(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 630 337 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
01.03.2006 Bulletin 2006/09

(21) Application number: **04733576.5**

(22) Date of filing: **18.05.2004**

(51) Int Cl.:
E05D 15/26 *(1968.09)* ***E05D 15/12*** *(1968.09)*
E06B 3/48 *(1968.09)*

(86) International application number:
PCT/ES2004/000221

(87) International publication number:
WO 2004/104344 (02.12.2004 Gazette 2004/49)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR

(30) Priority: **23.05.2003 ES 200301211**

(71) Applicant: **KLEIN IBERICA, S.A.**
08110 Montcada i Reixac (ES)

(72) Inventor: **TARREGA I LLORET, Miguel, Angel**
E-08017 Barcelona (ES)

(74) Representative: **Carvajal y Urquijo, Isabel et al**
Clarke, Modet & Co.,
C/ Goya No. 11
28001 Madrid (ES)

(54) MECHANISM FOR HANGING AND ADJUSTING FOLDING DOORS

(57) Arranged on an top guiding profile (1) is the travel carriage (2) for one of the leaves (12) of the door, as well as the pivoting hinge for the other leaf, said guiding profile (1) having a pair of top partitions (5) determining a longitudinal and mid groove for guiding small wheels or bearings (7) of a vertical axis assembled on the very carriage (1), in conjunction with wheels (3) of a horizontal axis for the traveling thereof. The hinge (11) of the carriage (2), which can be regulated in height with regards thereto, the same as the pivoting hinge, is finished off at its bottom end in a planar bearing (21) resting on a pair of flat bars (16) assembled with longitudinal traveling ability in a profile (13) embedded on the top edge on each leaf of the door, such that said flat bars (16) can travel towards the exterior of the leaf in order to regulate the effective length of the hinges and level the door, and which can be subsequently fixed in a working situation with the aid of screws (17).

EP 1 630 337 A1

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a mechanism that has been especially conceived for suspending and regulating both runs or leafs of a folding door with parallel travel thereof, door in which said leaves can adopt a coplanar arrangement, specifically in a closed position, or a parallel or adjacent arrangement, specifically in an open position.

[0002] The object of the invention is to achieve a firm fixing both of the travel carriage intended for traveling along the corresponding guide fixed to the top crossbeam of the doorframe to the top edge of the leaves of the door and of the other leaf of the door to the pivoting attachment point.

[0003] The mechanism is especially suitable for being used with doors of a very considerable weight, although evidently it is applicable to all types of folding doors in general.

BACKGROUND OF THE INVENTION

[0004] The common structure of a folding door consists of two dimensionally identical leaves which are hingedly joined together through one of their vertical edges, said leaves being suspended from a top guide to which one of such leaves is hingedly fixed at its free vertex, whereas the other ends in a runner or carriage for travel on the guide, which, maintaining its alignment with the latter, nevertheless allows for the lateral swinging of the corresponding leaf during the maneuvers of folding and unfolding of the door, that is of opening and closing thereof.

[0005] Due to the nature of said leaves, usually made of wood, they have a considerable weight that must be supported by the means of fixing to the top edge thereof of said travel carriage and the hinged suspension element, which entails that in normal operation of the door, clearances and hangings negatively and seriously affecting the conditions of closing thereof on the corresponding frame occur.

[0006] Evidently, this problem becomes pronounced as the weight of the door increases.

[0007] A mechanism for mounting sliding and folding doors which are suspended by means of rolling members of top rails is described in Spanish patent No. 9100551 of the same applicant. This mechanism, however, is not suitable for mounting doors of great weight, as it does not allow adequate suspension and, essentially, regulation and adjustment of the position of the leaves of said doors.

DESCRIPTION OF THE INVENTION

[0008] The mechanism for suspending and regulating folding doors proposed by the invention solves in a fully satisfactory manner the problems set forth above, even in doors with a much more considerable weight than normal.

[0009] To this end and more specifically, two basic profiles participate in the mechanism of the invention, one intended for being fixed to the top crossbeam of the frame and constituting the guide for the travel of the carriage of the door itself, and the other intended for being fixed to the top edge of each of the two leaves of the door, being embedded in a groove operatively made in said doors, which makes such profile invisible, nevertheless being firmly fixed to the corresponding door by means of a longitudinal alignment of screws making the appearance of clearances between profile and leaf impossible.

[0010] The top or rolling profile, with the classical grooved configuration, of a narrowed opening, downwardly oriented and determining two side rolling tracks for the corresponding carriage, incorporates on its top and intermediate branches two vertical and symmetrical partitions constituting a channel for a pair of wheels or bearings, with a vertical axis which the travel carriage is provided with for an adequate centering thereof.

[0011] The travel carriage further has a central and vertical hole in which an internally threaded bushing provided with anti-rotation means is coupled, which bushing is intended to receive, with the height regulating ability, a hinge that constitutes the element for coupling the corresponding leaf of the door to the travel carriage, said bushing having a radial orifice in which a setscrew plays for immobilizing the hinge in the working position chosen for it, after appropriate door leveling.

[0012] The inner profile, the one intended for being embedded in the top edge of each of the leaves of the door, adopts a grooved configuration, of rectangular section, open on top, and is provided on the inner face of the side branches of several pairs of ribs properly facing each other, such that between them a pair of flat bars is arranged which are integrally fixed, both to each other and to the inner profile itself, with the collaboration of a set of screws aided by respective spacers, one of said screws being the hinge corresponding to the travel carriage, aided at its bottom head or end by a planar bearing allowing the necessary swinging of the leaf with regards to the travel carriage during the maneuvers of opening and closing thereof.

