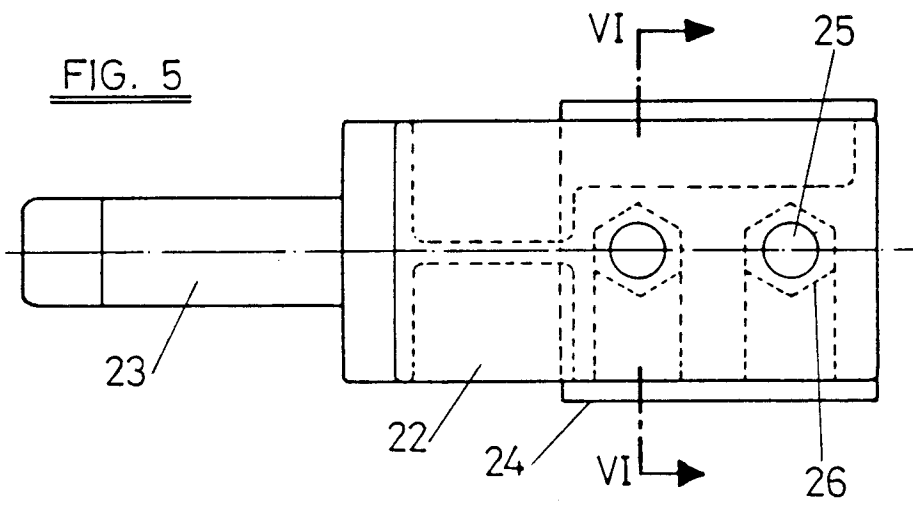
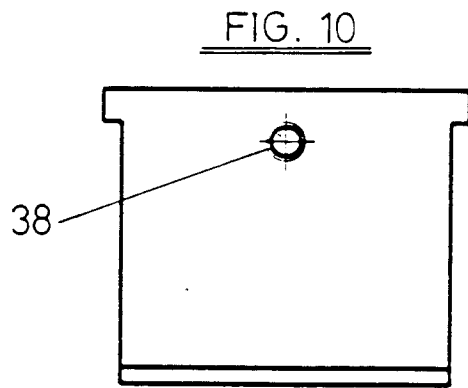
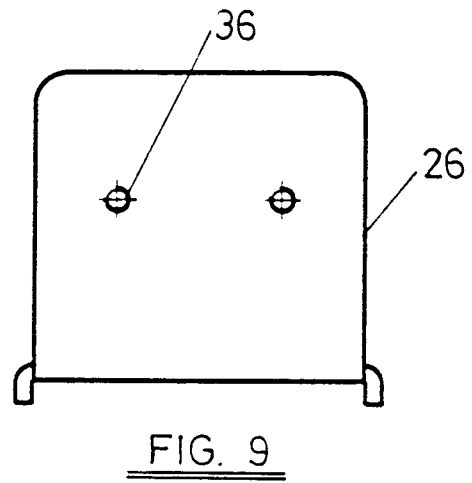
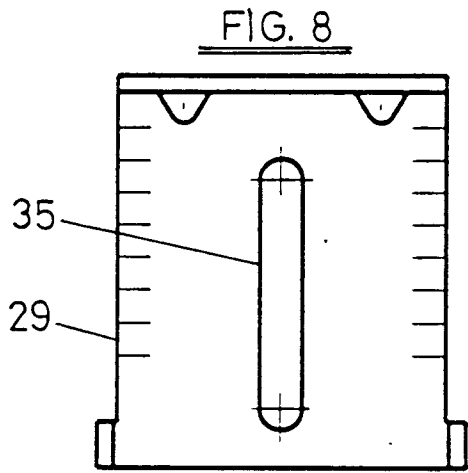
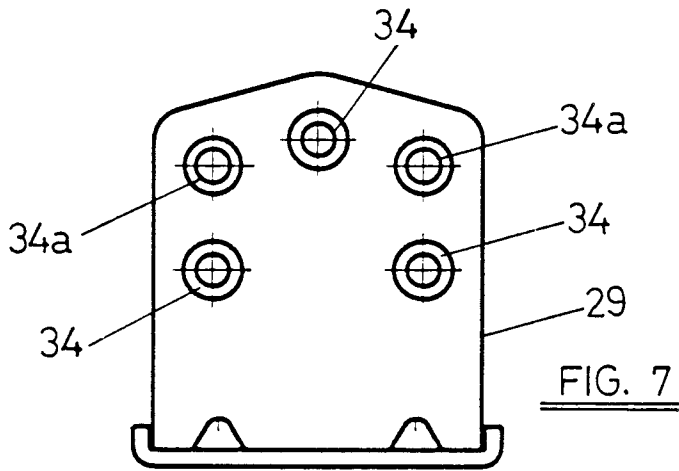
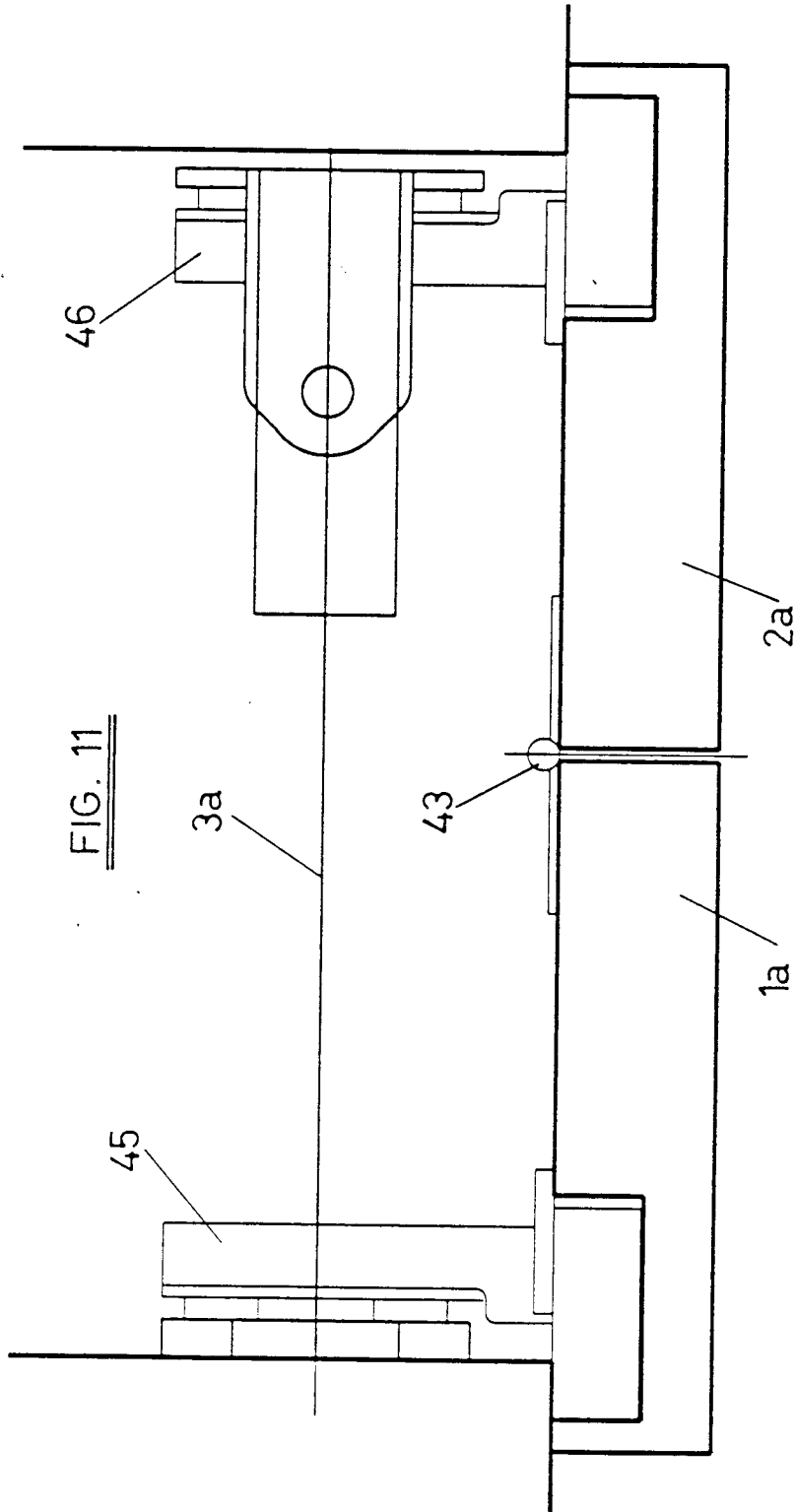


FIG. 6







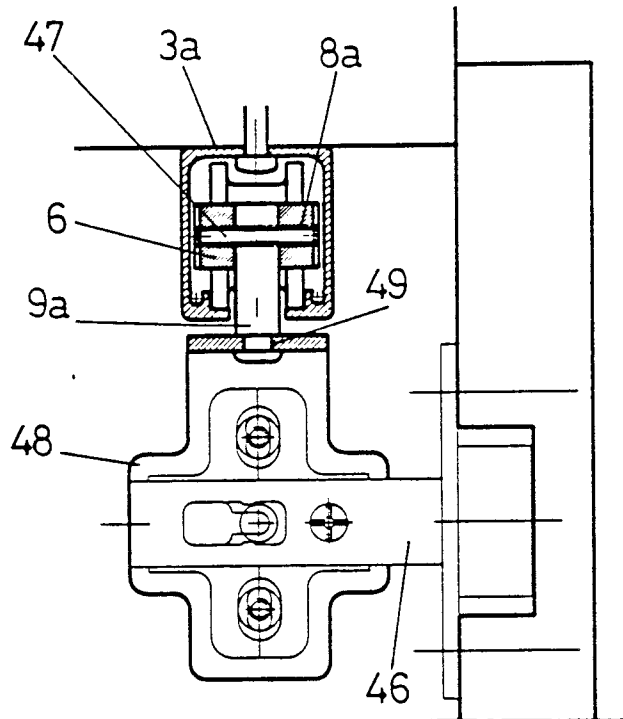
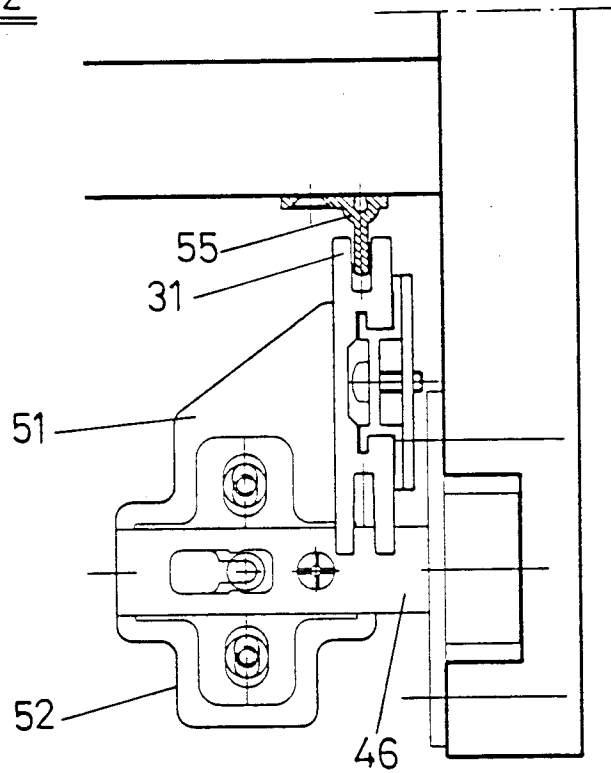
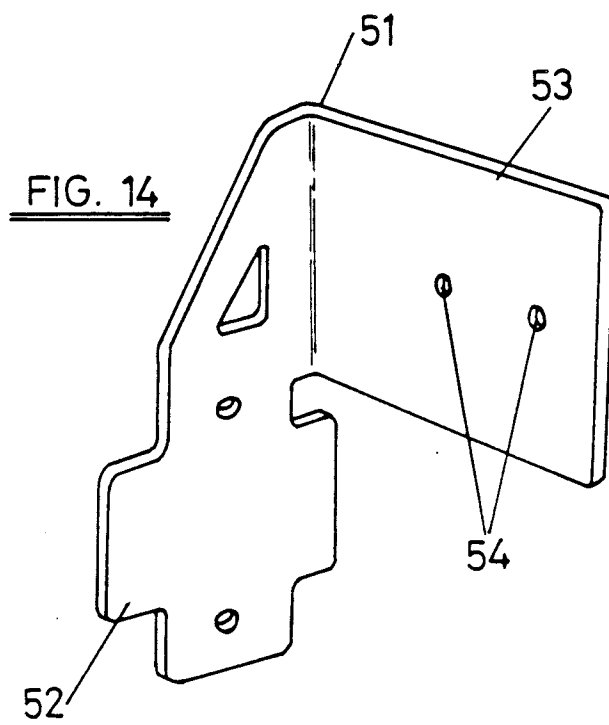
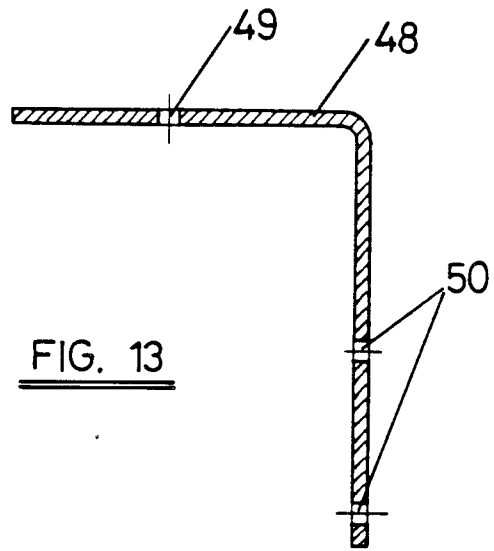


FIG. 12







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-A-2 555 289 (HAAB)	1	E05D15/06
