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(54) **Roller shutter working both as roll-up shutter and jalousie**

(57) A roller shutter working both as a roll-up shutter and a jalousie, comprising a plurality of slats (3) and a driving chain (5) crosswise to which the plurality of slats (3) is fastened. The driving chain (5) comprises a plurality of driving links (7) and a plurality of connecting links (9).

Each driving link (7) is fastened to at least one slat (3) and is arranged to drive it in order to open and close a plurality of openings (11). Both the driving links (7) and the connecting links (9) extend along less than the half of the total width (W1) of the roller shutter (1).

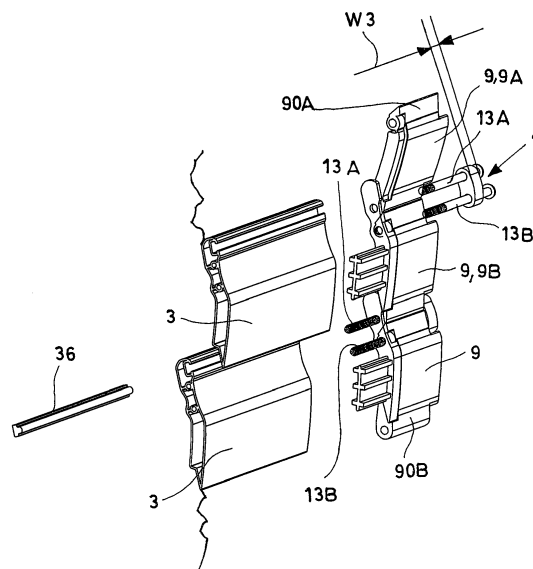


Fig.4

EP 2 811 103 A1

Description

Field of the invention

[0001] The present invention relates to a roller shutter to reversibly close doors, windows or other building openings, capable of performing the functions of both a roll-up gate or roll-up shutter and a jalousie.

Background art

[0002] Currently, for example from document EP189091, roller shutters are known that are capable of performing the functions of both a roll-up gate or roll-up shutter and a jalousie. The author of the present invention has noted that these and other known roller shutters have a relatively complex, sometimes unreliable mechanical construction. The document DE1237289 describes a roller shutter wherein, when lowered, its own weight causes the opening of a plurality of blades so as to allow the passage of air and light, while when lifted, again by gravity, the blades close, mostly preventing the light from the outside from passing, being, on the other hand, less effective in preventing the passage of air. Each blade is fastened to a cross member extending horizontally along the entire width of the window or other opening to close, and may slide inside a lateral guide to lift or lower the roller shutter. According to the author of the present invention, these cross members uselessly reduce the visibility through the lowered roller shutter, that is when the blades are open; furthermore, they uselessly increase the cost of the roller shutter and, on the other hand, do not contribute in a significant way to preventing draughts and the passage of air when the roller shutter is lowered and the blades are closed.

[0003] An object of the present invention is to overcome the drawbacks of the prior art mentioned hereinabove and, in particular, to provide a roller shutter having a relatively simple construction which, when working as a jalousie, provides a lower degree of obstruction to the view or the ventilation, and, when working as a roll-up shutter or blind, provides a greater degree of obstruction to air and/or light.

Summary of the invention

[0004] Such object is achieved, according to the present invention, by a roller shutter having the features according to claim 1.

Further features of the device are defined in the dependent claims.

The advantages attainable by the present invention will appear more clearly to the person skilled in the art from the following detailed description of a particular exemplary, non-limiting embodiment, illustrated with reference to the following schematic figures.

Figure listing

[0005]

Figure 1 shows a first perspective view of a portion of a roller shutter according to a particular embodiment of the invention and with part of the slats open; Figures 2 and 3 respectively show a second and a third perspective view of the roller shutter of Figure 1, with the slats respectively closed and open; Figures 4 and 5 respectively show a fourth and a fifth exploded perspective view of the roller shutter of Figure 1, with the slats respectively closed and partially open;

Detailed description

[0006] In the present description, the term "crosswise" means that two bodies have an inclination, one relative to the other, equal to or greater than 45°; the term "longitudinal" means that two bodies have an inclination, one relative to the other, lower than 45°. Figures 1-5 relate to a roller shutter according to a particular embodiment of the invention, indicated with overall numeral reference 1 and usable for example to reversibly close doors, windows or other apertures of buildings. The roller shutter 1 comprises:

- a plurality of slats 3 arranged adjacent to one another and arranged for sheltering from wind, sun, light and bad weather;
- at least one driving chain 5 crosswise to which the plurality of slats 3 is fastened and each of such chains extends according to the sliding direction of the roller shutter (Figures 1-3). Preferably, the slats 3 are substantially rigid so as to be substantially similar to small planks, and may consist of, or comprise, for example a section bar of plastic material, aluminium or other metallic material or wood. Preferably, the roller shutter 1 is provided with two driving chains 5, each arranged along the edges of the sides of the roller shutter itself; in that case the various slats 3 are interposed between the two chains 5.

