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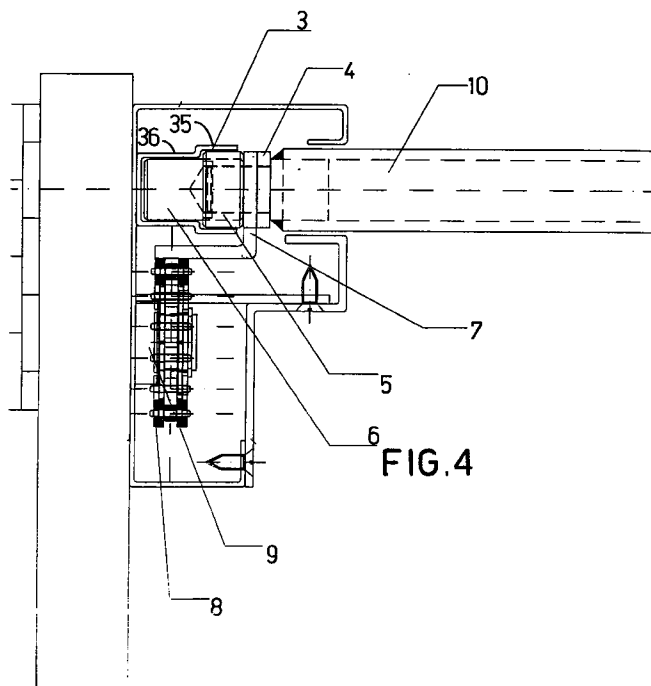
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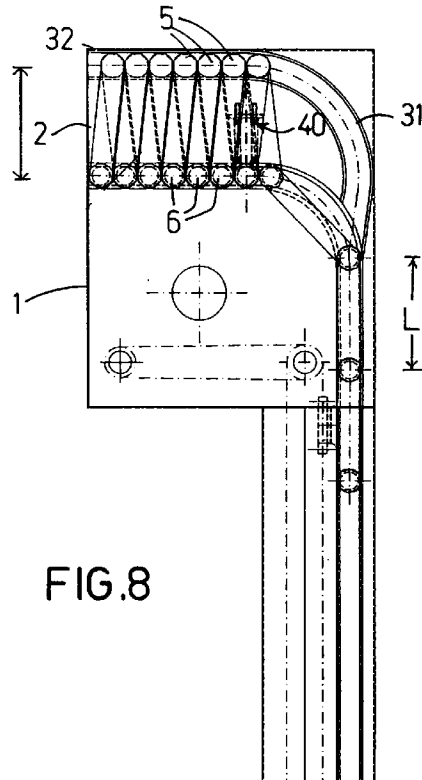
(54) Foldaway security shutter which can be folded and packed

(57) A foldaway security shutter is described, including a plurality of transverse elements (10) which slide between side guides (3) placed on the two opposite sides of an opening to be closed. The shutter has a closed position wherein the elements (10) extend along the guides, and an open position wherein the elements are assembled at the guides end. Each transverse element (10) comprises a first pair of lined up transverse rollers (5) and a second pair of lined up transverse rollers (6), wherein each pair of rollers (5, 6) engages with

a corresponding pair of side guides (35, 36), parallel and placed side by side along the opening to be closed. Close to said guides end, the guides bend and form terminal parallel stretches (32, 33), spaced by a distance equal to the longitudinal dimension (L) of the elements (10), so that in the closed position the transverse elements (10) are assembled, folded and packed between the terminal stretches (32, 33).



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Description

Background of the Invention

The present invention concerns the security shutter sector, and refers, in particular, to a foldaway security shutter which can be folded and packed; such shutter is suitable to close wall, floor, roof, automobile openings.

The security shutters currently known are of the door or sliding type; this kind of shutters are not, anyhow, foldaway shutters. The more widespread traditional foldaway system is the rolling blind or the garage shutter, wherein the shutter comprises a plurality of transverse slats hinged together (pertaining to blinds or shutters) which slide between longitudinal side guides and that wind up, in order to allow the opening of a door or a window, on a roller contained in a small space, called roller shutter box, obtained in the wall.

