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(71) Applicant: **KLEIN IBERICA, S.A.**
E-08024 Barcelona (ES)

(72) Inventor: **Tarrega Lloret, Miguel Angel**
E-08024 Barcelona (ES)

(74) Representative: **Gomez-Acebo y Pombo, José Miguel**
c/o CLARKE, MODET & Co.,
Avda. de los Encuartes, No. 21
28760 Tres Cantos (Madrid) (ES)

(54) Structure for the assembly of sliding doors

(57) Structure for the assembly of sliding doors, made up of at least an upper tubular track (1) along which may slide rollers (2) from which doors (4) are suspended. The track has on its upper wall an internal longitudinal channel forming (12) in which the heads of the fixing screws are housed, whereas it is externally fitted with wings (15) that define, together with the outside of the channel forming (12), the track (1) resting base. The rollers (2) incorporate a frame made from an U shaped profile.

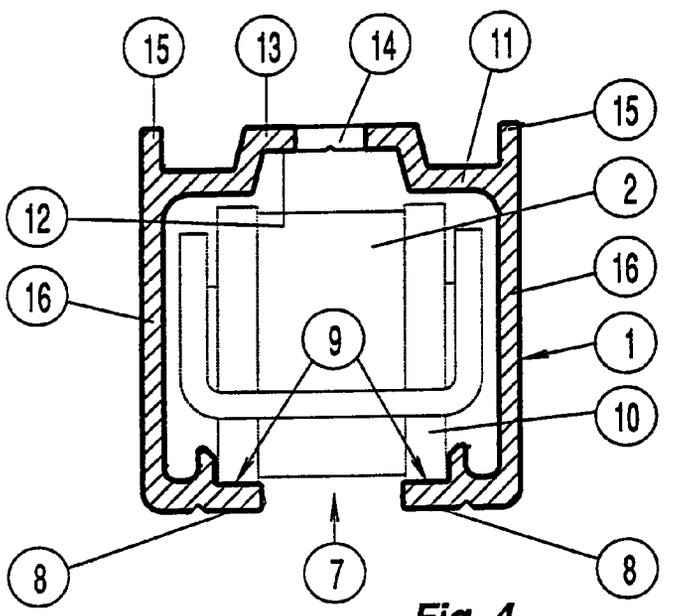

Fig. 4

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Description

This invention refers to a structure for the assembly of sliding doors, made up of at least an upper track on which the rollers from which the doors are suspended may travel, the doors being further coupled at their lower end on guides that prevent any rocking movements.

A structure of the type set out is described in Spanish patent number 8701178, of the same applicants, in which the track is made up of a square section profile fitted along its lower wall with a central slot, limited by internal tracks on which the rollers run, whereas the opposite wall has a central alignment of countersunk holes and intermediate external longitudinal fins located between the central alignment of the holes and the longitudinal edges.

With this constitution, the heads of the screws used to fix the track must be of a size equal or smaller than the countersinking practised on the aforementioned holes, so that said head does not protrude towards the inside of the track. To meet this condition the upper wall of the track must be thick enough to enable effecting deep enough countersunk holes or alternatively by drawing or by ensuring that the heads of the screws are not very high.

On the other hand, the supporting surface of the track upon the surface of the ceiling on which it is fixed is defined by the free longitudinal edge of the two intermediate external fins. Due to these fins being retracted in respect of the longitudinal walls of the track, the width of the support surface is reduced and with it the stability of said track.

According to the invention patent number 8701178, the rollers include a box shaped frame, of a relatively high cost, because of their manufacturing process.

The object of this invention is a structure of the type set out above, in which the track presents a constitution that would allow absorbing the heads of the screws without any risk of their protruding towards the inside of the channel and without requiring a greater thickness of the corresponding wall or the performance of drawing operations. Another object of the invention is to achieve a more stable track support base upon its fixing surface.

In the structure subject of this invention the roller frame is manufactured starting off a profile that may be obtained using traditional systems and that allows a reduction of the cost of the frame in respect of the traditional structures. Furthermore, the constitution of the roller wheels allow their thoroughly silent and smooth displacement.

Pursuant to this invention, the tubular track of the structure has, on the wall opposite its open wall, an internal central longitudinal channel moulding that forms externally a protruding longitudinal portion. Holes to accommodate the fixing screws are practised on the bottom of this channel melding. The channel melding is internally sized so as to accommodate the heads of the screws.

With this constitution, the profile making up the track requires only the execution of the screw passage holes, given that the screw head housing is achieved through the previously described channel melding.

According to another characteristic of the invention, the upper wall or bottom of the track has two externally longitudinal wings that are located at either side of the protruding portion, as an extension of the adjacent walls. These wings have a height equal to that of the aforementioned protruding portion, so as to jointly define the track supporting surface. In this way a totally stable supporting base is achieved, upon being defined by both the central protruding portion and the longitudinal wings located at either side, which are furthermore separated by a distance equal to the width of the track.

The frame of the rollers that are housed and move inside the track is made up, pursuant to the invention, by an inverted U section profile on which bottom there is a central hole, coinciding with which it has, internally fitted, a stub end internally threaded so as to allow the passage of the screw from which the sliding doors are to be suspended. On either side of said stub end are fitted the wheels that will protrude through openings located on the bottom of the frame profile.

With this constitution, the frame is formed from a profile obtained using traditional systems, such as extrusion, in which it shall only be necessary to practice the openings and holes required to fit and assemble the various roller components.

The roller wheels may include axes fitted on their external surface with longitudinal grooves to store lubricant.

Furthermore each one of the roller wheels may be made up of an external housing made of plastic material, a metal stub end coaxially fitted within the aforementioned housing and two aligned stub ends that are fitted upon the axis of the wheel and are supported by their external ends against the walls of the frame, further having the two aligned stub ends, starting off their adjacent edges, two conical offsets forming an intermediate furrow, across from which the stub end fixed to the frame has a further annular furrow, for the assembly of bearing balls between the two furrows.

Any of the above described constitutions of the roller wheels will eliminate any possible wheel turning friction, so that door displacement may take place smoothly and silently.