[0007] The driving chain 5 comprises a plurality of driving links 7 and a plurality of connecting links 9 articulated together - for example hinged - one after the other so as to form a succession and so that a plurality of driving links 7 is articulated with, and interposed between, two connecting links 9, and a plurality of connecting links 9 is articulated with and interposed between two driving links 7. Each link 7, 9 may be for example a substantially rigid mechanical piece free from internal articulations. The connecting links 9 may approximately have for example the shape of a rectangular plate (Figure 2). Preferably, the driving links 7 are linked to the adjacent connecting links 9, 9A, 9B substantially like connecting rods.

[0008] According to one aspect of the invention, at

least some of the driving links 7 are fixed, link by link, to at least one respective slat 3 and are arranged to drive it in order to reversibly open and close a plurality of openings 11, each of which is interposed between two adjacent slats 3.

[0009] Moreover, both the driving links 7 and the connecting links 9 extend along less than the half of the total width W1 of the roller shutter 1. Most preferably, both the driving links 7 and the connecting links 8 extend along less than a quarter of the total width W1, more preferably along less than an eighth and even more preferably along less than a tenth of the width W1 (Figure 2). Preferably, the width W2 of the connecting links 9 and the width W3 of the driving links 7 are equal to or lower than 10 cm; more preferably, the widths W2 and W3 are equal to or lower than 5 cm, and even more preferably equal to or lower than 3 cm (Figures 4, 5). Clearly, the lower the relative or absolute width W2, W3 of the links 7, 9, the lesser the open roller shutter will obstruct the view and ventilation.

[0010] Preferably at least some driving links are arranged, link by link, for driving at least one slat 3 by compressing or decompressing each driving chain 5 longitudinally to itself (arrow F1). Preferably, this is achieved by ensuring that at least some driving links are arranged, link by link, for orienting such slat 3 perpendicularly or transversally to the imaginary surface, in which the sequence of slats 3 lays, opening the openings 11 (Figures 1, 3) when said chain 5 is more compressed longitudinally to itself, and so as to orient said slat 3 according to a direction substantially tangential or longitudinal to the imaginary surface wherein the sequence of slats 3 lays, closing the openings 11, when the chain 5 is less compressed longitudinally to itself (Figure 2).

[0011] Advantageously, the driving links 7 are arranged to drive, link by link, at least one slat 3 when the weight of the roller shutter 1 itself compresses the driving chain - or chains- 5 longitudinally to itself, by simplifying the mechanical construction and use of the roller shutter. Advantageously, a plurality of driving links 7 is singularly fastened to at least one slat 3 through a first 13A and a second 13B hinging pin that, by rotating together with the respective driving link 7, drive the respective slat 3. Advantageously, each driving link 7 is articulated with a first and adjacent connecting link 9A through its first hinging pin 13A and is articulated with a second and adjacent connecting link 9B through its second hinging pin 13B (Figure 4). Preferably the first and second hinging pins 13A, 13B are longitudinal to the slats 3.

The roller shutter 1 may be provided with two groove guides 15, arranged along the sides thereof, and wherein or along which the links 7, 9 may slide (Figure 1). The grooves 15 may be for example fastened integral to the opening of the window or door which is to be closed by the roller shutter 1.

[0012] In order to drive a respective slat 3 and at the same time generate an articulated chain 5, each first 13A and each second hinging pin 13B preferably goes

through a respective driving link 7, both are fastened to the same slat 3 for example by being screwed down into respective holes 34A, 34B (Figure 5); moreover, the first pin 13A and the second pin 13B respectively go through a first 9A and a second connecting link 9B adjacent to each other and interposed between the slat 3 and the driving link 7.