The roller winding system is not utilized in those cases in which the shutters comprise elements which have longitudinal dimension (or height) over 8-10 cm and with a thickness over 15 mm, since the wound shutter would occupy an excessive space, much bigger than the one which is available with current roller shutter boxes.

Summary of the Invention

The object of the present invention is to realize a security shutter which can be packed inside a traditional roller shutter box, which in addition will be able to contain a normal winding blind for which purpose it is designed.

This and other objects and advantages, that will be better understood later on, are achieved, according to the present invention, by a foldaway security shutter, including a plurality of transverse articulated elements which slide between side guides placed on the two opposite sides of an opening to be closed; the shutter has a closed position wherein said elements extend along the guides and an open position wherein said elements are assembled at the guides end. The shutter is characterized by the fact that each transverse element comprises a first pair of lined up transverse rollers and a second pair of lined up transverse rollers, and that each pair of rollers is engaged with a corresponding pair of side guides parallel and placed side by side along said opening; close to said guides end, the guides bend and form terminal parallel stretches spaced by a distance equal to the longitudinal dimension of the elements, so that in the closed position the transverse elements are assembled and packed inside said terminal stretches.

Brief Description of the Drawings

The structural and functional characteristics of a preferred, but not limiting, embodiment of the shutter according to the invention will now be described, making reference to the attached drawing, wherein:

Figure 1 is a front elevation view of an embodiment of the security shutter, according to the present invention, in its closed position;

Figure 2 is an horizontal section along line II-II of Figure 1;

Figure 3 is a vertical section along line III-III of Figure 1;

Figure 4 illustrates, in enlarged scale, a detail of Figure 2;

Figure 5 illustrates, in enlarged scale, a detail of Figure 3;

Figure 6 is a front view of the shutter of Figure 1, in the open configuration;

Figure 7 is a vertical section along line VII-VII of Figure 6; and

Figure 8 illustrates, in enlarged scale, a detail of Figure 7.

Detailed Description of the Invention

Referring to figures 1 to 3, the foldaway security shutter according to the present invention comprises a plurality of articulated transverse elements 10 which slide between side guides 3 placed on the two opposite sides of an opening to be closed. In the closed configuration of Figure 1, the transverse elements 10 extend along the guides 3 on the same plane in order to close an opening.

Each transverse element 10 comprises a pair of lined up transverse upper rollers 5 and a pair of lined up transverse lower rollers 6 that engage with the side guides 3, in a way that will be clear later. Each pair of rollers 5, 6 is mounted in idle position and can rotate around a corresponding transverse axis 15, 16; said axes 15, 16 could be formed by transverse bars connected by longitudinal connecting rods 4 as in the example illustrated in the attached drawings, where the frame has a grate structure.

Alternatively, the transverse elements 10 could be formed by panels wherein upper and lower housings are obtained in order to receive the paired idle rollers 5, 6; in this last case the axes 15, 16 are intended as the geometric axes formed by said housings. In any case, each transverse element, formed by a panel or by a pair of bars connected by connecting rods, is pivotally connected to its adjacent elements, preferably by longitudinal connecting rods 4.

Referring to figure 4, each security shutter side guide 3, according to the present invention, is formed by a fixed structure with a U-shaped double width section, in which there is an outer portion 36, smaller in width, suitable to receive the lower rollers 6, and an inner portion 35, larger in width, suitable to receive the larger upper rollers 5. In the shown example, the pair of lower rollers extend outward transversally more than the upper ones and all of them are lined up in the same plane, so that the two separate sliding housings 35, 36, can be advantageously formed by a unique element, the structure 3.

Always referring to Figure 4, the shutter has a motion system of the pinion-chain or pulley-belt type, wherein one of the rotating elements 9 (pulley or pinion) is activated by a suitable electric motor (not illustrated for simplicity reasons) and/or by a traditional type crank system applied to a transmission box. The motion system flexible element 8 (belt or chain) engages itself with two hooking elements 7, one on the right side and one on the left side, preferably as L-shaped connecting rods of the type illustrated in Figure 4, in order to bring the shutter to the closed position (Figure 1) or to the open position (Figure 6).