[0013] By means of loosening said screws, said flat bars are removable through one of the ends of the inner profile for regulating the position of the fixing hinge of the travel carriage and consequently for leveling the height of the door, a stop limiting the longitudinal travel of said flat bars in their coupling by runner in the profile being at the opposite end of said profile.

[0014] At the pivoting point of the door, countering the travel carriage, there is established a short profile run provided with a pair of dovetailed ribs through which the top profile or guide for the carriage is coupled, it being stabilized in a working position by means of setscrews, said auxiliary profile having at least one threaded orifice for coupling a hinge similar to that of the travel carriage

and in this case exclusively in duties as a swinging axis for the corresponding leaf of the door.

[0015] At a lower level, the leaf is guided by conventional means at the end corresponding to the travel carriage, whereas at the opposite end a descending pivot ending in a bearing that plays within a guide properly embedded in the ground, said bearing being longitudinally retained with the collaboration of two parts, in stop duties, established within the guide at both sides of the pivot and fixed by means of respective setscrews, has been provided from the arrangement at the bottom edge of the leaf of a profile identical to that of its top edge.

[0016] Finally and in accordance with another of the features of the invention, a limiting stop of the closed position for the door, which also causes a resilient locking thereof in such position, has been provided for on the top guide.

DESCRIPTION OF THE DRAWINGS

[0017] In order to complement the description being made and for the purpose of aiding to better understand the features of the invention, according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description in which, with an illustrative and non-limiting character, the following has been depicted:

Figure 1 schematically shows a top plan view of a folding door provided with the suspending and regulating mechanism constituting the object of the present invention, without the top guiding profile.

Figure 2 shows a side elevational and sectional detail of the same assembly depicted in the previous figure, at the level of the top end area of the leaf of the door carrying the travel carriage, with the corresponding guide.

Figure 3 shows a cross-sectional detail of the top guide at the level of the travel carriage.

Figure 4 shows a partial top plan detail of said carriage.

Figure 5 shows a cross-sectional detail similar to that of Figure 3 but carried out at the level of the swinging point of the corresponding leaf of the door, which also appears partially depicted.

Figures 6 and 7 show a plan view and a cross-sectional detail of the auxiliary profile used for fixing to the top guide both the pivoting hinge of the door and the closing limiting stop thereof.

Figure 8 shows another cross-sectional detail at the same level as that of Figure 5, but now corresponding to the bottom end area of the door, where the latter connects to the corresponding bottom guide embedded in the ground.

Figure 9 shows a cross-sectional detail similar to that of the previous figure, parallel and close thereto.

Figure 10 finally shows a perspective detail of the run limiting stop of the door in the closed position.

PREFERRED EMBODIMENT OF THE INVENTION

[0018] In view of the described figures, it can be seen how a profile (1) constituting a top guide, inside of which a carriage (2) provided with two pairs of wheels (3) with a transverse axis for sliding on respective side tracks (4) defined in the profile (1) itself, the profile further incorporating a pair of vertical, descending, and symmetrical top partitions (5) which determine a longitudinal and intermediate groove (6) in which a pair of wheels or bearings (7) play, properly fixed to the carriage (2) and the purpose of which is to prevent the pitching thereof, participates in the mechanism proposed by the invention.

[0019] The carriage (2) further incorporates a central and vertical orifice (8) to which a bushing (9) provided with an inner thread (10) is coupled for coupling to said carriage (2) a hinge (11) constituting the hinged linking element of the carriage to the corresponding leaf (12) of the door, as will be seen below.

[0020] For its part, the leaf (12) incorporates a wide groove on its top edge, as the other leaf (12'), in which a profile (13) of a general U-shaped configuration is embedded, which is fixed to respective leaves (12-12') of the door through a large profusion of screws or wood screws (14) which ensure an intimate and firm joining between profile and leaf, each of these profiles (13) incorporating three pairs of side and facing ribs (15) intended for coupling, with longitudinal traveling ability, a pair of flat bars (16) fixable both to each other and to the profile (13) by means of screws (17) and with the collaboration of spacers (18), such that in the loosened situation of said screws (17) said flat bars (16) can slide along the profile (13), emerging on the outside thereof, specifically for the purpose of allowing the axial regulation of the hinge (11) and consequently the spacing between the travel carriage (2) and the corresponding leaf (12), after the regulation of which the flat bars (16) travel towards the bottom or inner end of the profile (13), up to a limit situation in which they hit against a stop, e.g. the spacer (18), fixed in turn by means of a screw (19).

[0021] Obviously the hinge (11) equally traverses the flat bars (16), it is also aided by a spacer (20) and next to its head it incorporates a planar bearing (21) allowing the free rotation of the hinge (11), and therefore of the carriage (2), with regards to the leaf (12) it is associated to.

[0022] On the opposite end of the other leaf (12'), the pivoting attachment thereof to the top guide (1) is formed in the conventional manner, and for this purpose said guide or profile (1) incorporates at the bottom, under its rolling tracks (4), as many dovetailed grooves (22) here intended for the coupling of a short auxiliary profile (23), specifically of an approximately inverted T-shape profile, the transverse branch of which incorporates at the top ribs (24), also with a dovetail profile which match said grooves (22) in terms of shape, size and position, as well as side orifices (25) for the final fixing thereof with the collaboration of setscrews (26) incorporating in their cen-

tral branch a pair of threaded orifices (27) which can be used selectively for the coupling of a hinge (28), similar to the carriage hinge (11), which equally traverses the flat bars (16) assembled on the profile (13) associated to the top edge of the leaf (12') and which is aided by the same planar bearing (29) allowing the rotation or swinging of the leaf (12') with regards thereto, at least one setscrew (30) collaborating with said hinge (28), immobilizing it after performing the height regulation thereof.