Preferably, each slat 3 forms a first 30 and a second longitudinal edge 32, at least some slats 3 are fastened to the respective first 13A and second 13B pin, each slat in proximity of its first longitudinal edge 30, and the second longitudinal edge 32 of each slat 3 is arranged for resting onto an adjacent slat 3 when the opening 11 between the two slats 3 is closed (Figure 2).

[0013] Advantageously, at least when the driving chain - or chains- 5 are longitudinally compressed, and/or when the slats 3 close the openings 11, the end edges 90A, 90B of at least some of the connecting links 9 rest on, optionally overlapping, the end edges 90A, 90B of the two adjacent connecting links 9A, 9B, so as to eliminate, or at least to reduce, air or light passing through the chain 5 (Figures 2, 4). In order to increase the seal and reduce the air passing through the various closed slats, each of them is advantageously provided with a relative longitudinal sealing gasket 36, arranged to rest on the lower edge 32 of an adjacent slat 3.

In order to drive the slats 3 thanks to the weight of the roller shutter 1 itself, the end edges 90A, 90B of at least some of the connecting links 9 preferably have crosswise acute angle sections, and/or such shapes to always have faces inclined relative to one another, so as to prevent the connecting 9 and driving links 7 from tripping and getting blocked into each other in positions longitudinal to the chain 5 itself and the slats 3 from getting stuck in a closing position.

[0014] In order to further prevent the driving 7 and connecting links 9 from tripping and the occurrence of a dead centre between them, the roller shutter 1 is preferably arranged so that all the first 13A and the second 13B hinging pins 13 can never be aligned to each other. To that purpose, the reciprocal rotations of the links 7, 9 may be limited by appropriate mechanical butts, and/or the links 7, 9 may be more or less arched in shape, at least longitudinally to the driving chain 5.

The operation of the roller shutter 1 will now be described.

[0015] In the condition of Figure 2 the slats and the links 7, 9 of the depicted portion of the roller shutter 1 are hung to one another and as aligned as possible to one another by gravity; again by gravity the slats 3 close the openings 11, the upper edges 30 of each slat 3 rest on and partially overlap the lower edges 32 of an adjacent slat 3; similarly, the upper edges 90A of each connecting link 9 rest on and partially overlap the lower edges 90B of an adjacent connecting link 9, eliminating or at least minimising the air or light passing through the roller shutter; the latter in Figure 2 works substantially as a conventional roll-up shutter or roll-up gate. On the contrary, in order to work as a jalousie, the roller shutter 1 is -par-

tially or completely- lowered so that, thanks to its own weight, the various pins 13A, 13B are more misaligned with each other and the links 7, 9 take more crosswise orientations with respect to the chains 5 and to the imaginary laying surface of the roller shutter 1. By rotating, the driving links 7 in turn cause the respective slats 3 to rotate by orientating them perpendicularly, or in any case crosswise, to the imaginary laying surface of the roller shutter 1 and by opening the openings 11 (Figures 1, 3, 5). The various slats 3 contact each other only to ensure a good seal against draughts and the passage of light, but not to drive their own opening and closing.

[0016] The foregoing description clearly describes the construction simplicity of the roller shutter 1 and its great seal against the passing of air and light when it is closed. Since, when it is open, the only members extending across the window or door which it closes are the slats 3, there further emerges that the roller shutter 1 obstructs very little of the view and ventilation. Furthermore, the absence of further cross members -for example fixed cross members of the roller shutter of the document DE1237289- contributes to simplifying the mechanical realization of the roller shutter 1 and to reducing its manufacturing costs.

[0017] The exemplary embodiments previously described are susceptible to various modifications and variants without, however, departing from the scope of protection of the present invention. Moreover, all details can be replaced with other technically equivalent ones. For example, the materials used as well as the sizes, can be whatever, according to the technical requirements. It is understood that an expression such as "A comprises B, C, D" or "A is made up of B, C, D" comprises and describes also the particular case wherein "A consists of B, C, D". The examples and listings of possible variations to this application are to be intended as non-limited listings.

Claims

1. Roller shutter working both as roll-up shutter and jalousie, comprising

- a plurality of slats (3) arranged adjacent to one another and arranged for sheltering from wind, sun, light and bad weather;
- at least a driving chain (5) crosswise to which the plurality of slats is fastened (3);

and wherein:

- the driving chain (5) comprises a plurality of driving links (7) and a plurality of connecting links (9) articulated together so as to form a succession so that at least some of the driving links (7) are articulated with and individually interposed between two connecting links (9, 9A, 9B) and a

plurality of connecting links (9, 9A, 9B) is articulated and interposed between two driving links (7);

- at least some of the driving links (7) are fixed, link by link, to at least a respective slat (3) and are arranged to drive it in order to reversibly open and close a plurality of openings (11), each of which is interposed between two adjacent slats;
- both the driving links (7) and the connecting links (9) extend along less than the half of the total width (W1) of the roller shutter (1).