In the embodiment shown in the drawings, the shutter is of the vertical motion type, but it is understood that it could be applied to close openings along an horizontal direction of motion, according to design requirements.

Referring to Figure 5, the shutter has its own compartment 2 obtained in the roller shutter box 1 where it is folded and packed in order to free the opening (window, door, etc.) wherein it is mounted. Inside the roller shutter box 1, in correspondence with the switch points 30 each guide 3 bends and splits in two substantially horizontal and parallel terminal branches 32, 33, spaced by a distance corresponding to the longitudinal dimension L of the transverse elements 10; the upper branch of the terminal stretches forms the terminal part of the guide portion 35 for the upper or inner rollers 5, while the lower branch 33 forms the extension of the lower guide portion 36 for the lower or outer rollers 6. As illustrated in Figure 8, the larger diameter rollers 5 are diverted, as in a locked switch, by branch 30 and forced to move along a curve 31 having the median radius equal to the pitch of the rollers or to the longitudinal length of each transverse element 10.

In order to improve the sliding movement during the opening and the closing operation of the shutter, while the larger rollers 5 run along the curve 31, the rollers 6 belonging to the same transverse element 10 remain preferably blocked in position by means of an elastic holding device 40 placed on the lower terminal stretch 33 in a point substantially corresponding to the geometrical centre of the curve 31. Such holding device intercepts each roller 6 and offers resistance to its passage; each transverse element 10 is pivotally connected to the lower rollers 6 and rotates around them, forcing the rollers 5 to enter and to run along curve 31. The blocking action exercised by the device 40 is of the elastic and temporary type, and it lasts until the moment when a roller 6 belonging to the next transverse element 10, which takes the place of the preceding roller and causes it to advance along the guides.

In the preferred embodiment shown in Figures 5 and 8, the elastic holding device 40 is formed by a pair of pistons 41 perpendicular to the terminal branch 33.

The pistons are spaced by a distance suitable to block a roller 6, and they act on this roller through hemispheric ends 42 pushed by springs 43, each spring having preferably a control screw (not illustrated for simplicity reasons).

During the opening movement of the shutter, the rollers of equal size have to follow the same path and to go near the preceding ones, so that the panels or the transverse elements 10 are assembled in an orderly way and packed in a contained space in the compartment or shutter box 2.

It should be appreciated that, even by using elements of a certain height, the shutter, according to the present invention, occupies little space in its folded configuration, so that it can be easily contained in current shutter boxes.

It is understood that the invention is not limited by the embodiment herein described and illustrated, which has to be considered as an example of the security shutter embodiment. This embodiment can be further modified in regard to the shape and disposition of the parts, as well as the construction and working details.

Particularly, the running tracks for different rollers might also be obtained by having separate guides, or by placing differently the rollers, for example by placing the larger diameter rollers in the outer position and by having a double width (not illustrated) wherein the outer portion has the smaller width. Further, by using a holding device as the one indicated by numeral 40, the U-shaped upper terminal guide 32 could be substituted by a simple flat rolling track either in an inner position (indicated by numeral 38 in Figure 5) or by an outer position (indicated by numeral 37).

The invention is meant to cover all the various embodiments comprised in its domain, as defined by the following claims.

Claims

1. A foldaway security shutter, including a plurality of transverse articulated elements (10) which slide between side guides (3) placed on the two opposite sides of an opening to be closed, the shutter having a closed position wherein said elements (10) extend along the guides, and an open position wherein said elements are assembled at the guides end, characterized in that each transverse element (19) comprises a first pair of lined up transverse rollers (5) and a second pair of lined up transverse rollers (6), and in that each pair of rollers (5, 6) is engaged with a corresponding pair of side guides (35, 36) parallel and placed side by side along said opening; close to said guide end, the guides (35, 36) bend (31) and form parallel terminal stretches (32, 33) spaced by a distance equal to the longitudinal dimension (L) of the elements (10), so that in the closed position said transverse elements (10) are assembled, folded and packed between said terminal stretches (32, 33).
2. A shutter according to claim 1, characterized in that the guides (35, 36), placed on the same opening side, form a structure (3) comprising a first portion (35) suitable to receive and let slide a roller (5) of

the first pair of roller, and a second portion suitable to receive and let slide a roller (6) of the second pair of rollers.