[0023] In opposition to this hinge (28), at a level beneath the door and as can be observed in figure 8, the latter incorporates a fixed pivot (31), conveniently integral with a profile (13') identical to profile (13) embedded in the top edge of the door, this bottom profile (13') being equally embedded in the bottom edge of the leaf (12'), and equally having a pair of flat bars (16') for immobilizing said pivot (31), which is finished in a bushing or bearing (32) allowing its free rotation with regards to a bottom guiding profile (33) conveniently embedded in the floor (34) and fixed thereto by means of screws or wood screws (35), the pivot (31) with its corresponding bearing (32) being immobilized inside the guide (33) with the collaboration of a pair of stops (36) located on either side thereof, movable by sliding over the guide (33) through the tongue and grooved coupling (37) and fixable in the working position by means of at least one screw (38).

[0024] All that must finally be mentioned is that an auxiliary profile (23'), similar to that used to fix the swinging hinge (28) to the top guide (1), can be used to fix a rubber stop (39) to said guide (1) which limits the run of the travel carriage (2), further having a pair of retention tabs (40) which determine a clamp (41) on their free end which acts upon the corresponding end of the carriage (2), locking the door in its closed position.

Claims

1. A mechanism for suspending and regulating folding doors, of the type structured by means of two leaves joined together by means of hinges, one of them pivoting and the other sliding on an top guide, **characterized in that** both leaves (12-12') of the door incorporate, embedded on their top edge, respective profiles (13), firmly fixed to said leaves by means of respective sets of screws or wood screws (14), each one of these profiles (13) incorporating, on their side walls and internally, pairs of ribs (15) opposite each other for coupling, with longitudinal traveling ability, of at least one pair of flat bars (10) fixable both to each other and to the profile (13) with the collaboration of screws (17) aided by spacers (18), and said flat bars (16) also being traversed both by the fixing hinge (11) for fixing to the corresponding leaf (12) of the travel carriage (2), and the hinge (28) constituting the pivoting axis for the other leaf (12'), all of this such that said flat bars (16) can travel towards the exterior of the respective leaves by means of a runner, in order to establish full accessibility to said hinges (11) and (28), for regulating or leveling the door.

2. A mechanism for suspending and regulating folding doors according to claim 1, **characterized in that** the profile (1) constituting the top guide incorporates internally and on its top branch a pair of partitions (5) determining a longitudinal and mid groove (6) in which there plays a pair of small wheels or bearings (7) of a vertical axis emerging from the carriage (2).

3. A mechanism for suspending and regulating folding doors according to the previous claims, **characterized in that** the carriage (2) incorporates a vertical orifice (8) in which a bushing (9) is coupled thereto with no rotation ability, which bushing is provided with an inner thread (10) in which plays said articulated fixing hinge (11) for the corresponding leaf (12) of the door, which hinge (11) after traversing the pair of flat bars (16), incorporates a planar bearing (21) facilitating the tilting of the leaf (12).

4. A mechanism for suspending and regulating folding doors according to claim 1, **characterized in that** the profile (1) constituting the top guide of the door incorporates at the bottom, under the rolling tracks (4) for the carriage (2), as many grooves (22), preferably dovetailed, for the fixing of a small auxiliary profile (23), which can be coupled by runner in said grooves, and fixed with the collaboration of setscrews (26) and provided with at least one threaded orifice (27) for coupling the hinge (28) corresponding to the pivoting leaf (12'), which equally traverses the flat bars (16) of the profile (13) embedded on the top edge of the leaf (12), and finished on its top end in a planar bearing (29).

5. A mechanism for suspending and regulating folding doors according to claims 1 and 4, **characterized in that** another auxiliary profile (23'), similar to profile (23) is coupled by the same system to the free end of the profile (1) constituting the top guide, on the end corresponding to door closure, which auxiliary profile (23') constitutes the support for a rubber stop (39) and for a pair of tabs (40) constituting a retention clamp (41) for retaining the travel carriage (2) in the closing position of the door.

6. A mechanism for suspending and regulating folding doors according to claim 1, **characterized in that** the pivoting door (12') incorporates, in the vertical corresponding to the top hinge (28), a fixed pivot (31), fixed to a bottom profile (13') of the leaf (12') which is identical to and embedded in the same manner as the top profile (13), fixed by means of a pair of flat bars (16'), which pivot (31) plays in a bottom guide (26), preferably embedded in the floor, in which it is longitudinally retained with the collaboration of

a pair of stops (36) located at either side of the pivot (31) and fixable by means of respective screws (38).