2. Roller shutter according to claim 1, wherein both the connecting links (9) and the driving links (7) extend along less than a quarter of the total width (W1).

3. Roller shutter according to claim 1, wherein both the width (W2) of the connecting links (9) and the width (W3) of the driving links (7) is equal to or lower than ten centimetres.

4. Roller shutter according to claim 1, wherein at least some driving links are arranged, link by link, for driving at least a slat (3) by compressing or decompressing the at least one driving chain (5) longitudinally to itself.

5. Roller shutter according to claim 4, wherein at least some driving links are arranged, link by link, for orienting the at least one slat (3) perpendicularly or transversally to the surface in which the sequence of slats (3) lays when said chain (5) is more compressed longitudinally to itself and for orienting the at least one slat (3) according to a direction substantially tangential or longitudinal to the surface wherein the sequence of slats (3) lays when said chain (5) is less compressed longitudinally to itself.

6. Roller shutter according to claim 4, wherein each driving link (7) is arranged for driving at least one slat (3) when the weight of the roller shutter (1) itself compresses or decompresses the at least one driving chain (5) longitudinally to itself.

7. Roller shutter according to claim 1, wherein:

- a plurality of driving links (7) is singularly fastened to at least one slat (3) through a first (13A) and a second (13B) hinging pin that, by rotating together with the respective driving link (7), drive the respective slat (3);
- at least some driving links (7) are articulated, link by link, with a first and adjacent connecting link (9A) through its first hinging pin (13A) and is articulated with a second and adjacent connecting link (9B) through its second hinging pin (13B).

8. Roller shutter according to claim 1, wherein each slat (3) forms a first (30) and a second longitudinal edge (32), at least some slats (3) are fastened to the respective first (13A) and second (13B) hinging pin, each slat in proximity of its first longitudinal edge (30), and the second longitudinal edge (32) of each slat is arranged for resting onto an adjacent slat (3) when the opening (11) between the two slats is closed.
9. Roller shutter according to claim 1, wherein at least some connecting links (9) singularly form a first (90A) and a second end edge (90B) that, at least when the at least one driving chain (5) is longitudinally compressed, and/or when at least some slats (3) close the openings (11), rest on the end edges (90A, 90B) of the two adjacent connecting links (90A, 90B) so as to eliminate or at least to reduce air or light passing through the chain (5).