The structure of the invention does furthermore simplify the intermediate door fastening elements and the roller retaining devices.

The characteristics of the structure of the invention, as set out in the claims thereof, as well as the advantages accrued therefrom, may be understood with greater ease using the description set out below, prepared in reference to the attached drawings, which show a possible way of execution, prepared as a non limitative example.

On the drawings:

Figure 1 is a schematic elevation view of a door manufactured pursuant to the invention, shown in the open position.

Figure 2 is an upper plan view of the door shown in figure 1.

Figure 3 is a plan view of a door of the type called "enclosed between walls", showing the position of the intermediate door fastening elements.

Figure 4 is a side view of the upper tubular track.

Figure 5 is an upper plan view of the tubular track shown in figure 4.

Figure 6 is a side elevation view of one of the rollers housed in the tubular track shown in figures 4 and 5.

Figure 7 is a longitudinal section view of the roller, seen as per the VII-VII cutting line of figure 6.

Figure 8 is a view similar to that shown in figure 7, showing an execution variant.

Figure 9 is a side view of a suspension roller with the intermediate door fastening element.

Figure 10 is an upper plan view of the intermediate fastening element included in figure 9.

Figure 11 is a view similar to that of figure 9, showing an execution variant of the door fastening intermediate element.

Figure 12 is a side view of the fastening element shown in figure 11.

Figures 13 and 14 are views similar to that of figure 9, showing, in different positions, an intermediate door fastening element.

Figure 15 is a side view of the fastening element of figures 13 and 14.

Figure 16 is a side elevation view of a roller retaining element.

Figure 17 is a section view of the retaining element, seen as per the XVII-XVII cutting line of figure 16.

Figure 18 is an upper plan view of the lower door guiding device.

Figure 19 is a side cross-section view of the guiding device, seen as per the XIX-XIX cutting line of figure 18.

The structure of the invention, as shown in figures 1 to 3, is made up of a hollow carrying track 1, inside which may travel rollers 2 from which are suspended, by way of the intermediate fastening elements 3, doors 4. The track 1 incorporates internally retaining devices 5 for rollers 2. The door 4 is guided at its lower end by a guiding device 6.

In figure 2 the sliding door 4 is attached to a wall or partition when in its open position, whereas in the example shown in figure 3 the door 4 remains at its open position housed between two walls.

As shown in figures 4 and 5, track 1 has a tubular configuration, with approximately rectangular sides and has on its lower horizontal branch a longitudinal slot 7 limited by sections 8 out of which internally protrude a longitudinal rim limiting a flat external raceway 9 that constitutes the rolling surface of the wheels 10 of the rollers 2.

The upper horizontal wall 11 of the profile has an internal trapezium shaped longitudinal channel melding 12 that determines externally a protruding portion 13. Screw passage holes 14 are drilled on the bottom surface of channel melding 12. Out of the upper wall 11 do also protrude side end longitudinal wings 15 acting as an extension of the longitudinal walls 16 of the profile, having the wings 15 a height approximately equal to the protruding longitudinal portion 13.

Through the holes 14 will pass the screws used to fix the track to the ceiling, being the channel melding 12 sized so as to house the heads of the screws so used, without said heads protruding towards the inside of the track.

Track 1 shall lay against the surface of the ceiling on which it is fixed by way of the protruding portion 13 and the wings 15, defining between them the supporting surface or base, with a width equal to that of the profile, due to the wings 15 being an extension of the side walls 16 of said profile.

As may be observed in figures 6 and 7, the roller 2 has a frame 17 made using a U section profile. This profile has at its bottom end a central hole 18 around which an internally threaded stub end 19 is internally fixed. On either side of the stub end 19 are arranged wheels 10 mounted so that they may turn around axis 20, which have on their external surface longitudinal grooves 21 used to store lubricant.

Figure 8 represents an execution variant, in which each of the wheels 10 is made up of an external housing 22 made of plastic material, of a metal stub end 23 coaxially fixed within the previously mentioned frame and by two aligned stub ends 23 that support each other using their adjacent edges, whereas their external edges rest upon the roller frame or profile walls. The two aligned stub ends 24 have, as from their adjacent edges, two conical offsets 25 that determine an intermediate furrow, across from which the stub end 23 has a further annular furrow, for the assembly of bearing balls 27 between the two furrows. The aligned stub ends 24 are fitted upon axis 20.

The threaded stub end 19 of the rollers 2 is used to thread screw 28 from which the sliding door 4 will be suspended, using the intermediate fastening element 29. In the cases of figures 9 and 10 this fastening element is made up by a bridging plate which at its central section has a slot 30 for the passage of the screw 28, which is attached using counternuts 31. At the end positions of this strip are made holes 32 for the passage of screws 33 to be fixed on the upper edge of the door.

Figures 11 and 12 represent a suspension element execution variant made up of a strip 34 bent to form an inverted L, that at its upper end has a slot 35 for the passage of screw 28. On the larger branch of this strip are drilled holes for the passage of screws 36 to be secured to the side surface of the door. The strip 34 does further include lugs 37 bent towards the concave side of the strip to be supported upon the upper edge of the door 4.

In the execution shown in figures 13 to 15 the intermediate fastening element is made up of a profile 38 partially closed at its opening and which cups around the upper edge of the door. Within this profile is housed a Z shaped part 39 which end branches 40 and 41 are parallel. Part 39 may travel inside the profile 38, resting the branch 40 upon the internal surface of the bottom of the profile, whereas the upper section or branch 41 rests upon the wings 42 that partially close said profile. This branch 41 is fitted with a hole for the passage of screw 28 that threads inside the stub end of roller 2.

The profile 38 is fixed to the door using screws 43, which ends protrude with their head inside the profile to serve as the slide limiting tops of part 39, as shown in figures 13 and 14.

As may be better observed in figure 15, the head of the screw 28, polygonally contoured, remains tightly housed between the walls of profile 38, which prevents that screw turning.