3. A shutter according to claim 2, characterized in that the fixed structure (3) has a double width U-shaped section and that the pair of rollers (5, 6) are lined up on the same plane, wherein one of the roller pairs extends outward transversally more than the other one; the two separate rolling housings (35, 36) being respectively formed by the outer part and by the inner part of the structure (3). 5
10

4. A shutter according to claim 1, characterized in that each of said transverse elements (10) is formed by a pair of transverse bars, at which ends there are placed the rollers (5, 6), connected by at least a pair of longitudinal connecting rods (4). 15

5. A shutter according to claim 1, characterized in that each of said transverse elements (10) is formed by a panel wherein housings are obtained suitable to receive the rollers (5, 6) pairs. 20

6. A shutter according to claim 1, characterized in that it comprises a holding device (40) suitable to engage, in an elastic and releasable way, with one at a time of said transverse elements (10) so as to hold elastically and temporarily the second pair of lower rollers (6) of said element on the terminal inner stretch (33) in correspondence with the curve (31) centre of the terminal outer stretch (32), so that the first pair of rollers (5) of the same element (10) has to enter and to run along the curve (31). 25
30
35

7. A shutter according to claim 6, characterized in that the bending radius of the curved portion (31) is equal to the longitudinal dimension (L) of the transverse elements (10). 40

8. A shutter according to claim 6, characterized in that said holding elastic device (40) comprises a pair of holding elastic means (41) spaced by a distance suitable to block a roller (6). 45

9. A shutter according to claim 8, characterized in that said means (41) are a pair of pistons substantially perpendicular to the terminal branch (33). 50

10. A shutter according to claim 6, characterized in that said pistons act on the rollers (6) through hemispheric terminals (42) pushed by adjustable springs (43). 55