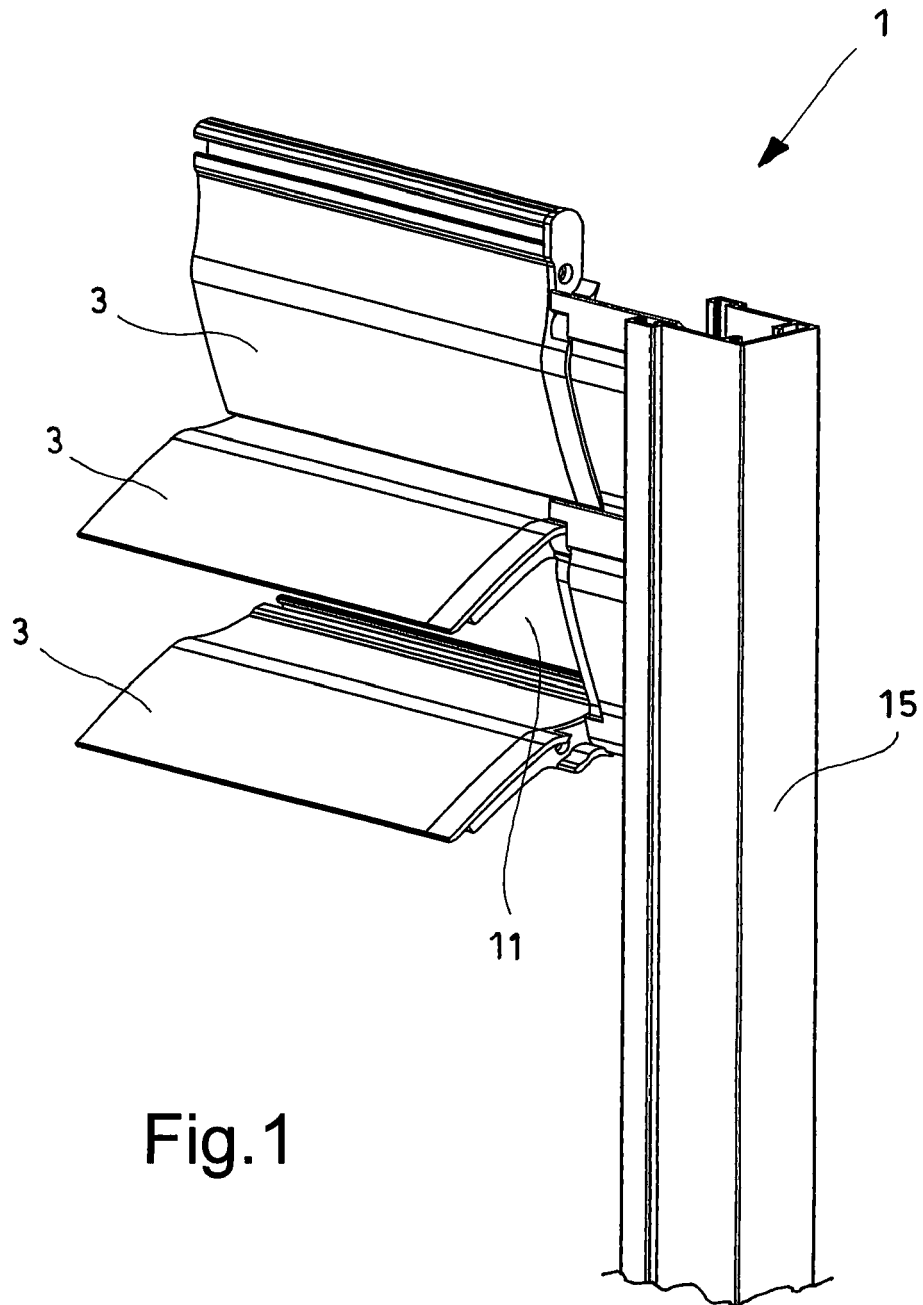


Fig.1