Figures 16 and 17 illustrate one of the retaining devices of rollers 2, made up of an inverted U shaped part 44, placed broadside and which side branches 45 run and rest perpendicularly upon raceway 9 of the track. These side branches have, starting off the end edge, notches 46 that may be housed upon the longitudinal ribs that protrude from raceways 9. The central branch of part 44 extends, from one of its sides, so as to form arm 47 directed towards the inside of the track 1, fitted to its bottom and featuring on its lower surface a curve-concave longitudinal notch 48 to receive one of the wheels of the adjacent roller. The intermediate branch of part 44 has a central hole 49 in which fits tightly a nut 50 on which is threaded a bolt 42 capable of resting its free end upon the bottom of the internal longitudinal channel forming 12 of track 1, thus remaining part 44 firmly fixed between the lower wings 8 and the bottom of the track.

Finally, the lower door guiding device 6, shown in figures 18 and 19, is made up of a part that includes a flat structured hollow central core 52, crowned at its base by a plate 53 fitted with holes 54 for the passage of fixing screws.

Claims

1. Structure for the assembly of sliding doors, incorporating at least an upper carrying tubular track and a lower guiding device; which track has square sides and is open along one of its walls as per a central slot internally limited by raceways along which rollers displaceable within the track may travel, from which the sliding doors are suspended using intermediate fastening elements, having the track furthermore fitted within it roller retaining devices, characterized because the tubular track has, on the wall opposite the open wall, a central internal longitudinal channel melding and two external longitudinal wings, which channel melding externally forms a centrally protruding longitudinal portion, has on its bottom holes for the passage of fixing screws and is sized so as to house the heads of the fixing screws; and which external wings are located at either side of the centrally protruding portion, as an extension of the adjacent walls, and with a height equal to that of the aforementioned protruding portion, with which they define the track resting surface; and because the rollers incorporate a frame made up of an U shaped profile, on which bottom side there is a central hole in coincidence with which it has internally fitted and internally threaded stub end, on either side of which are fitted wheels that protrude below through openings made on the bottom of the frame profile.

2. Structure as per claim 1, characterized because the axis of the wheels of the sliding door suspension rollers are fitted with external longitudinal grooves used to store lubricant.

3. Structure as per claim 1, characterized because each of the wheels of the sliding door suspension rollers are made up of an external plastic material frame, a metal stub end coaxially fixed inside the aforementioned frame and two aligned stub ends fitted upon the axis of the wheel, supporting each other using their adjacent edges and against the walls of the frame through the external edges; having the two aligned stub ends, off their adjacent edges, conical offsets defining an intermediate furrow, opposite which the stub end fixed to the frame has another annular furrow for the assembly of bearing balls between both furrows.

4. Structure as per claim 1, in which the intermediate sliding door suspension fastening elements include a U shaped profile partially closed through the use of longitudinal wings sealed by the upper edge of the sliding door, characterized because inside the profile is housed a Z shaped part with parallel end branches, capable of sliding along the profile and which rests upon the bottom of the profile using one of the end branches and, using the opposite end

branch, upon the wings that partially close said profile, having the previously mentioned latter branch a hole for the passage of a screw used to attach it to the stub end of the displaceable rollers, which screw has a polygonal head adjustable between the walls of the U shaped profile, so as to prevent it from turning, further having the U shaped profile two internal end tops on its bottom surface, made up of the heads of the two screws used to fix said profile at either end, which limit the displacement of the Z shaped part.

5. Structure as per claim 1, characterized because the roller retaining elements are made up of parts shaped as an inverted U, located broadside, which side branches run and support themselves perpendicularly upon the track sliding raceways and further have, as from their free edge, notches that may be housed upon the longitudinal ribs that protrude from said raceways, whereas the central branch extends, from one of its edges, forming an arm directed towards the inside of the track, fitted to its bottom and featuring on its lower surface a curve-concave longitudinal notch to receive one of the wheels of the adjacent roller; its intermediate branch further fitted with a central hole in which fits tightly a nut on which is threaded a bolt capable of resting its free end upon the ceiling of the track.