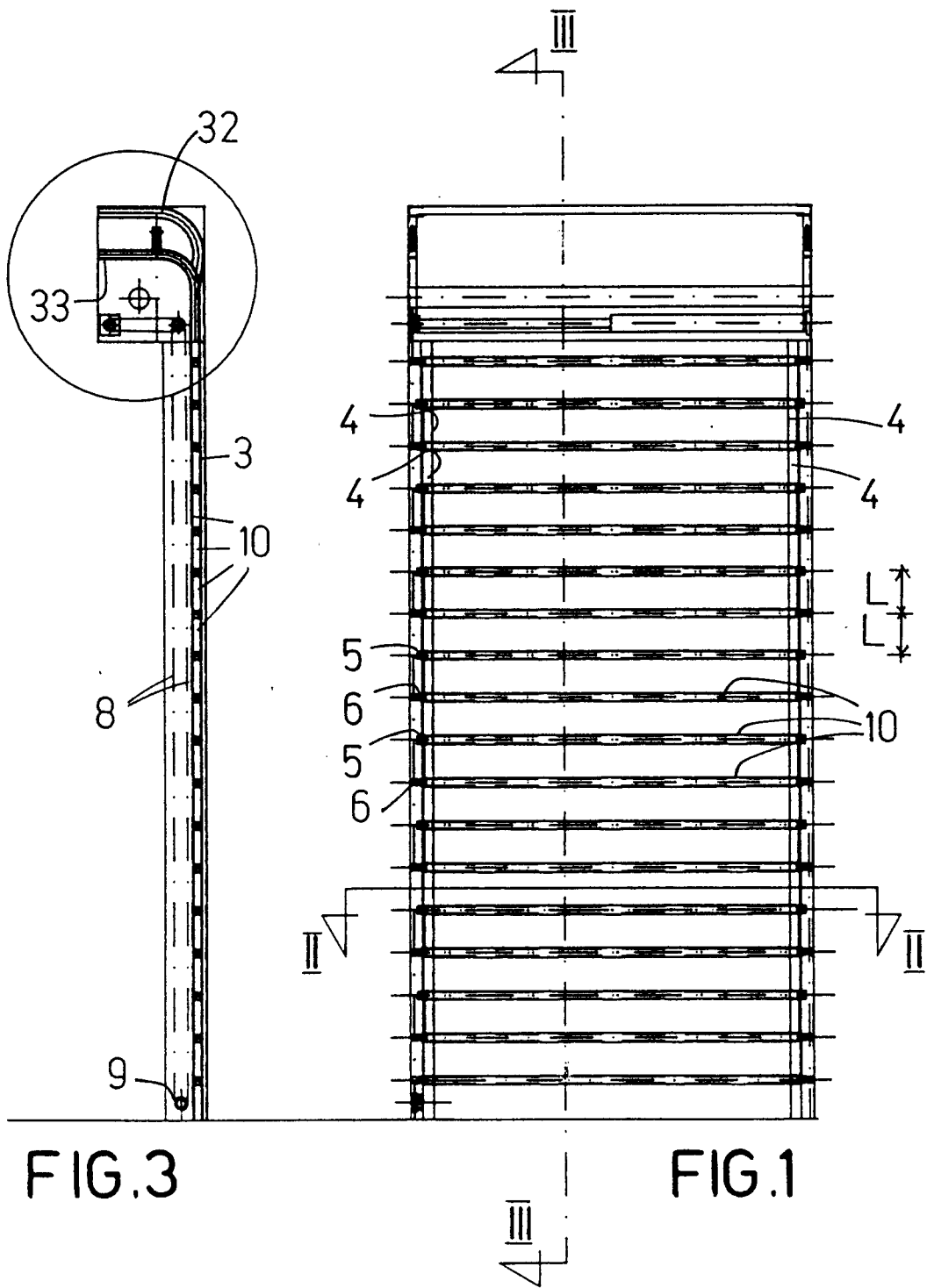
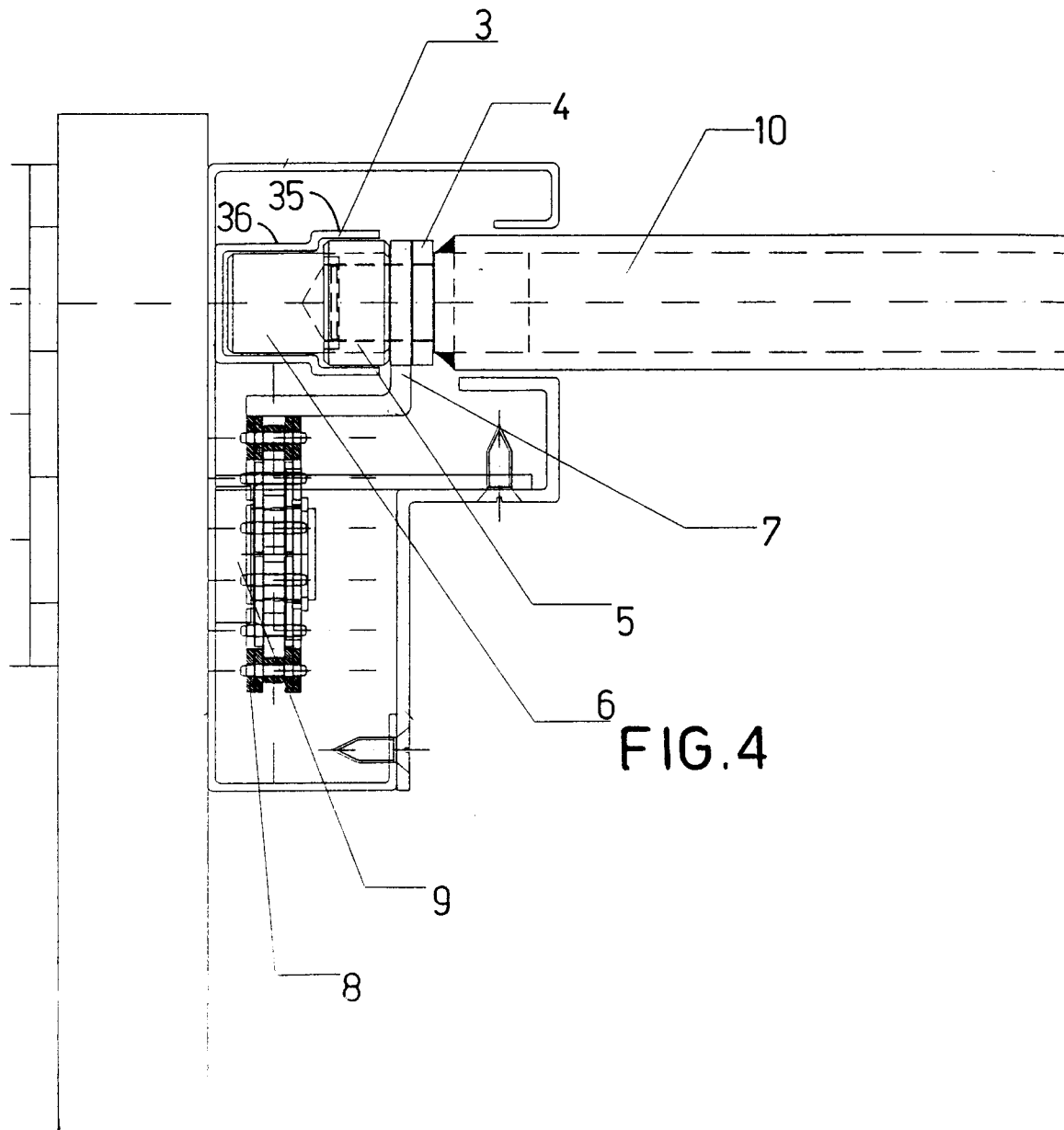