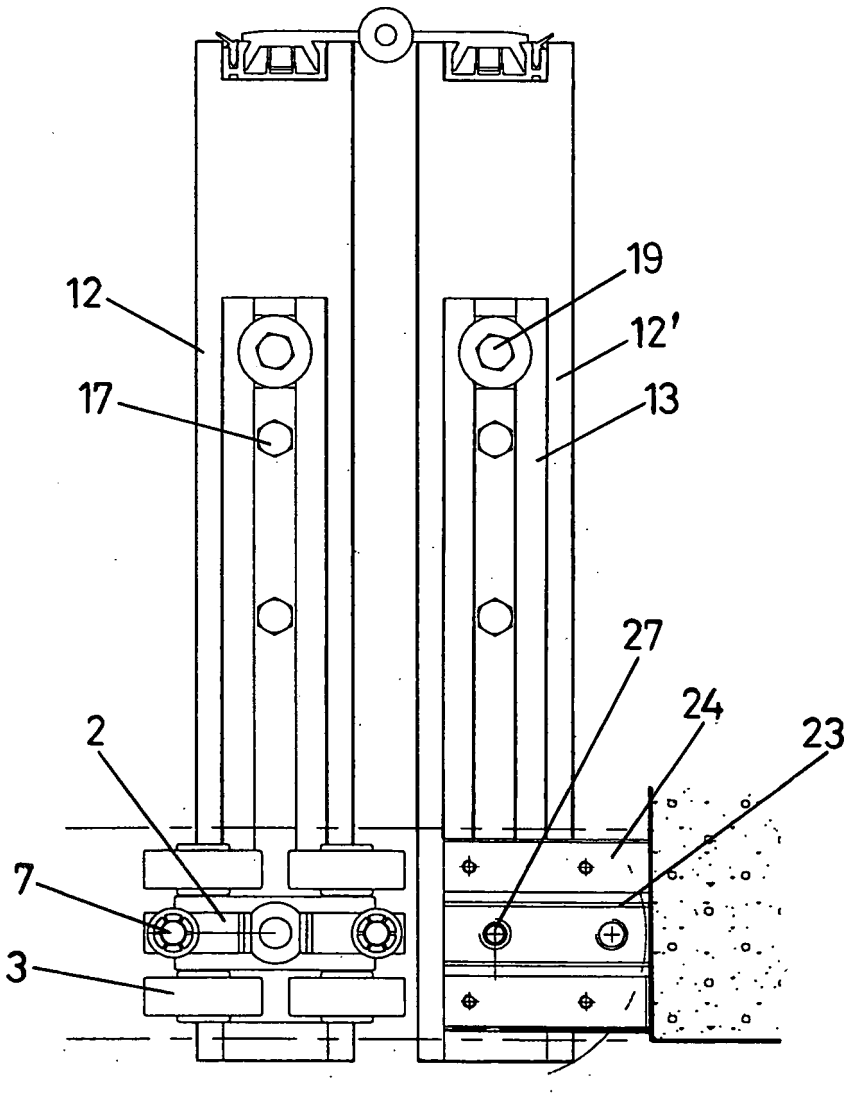


FIG. 1