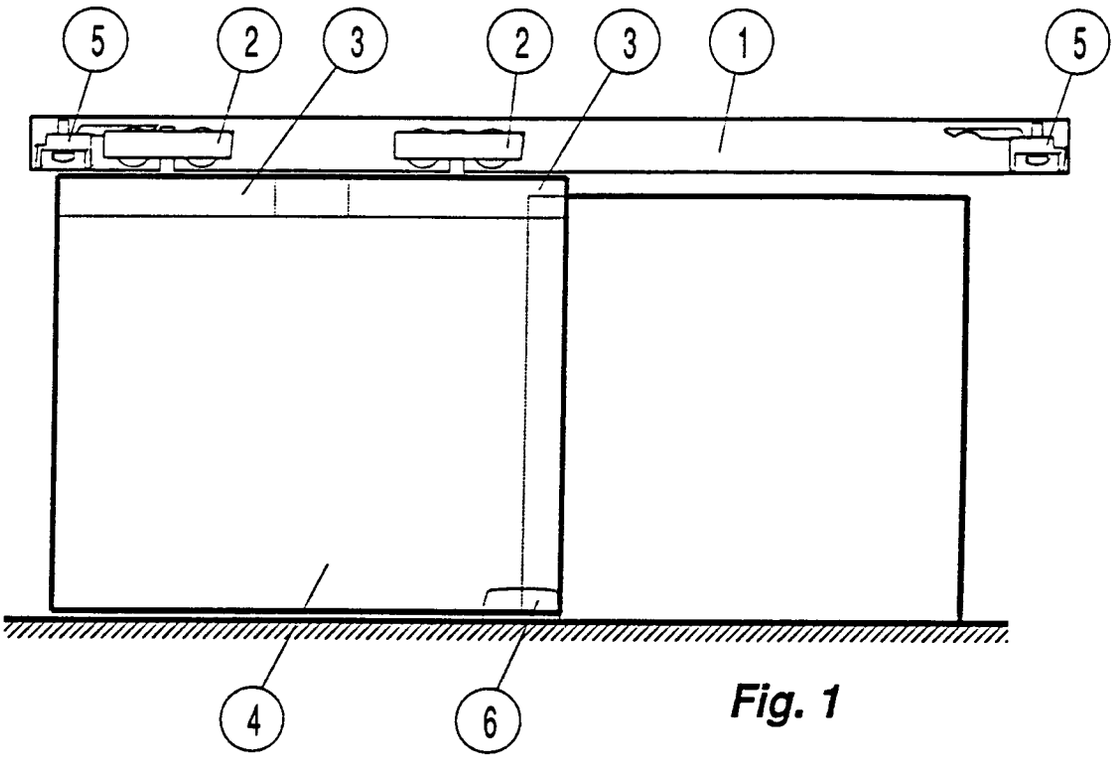

Fig. 1

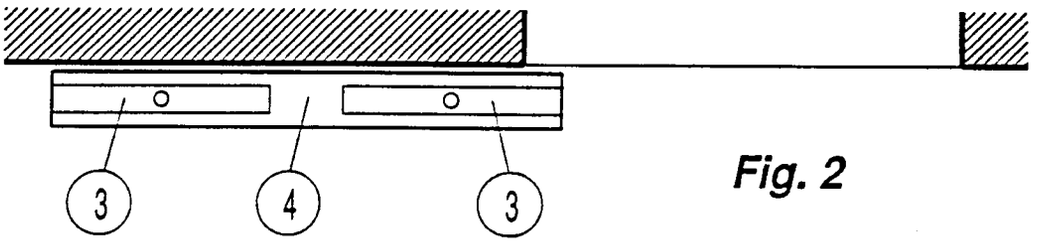

Fig. 2

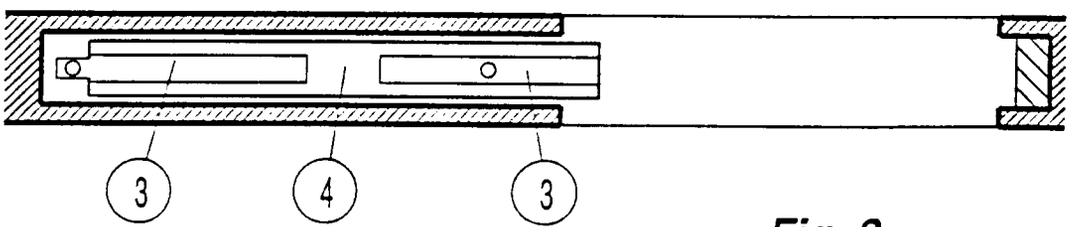

Fig. 3

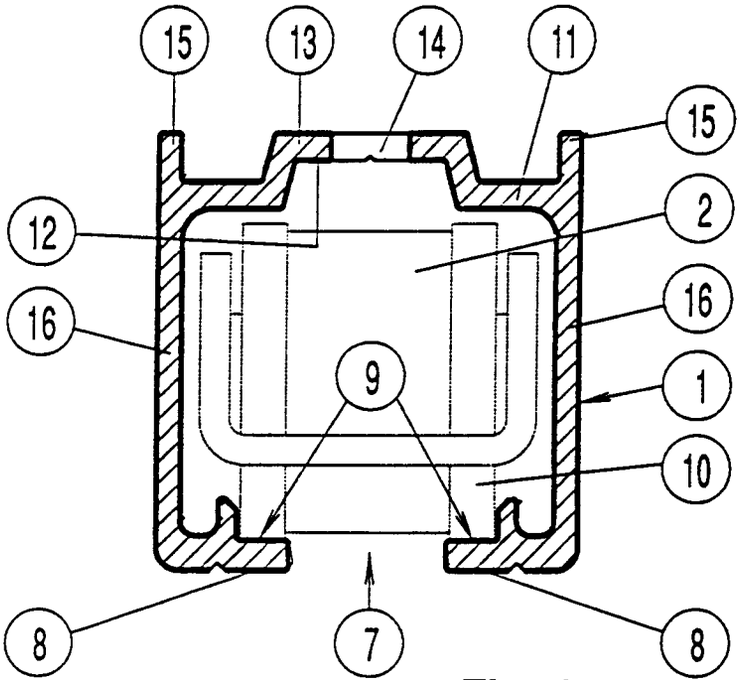

Fig. 4

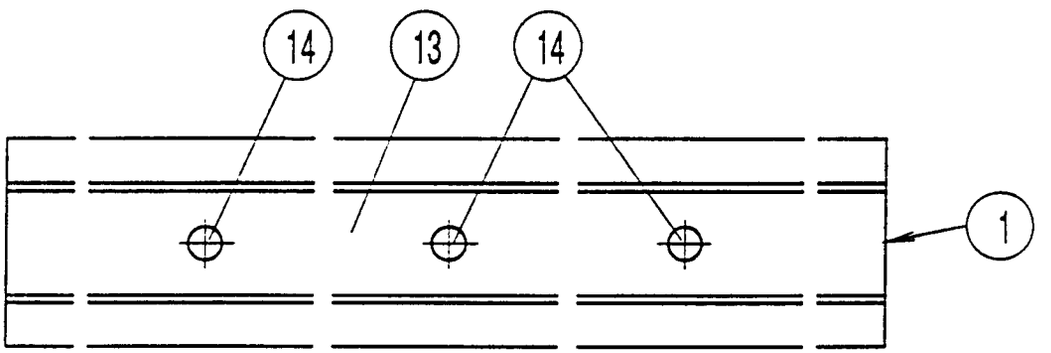

Fig. 5

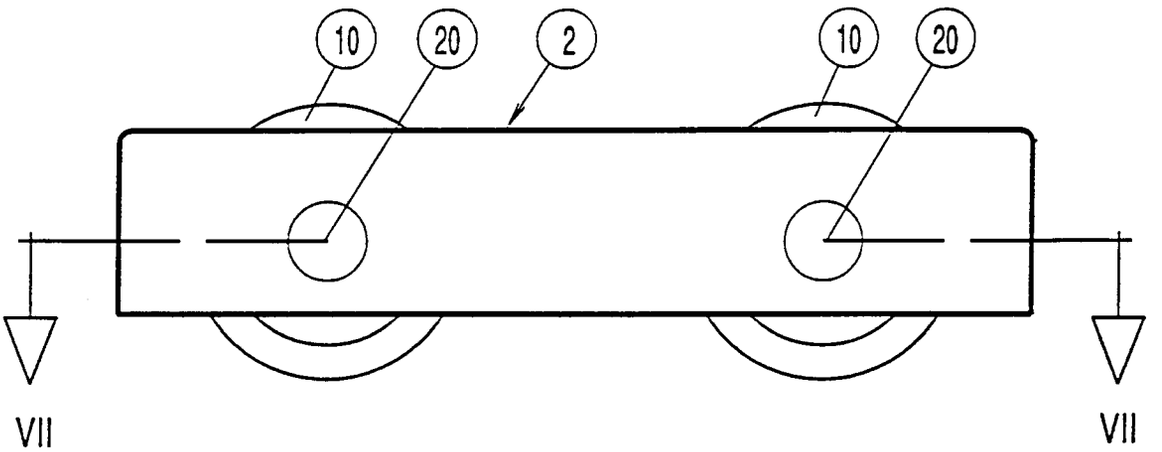

Fig. 6