FIG. 2

FIG. 1

FIG. 3



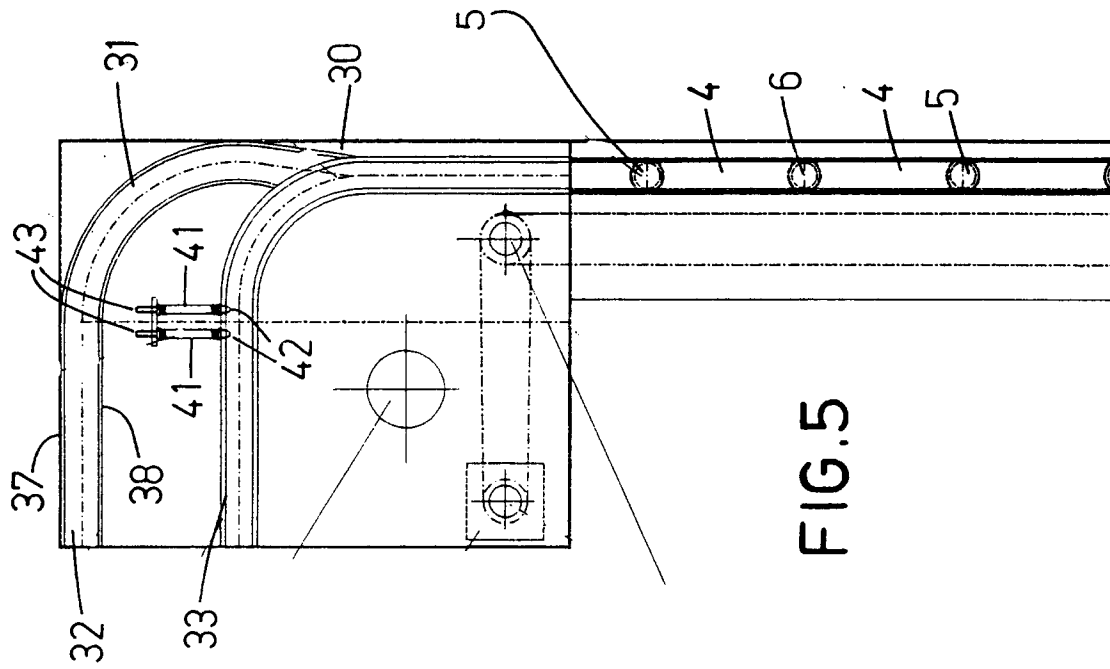


FIG. 5