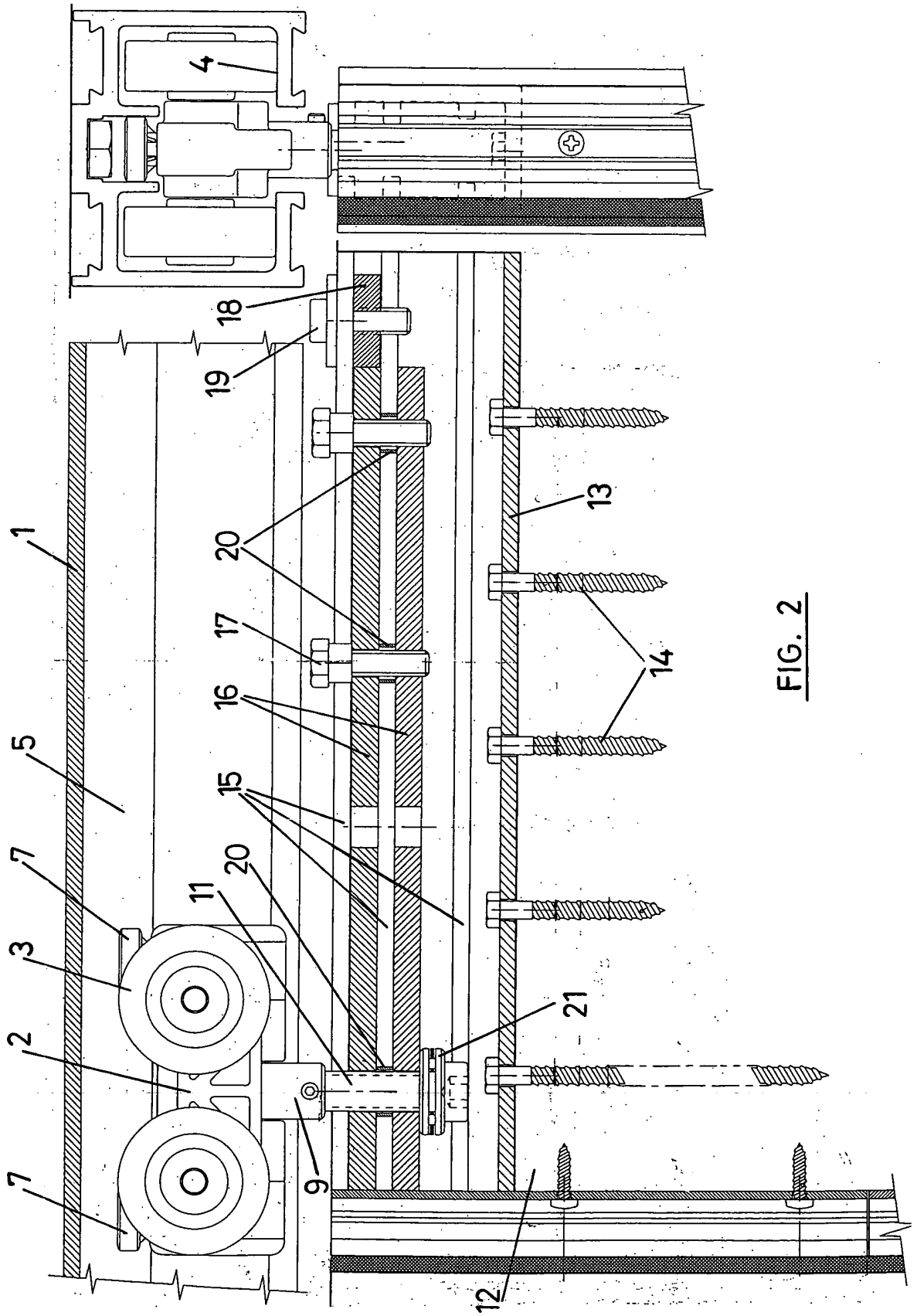
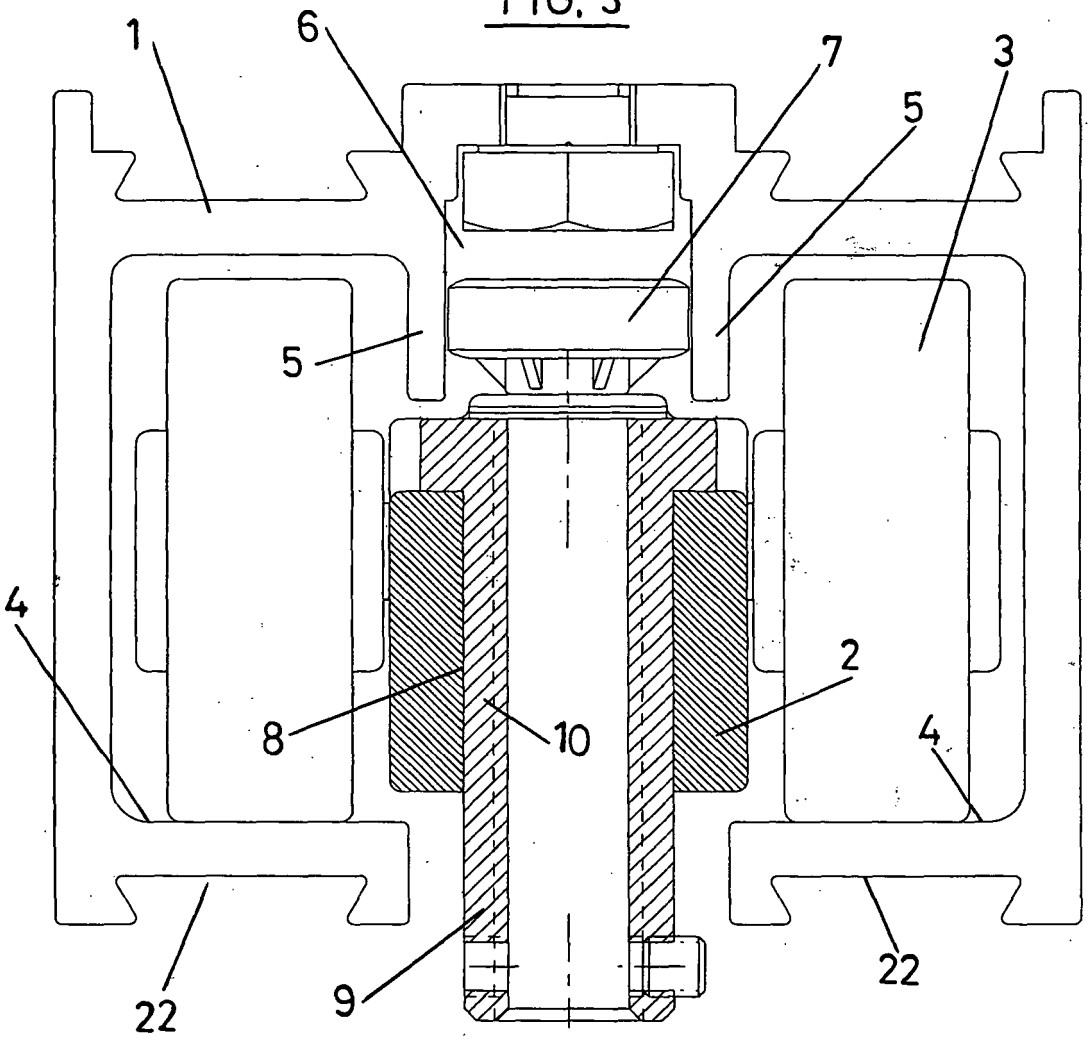