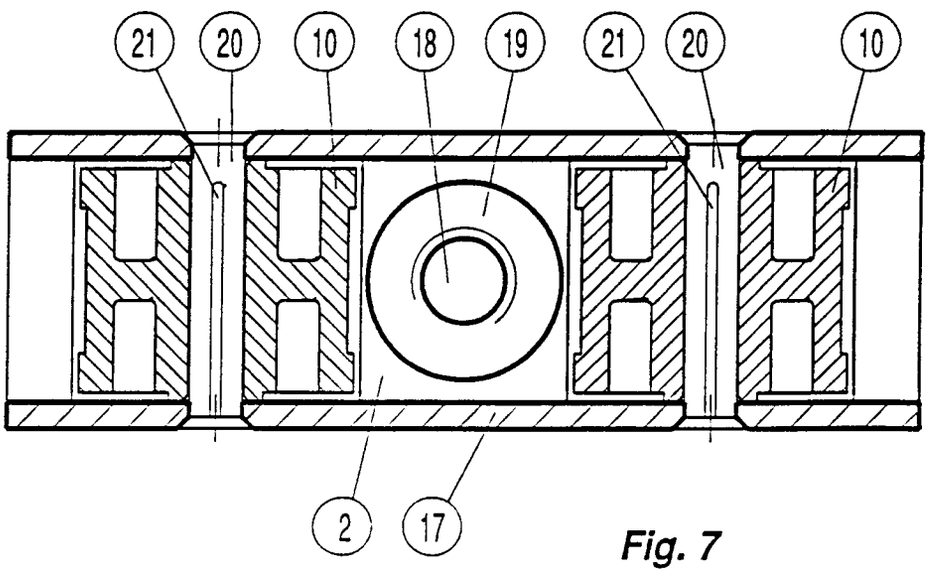

Fig. 7

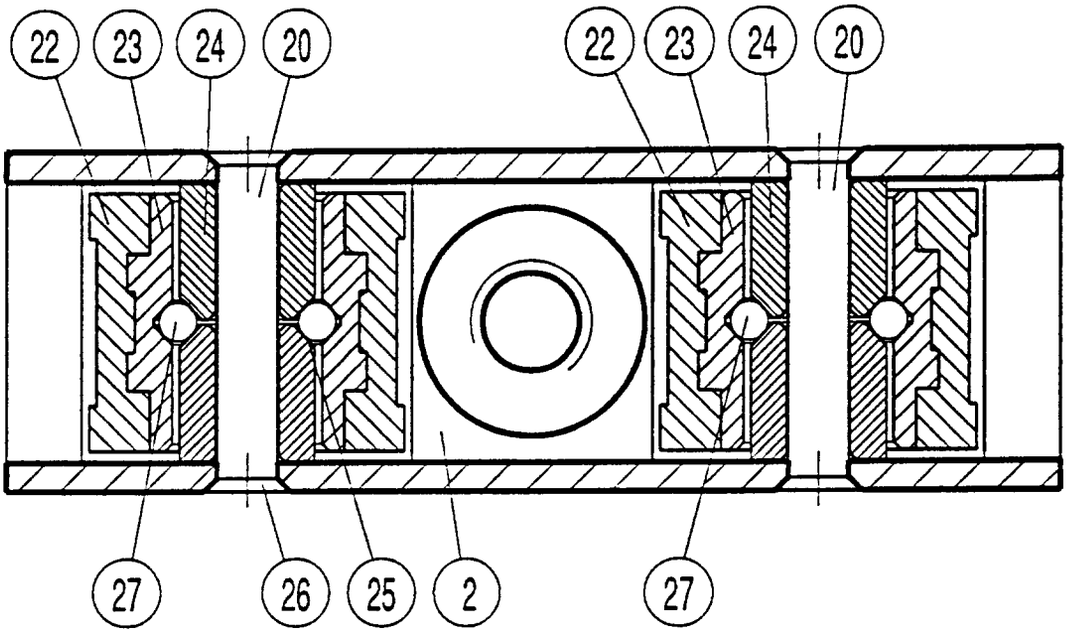

Fig. 8

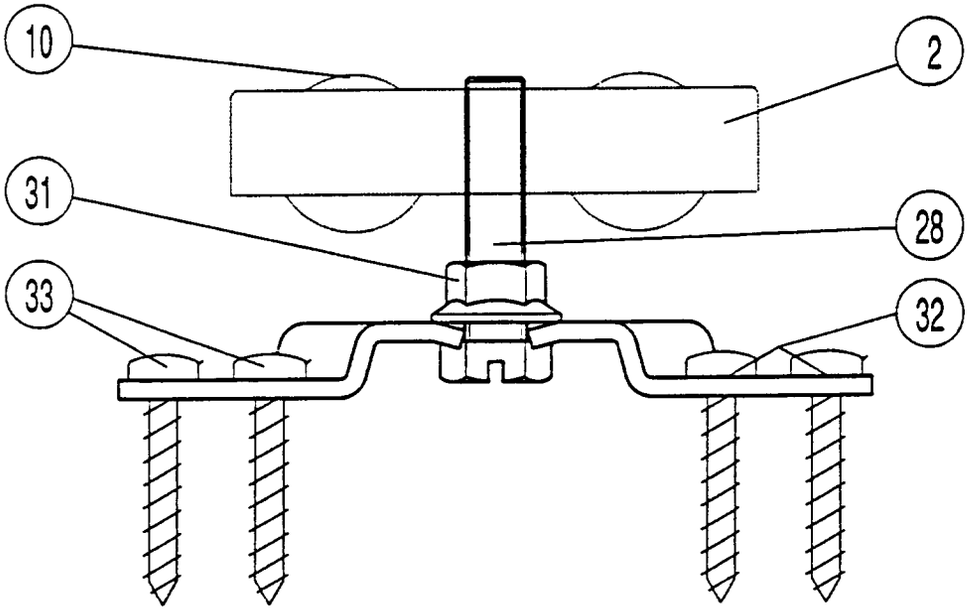

Fig. 9

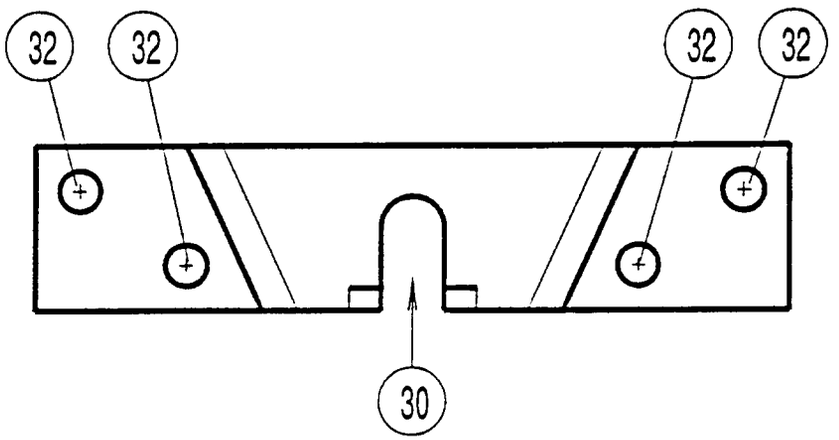

Fig. 10

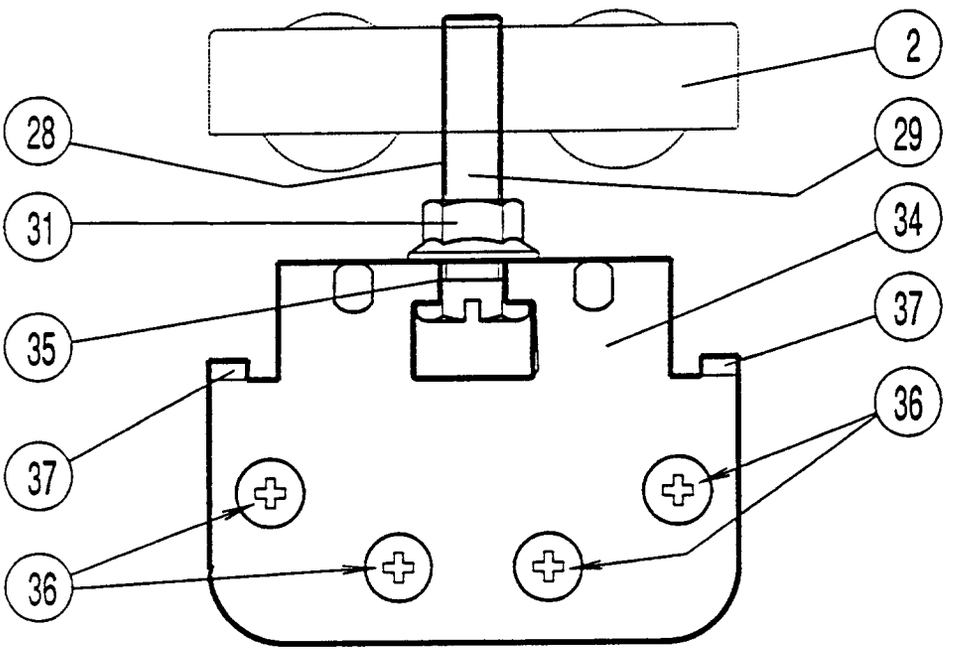

Fig. 11

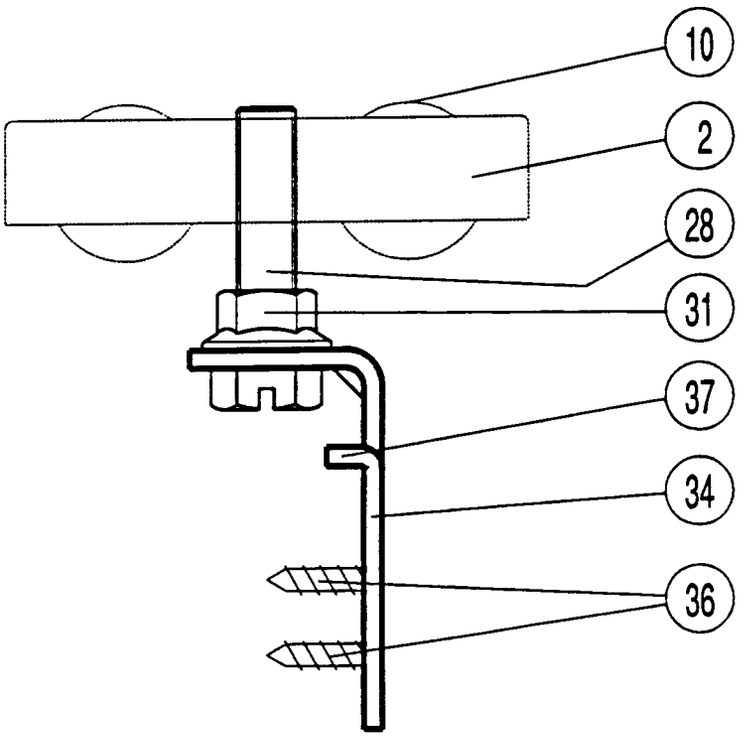

Fig. 12