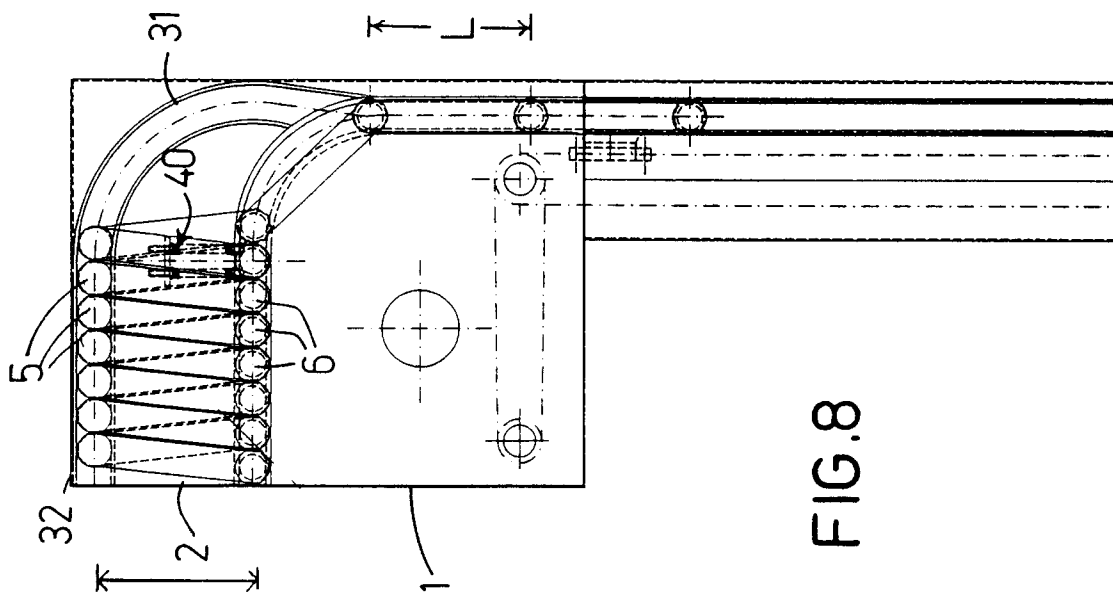
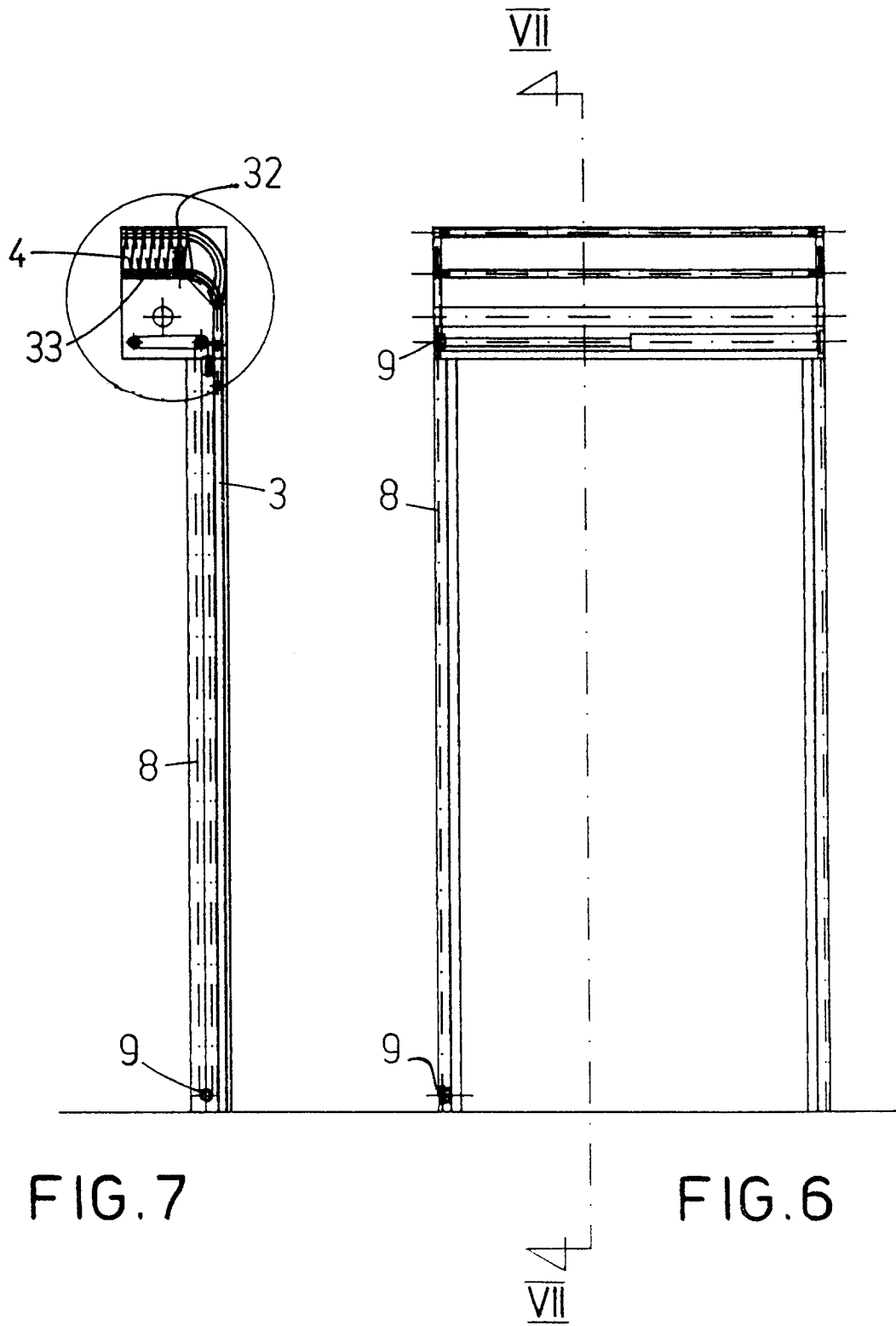