FIG. 2

FIG. 3



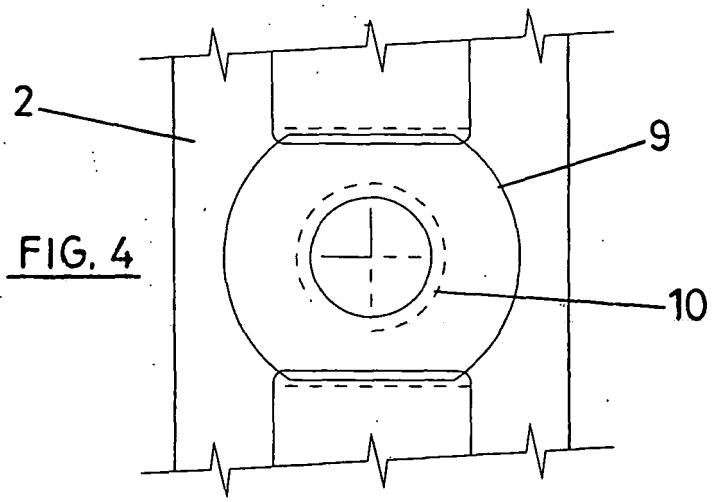
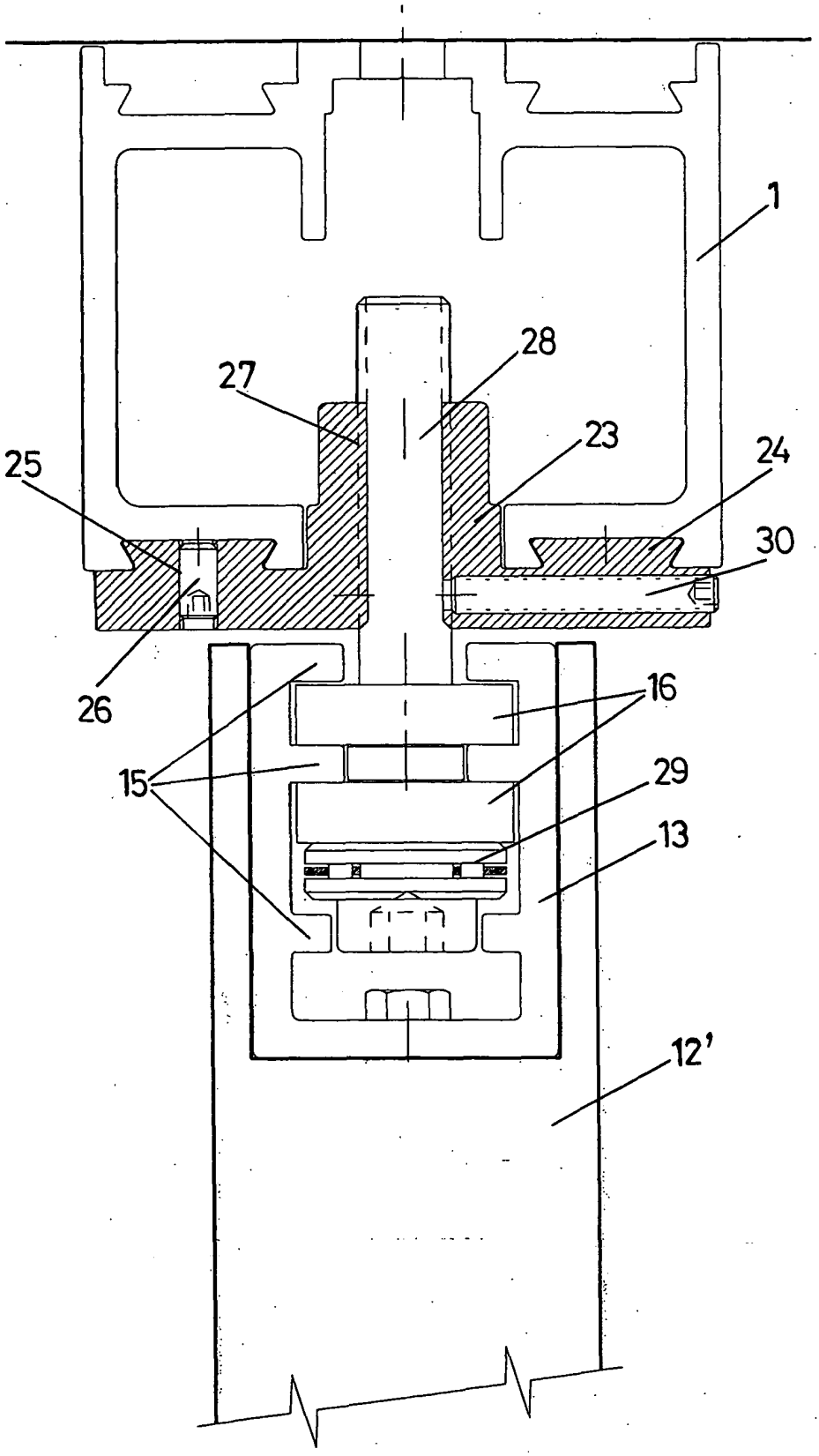