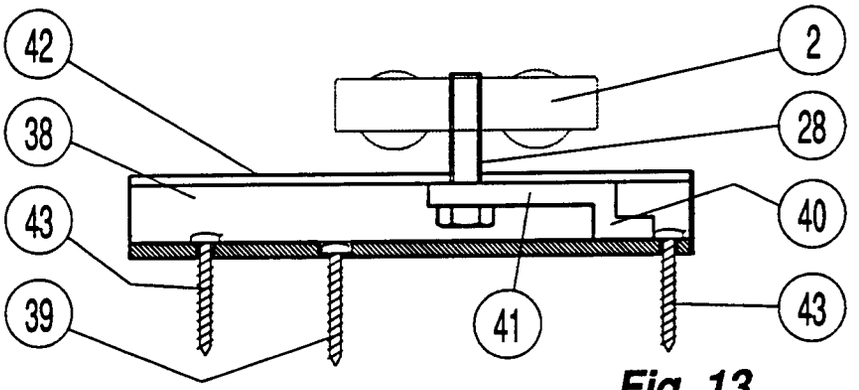

Fig. 13

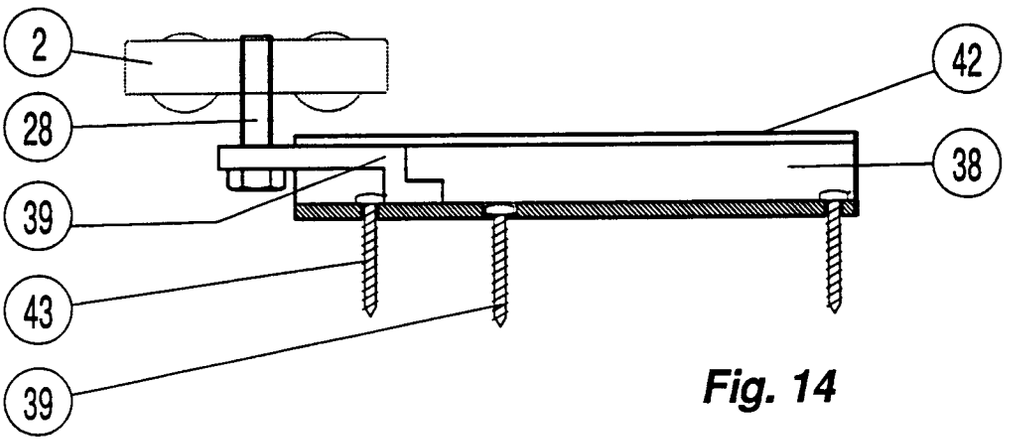

Fig. 14

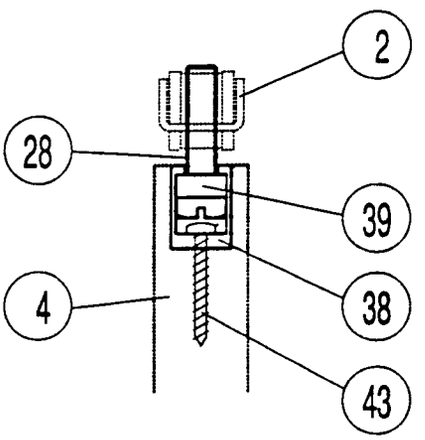

Fig. 15

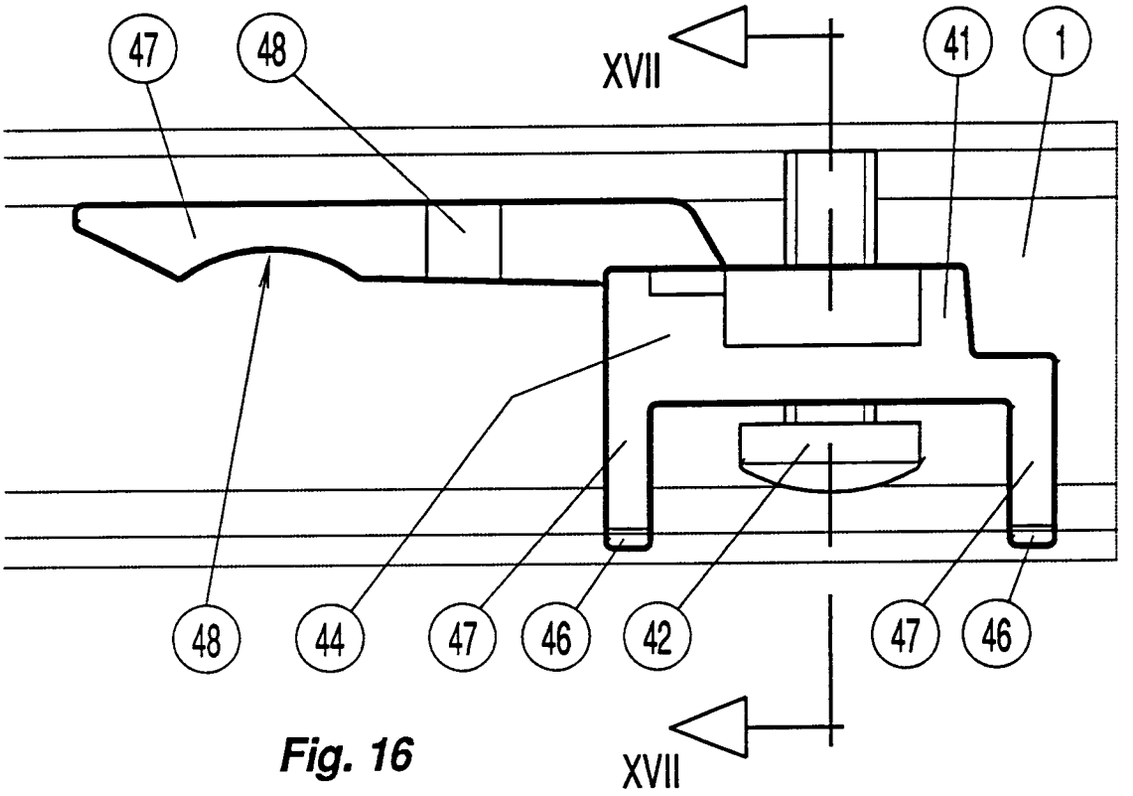

Fig. 16

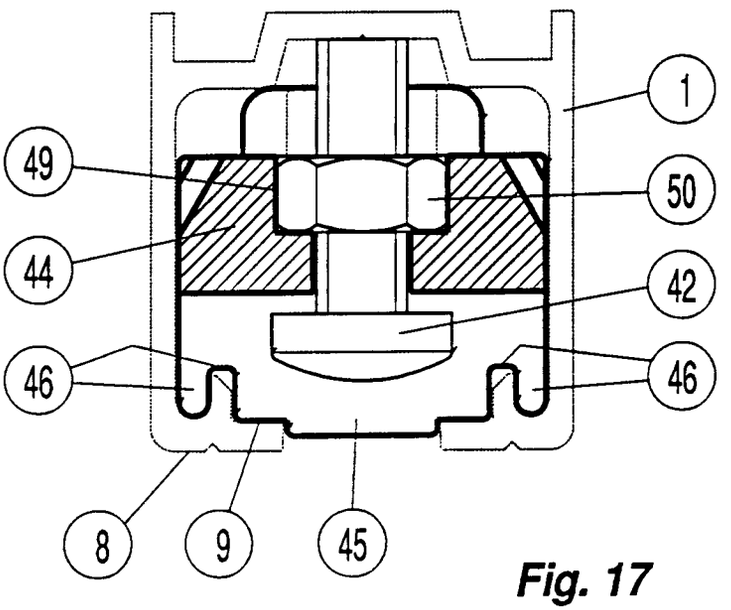

Fig. 17

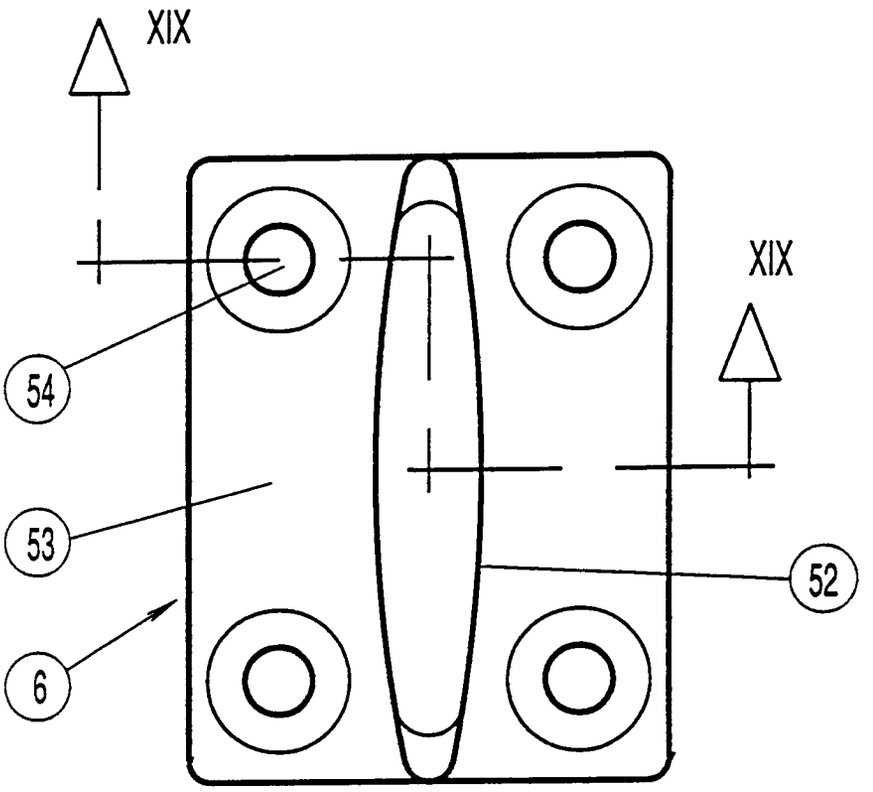

Fig. 18