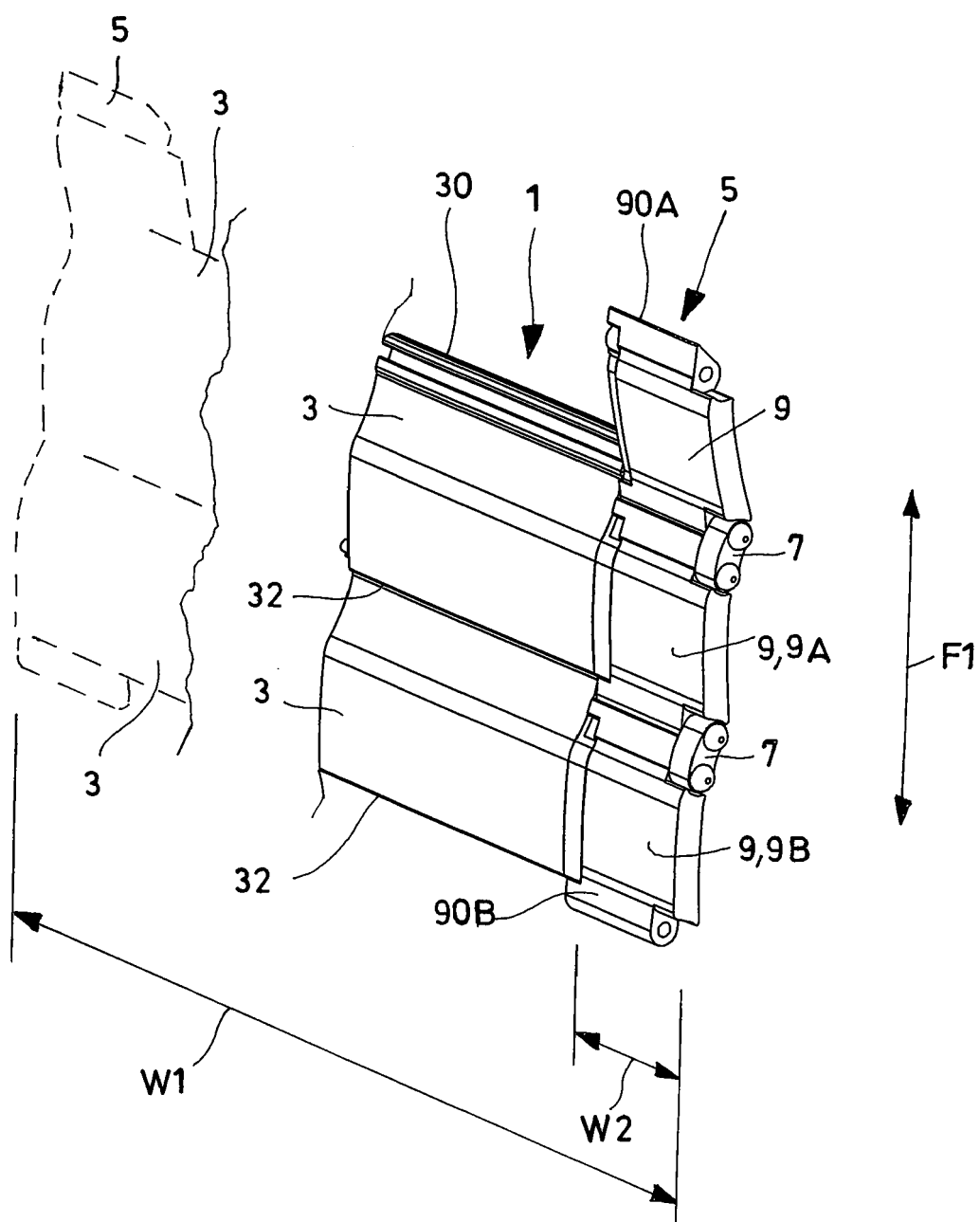


Fig.2

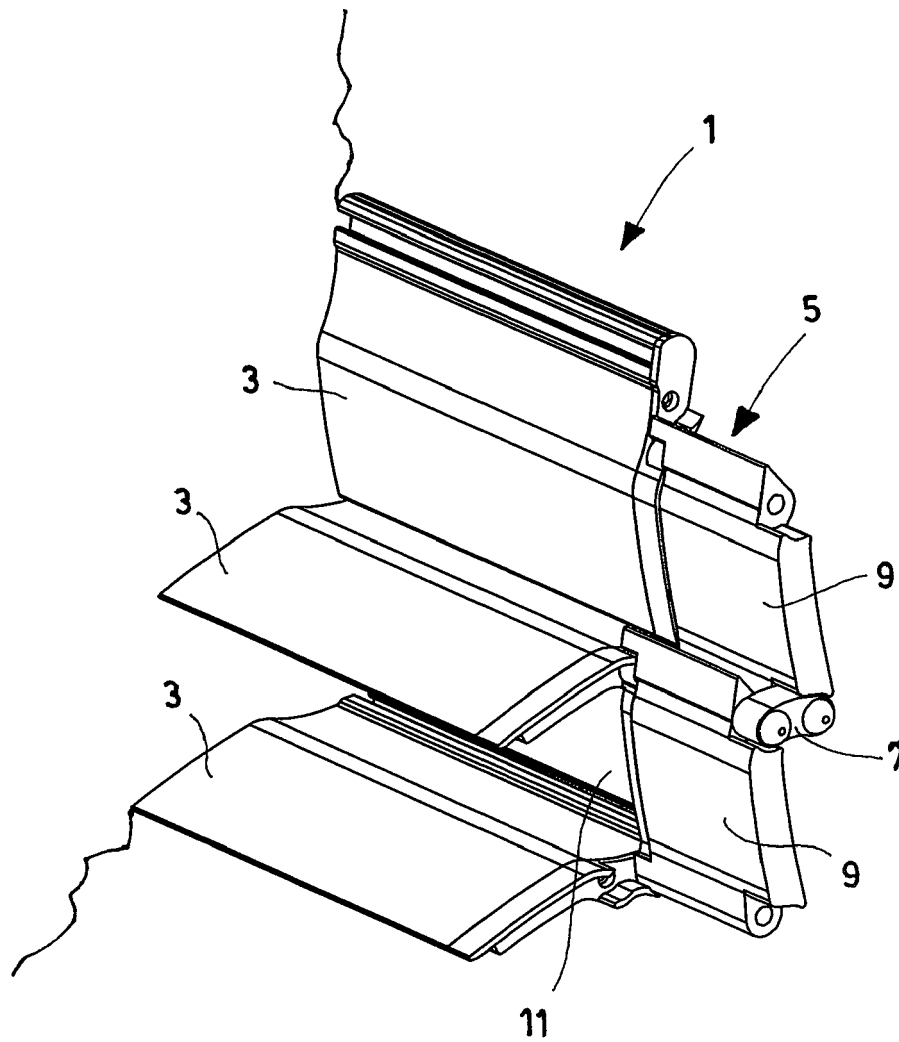