FIG. 4

FIG. 5



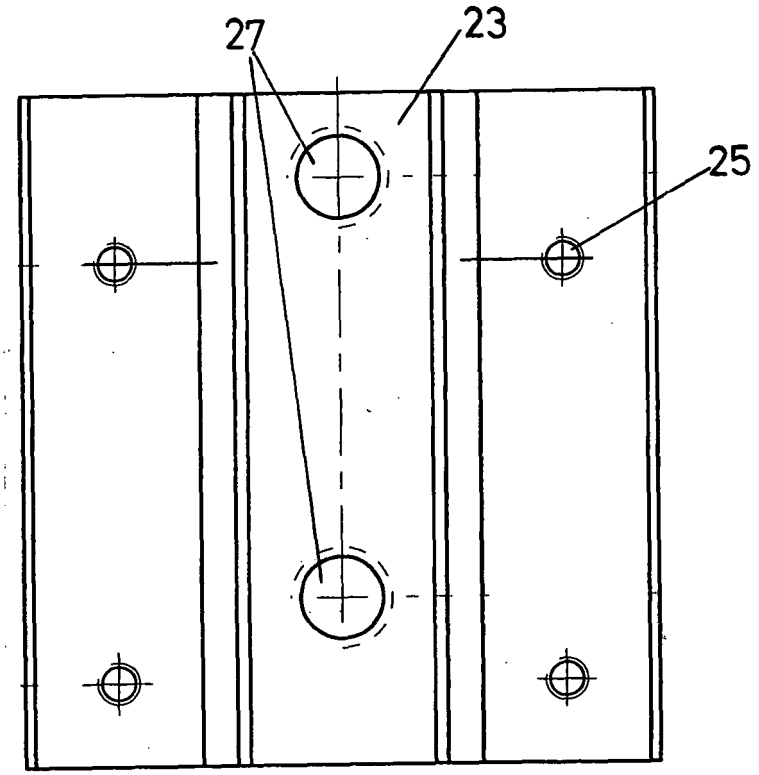


FIG. 6

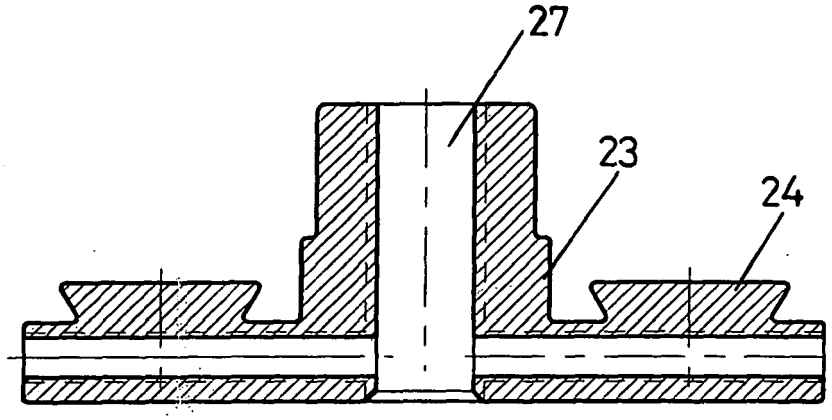


FIG. 7

FIG. 8

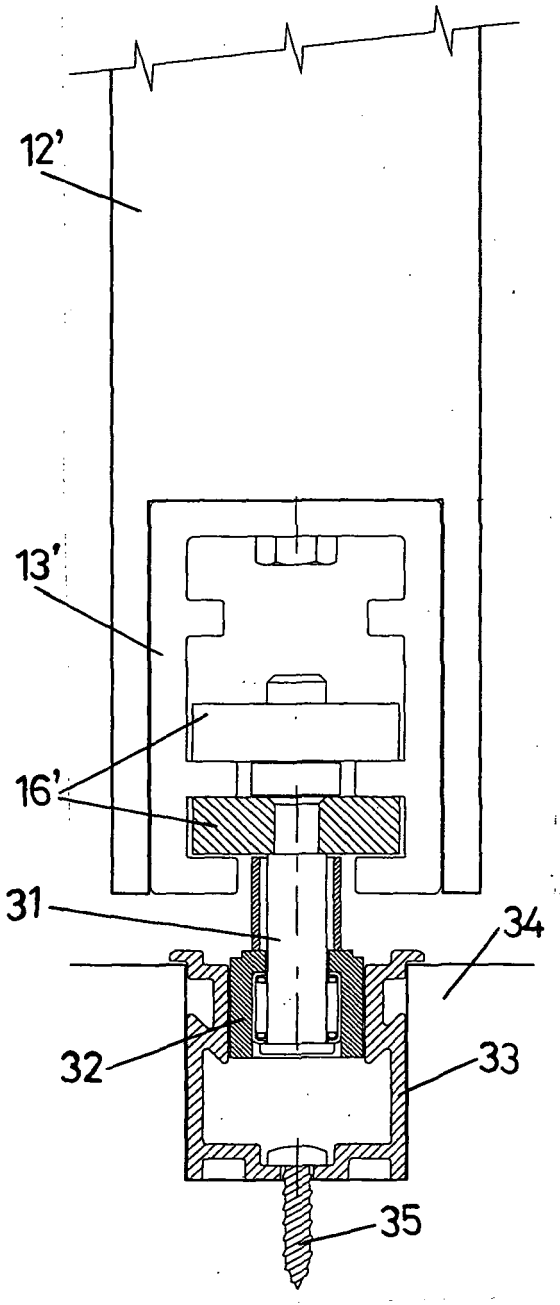


FIG. 9

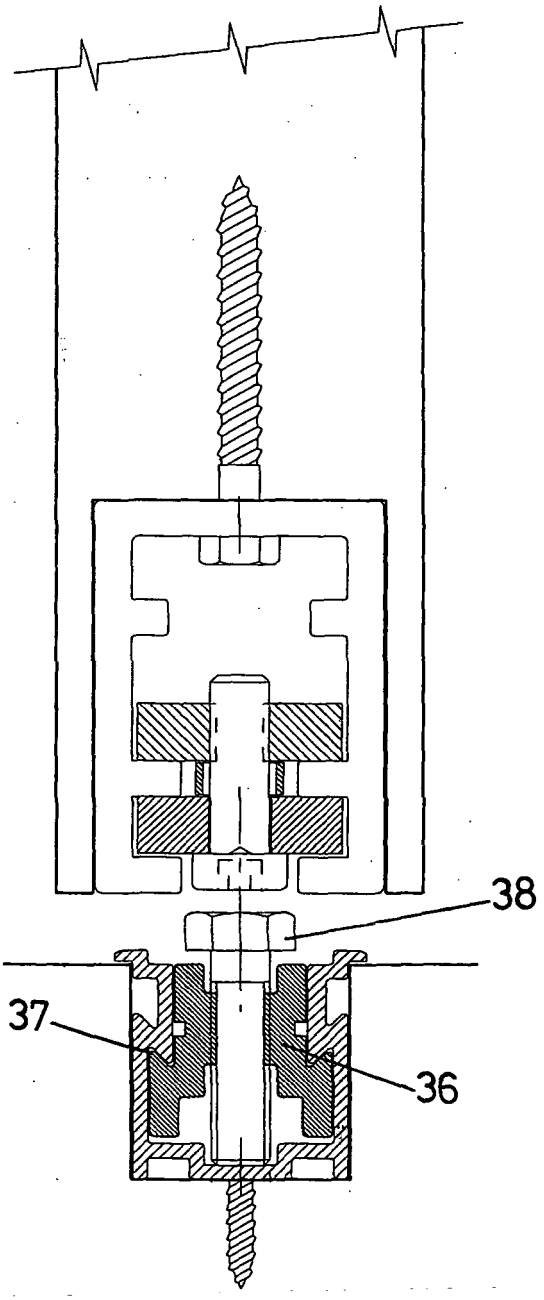
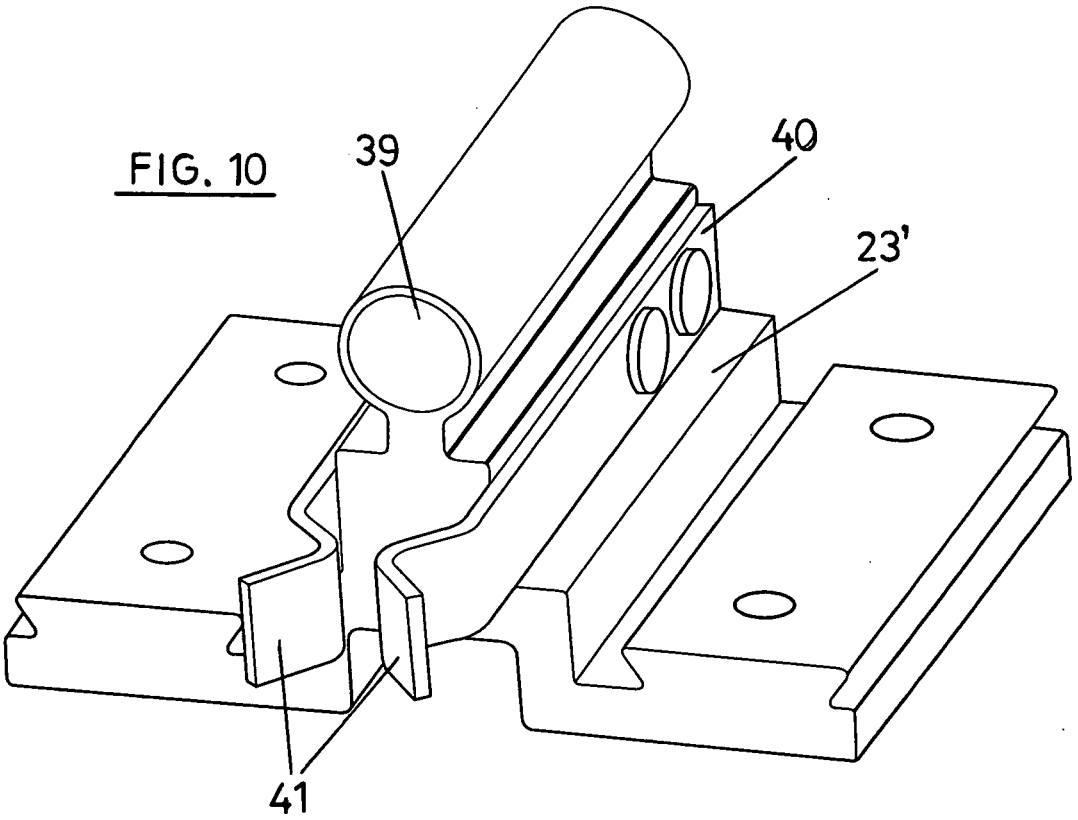


FIG. 10



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2004/000221

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E05D15/26, E05D15/12, E06B3/48

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E05D+, E05B+

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT,EPODOC,WPI,PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ES2084858 T (HESPE & WOELM GmbH & Co.) 1996-05-16; **column 3, line 61-column 6, line 36 and figures**	1-4
A	ES2057656 T (HESPE & WOELM GmbH & Co.) 1994-10-16 ; **column 6, line 23- column 8, line 60 and figures**	1-4
A	US1444349 A (LEEDS ROBERT R.) 1923-02-06 ; **the whole document**	1-3, 6
A	US3374821 A (WHITE DEAN S.) 1968-03-26 ; **column 3, line 44-column 4, line 65 and figures**	1-3, 6
A	ES2139430 T (HAWA AG.) 2000-02-01; **the whole document**	1,2,4