A	* page 1, line 1 - page 2, line 11 * * page 3, line 5 - page 5, line 14 * * page 6, line 8 - line 13; figures 1-3 * ---	2,3,5	E05D13/00
Y	AT-A-366 902 (J. BLUM)	1	
A	* page 3, line 15 - line 16; figure 8 * ---	6,7	
A	EP-A-0 385 045 (KLEIN IBERICA)	1	
	* column 5, line 2 - line 12 * * column 6, line 3 - line 48; figures 7,12,13 * ---		
A	DE-A-3 238 204 (PAULI & SOHN)	2	
	* page 16, line 1 - line 7; figure 8 * ---		
A	DE-C-242 447 (SCHERTZ & WINTERS)	3	
	* page 1, line 34 - line 42; figures 1,2 * ---		
A	DE-A-1 708 277 (VEREINIGTE BAUBESCHLAGFABRIKEN GRETSCH & CO.)	4	
	* page 5, line 11 - line 12; figure 1 * ---		
A	US-A-3 289 243 (MILETTE)	5	
	* column 3, line 4 - line 15; figures 2,3,9 * ---		
A	DE-A-2 553 175 (PFÄLER GEB. STOLL)	6	
	* page 6, line 14 - line 20; figure 1 * ---		
A	FR-A-1 362 519 (DEPRAT)	6	
	* page 1, column 1, line 39 - page 1, column 2, line 10; figures 1-3 * ---		
A	EP-A-0 010 220 (INBAUPRODUCT INNENBAUSYSTEME)	7	
	* page 5, line 28 - page 6, line 5 * * page 6, line 31 - page 7, line 7; figure 2 * ---		
A	CH-A-657 415 (HAAB)	8	
	* page 2, column 2, line 43 - line 55; figure 1 * * ---		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01 JUNE 1992	Examiner GUILLAUME G. E. P.
<b>CATEGORY OF CITED DOCUMENTS</b> 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			



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)
A	DE-A-1 817 951 (GRETSCH & CO) * page 6, line 17 - page 7, line 21; figure 1 *  -----	8	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01 JUNE 1992	Examiner GUILLAUME G. E. P.
<b>CATEGORY OF CITED DOCUMENTS</b> 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	