FIG. 8





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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 2078

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US-A-4 610 289 (SUGIHARA TOSHIHIKO) 9 September 1986 * column 3, line 1 - line 4 * * column 3, line 13 - line 55 *	1,2,5	E06B9/06
A	* figures 6A-9 * ---	3	
Y	AU-B-607 346 (ROLLUP INDUSTRIES PTY. LTD.) 28 February 1991 * page 5, line 11 - line 18 * * page 5, line 22 - page 6, line 28 * * figures 3,6-8 *	1,2,5	
A	US-A-4 379 478 (LICHY DALE) 12 April 1983 * column 3, line 50 - column 4, line 10 * * figures 2-4 *	1,2,5	
A	* figures 1,6,7 * ---	3	
A	US-A-4 303 117 (LINDBERGH CHARLES) 1 December 1981 * figure 27 * * column 15, line 3 - line 28 * * claim 13 *	1,5	
A	* figures 3-6,10A,24-26 * * column 7, line 1 - line 12 * * column 8, line 33 - line 46 *	6	
A	FR-A-2 277 225 (GRIESSER AG) 30 January 1976 * page 10, line 2 - line 9 * ---	1	
A	CH-A-611 968 (BAUMANN HANS PETER ; BAUMANN WILLY (CH)) 29 June 1979 * page 2, right-hand column, line 27 - line 30 * * page 2, right-hand column, line 40 - line 55 * * figures 2,3 * ---	2,3	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		18 October 1996	Guthmuller, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 2078

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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A	DE-A-34 01 477 (CHAMBERLAIN MFG CORP) 28 February 1985 * figures 1,2,11,14 *	1,5	
A	US-A-4 867 220 (MATSUMOTO MASAHARU ET AL) 19 September 1989		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Place of search THE HAGUE		Date of completion of the search 18 October 1996	Examiner Guthmuller, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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