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 JULY 2004 (14.07.04)	**28 JULY 2004 (28.07.04)**
Name and mailing address of the ISA/ **S.P.T.O.**	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/ ES 2004/000221

Patent document cited in search report	Publication date	Patent familiy member(s)	Publication date
ES 2084858 T	16.05.1996	EP 19920104846	20.03.1992
		EP0508180 AB	14.10.1992
		DE 4111929 AC	15.10.1992
		DE 9116993 U	15.12.1994
		AT 133232 T	15.02.1996
		DE 59205058 D	29.02.1996
		GR 3018999 T	31.05.1996
		DK 508180 T	10.06.1996
ES 2057656 T	16.10.1994	EP 19910107811	15.05.1991
		EP 0457286 AB	21.11.1991
		DE 4015870 AC	21.11.1991
		DE 9007691 U	14.04.1994
		AT 107997 T	15.07.1994
		DE 59102057 D	04.08.1994
		ES 2057656 T	16.10.1994
		DK 457286 T	07.11.1994
US1444349 A	06.02.1923	NONE	---
US3374821 A	26.03.1968	NONE	---
ES 2139430 T	01.02.2000	EP 19970810424	01.07.1997
		EP 0818598 AB	01.07.1997
		AT 187524 T	15.12.1999
		DE 59700817 D	13.01.2000
		ES 2139430 T	01.02.2000

Form PCT/ISA/210 (patent family annex) (July 1992)