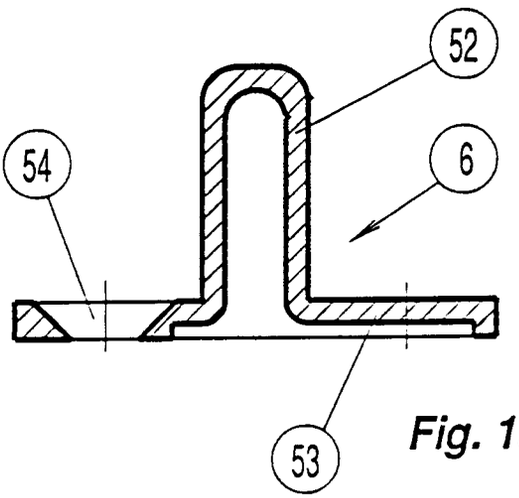

Fig. 19

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 50 0147

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)
A	EP-A-0 502 285 (KLEIN IBERICA) * column 3, line 20 - line 34 * * column 4, line 11 - line 18; figures 1,2,4 *	1	E05D15/06
A	EP-A-0 181 444 (HESPE & WOELM) * page 3, line 10 - line 13; figure 3 *	1	
A	DE-B-10 31 179 (DÖRKEN & MANKEL) * column 2, line 22 - line 28; figures 1-3 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 October 1996	Van Kessel, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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