Fig.3

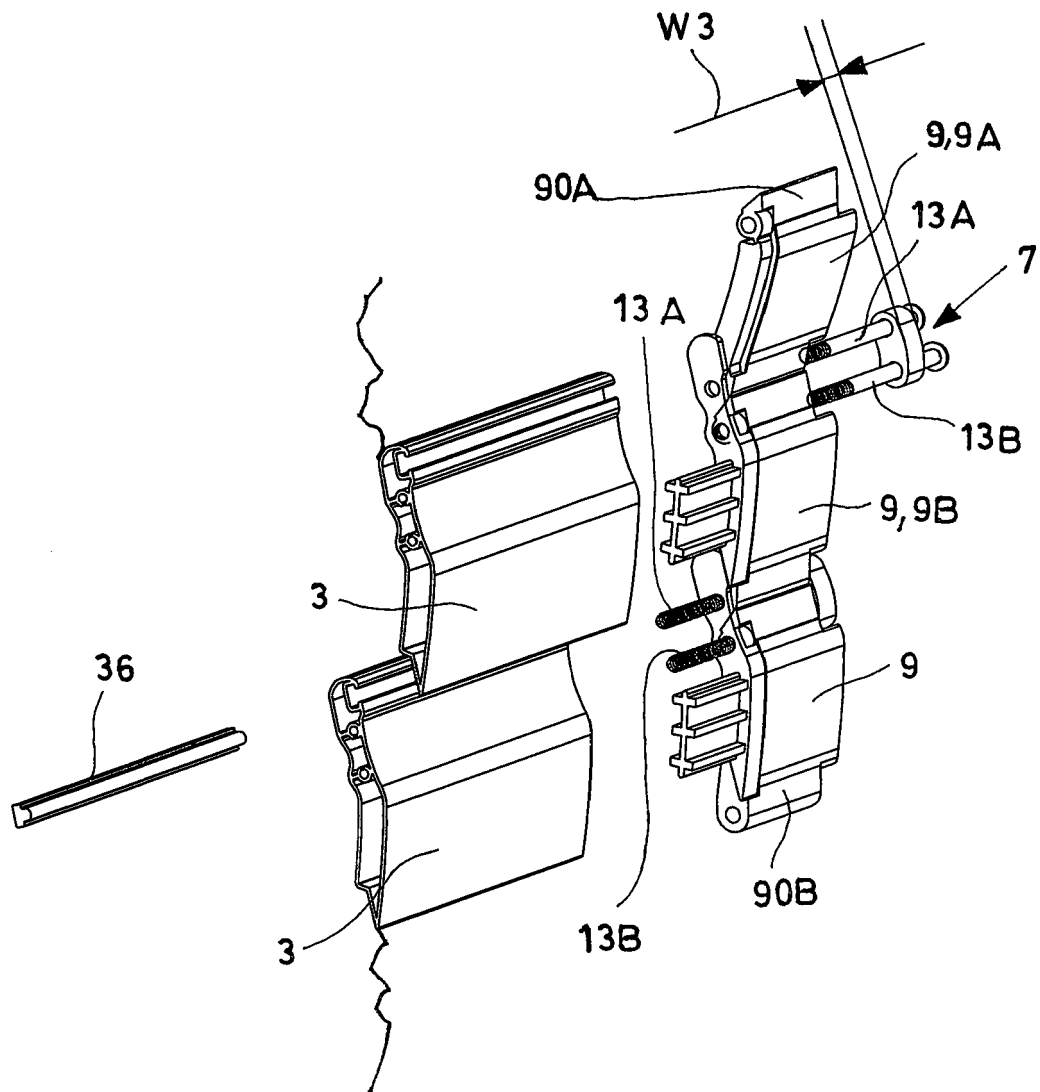
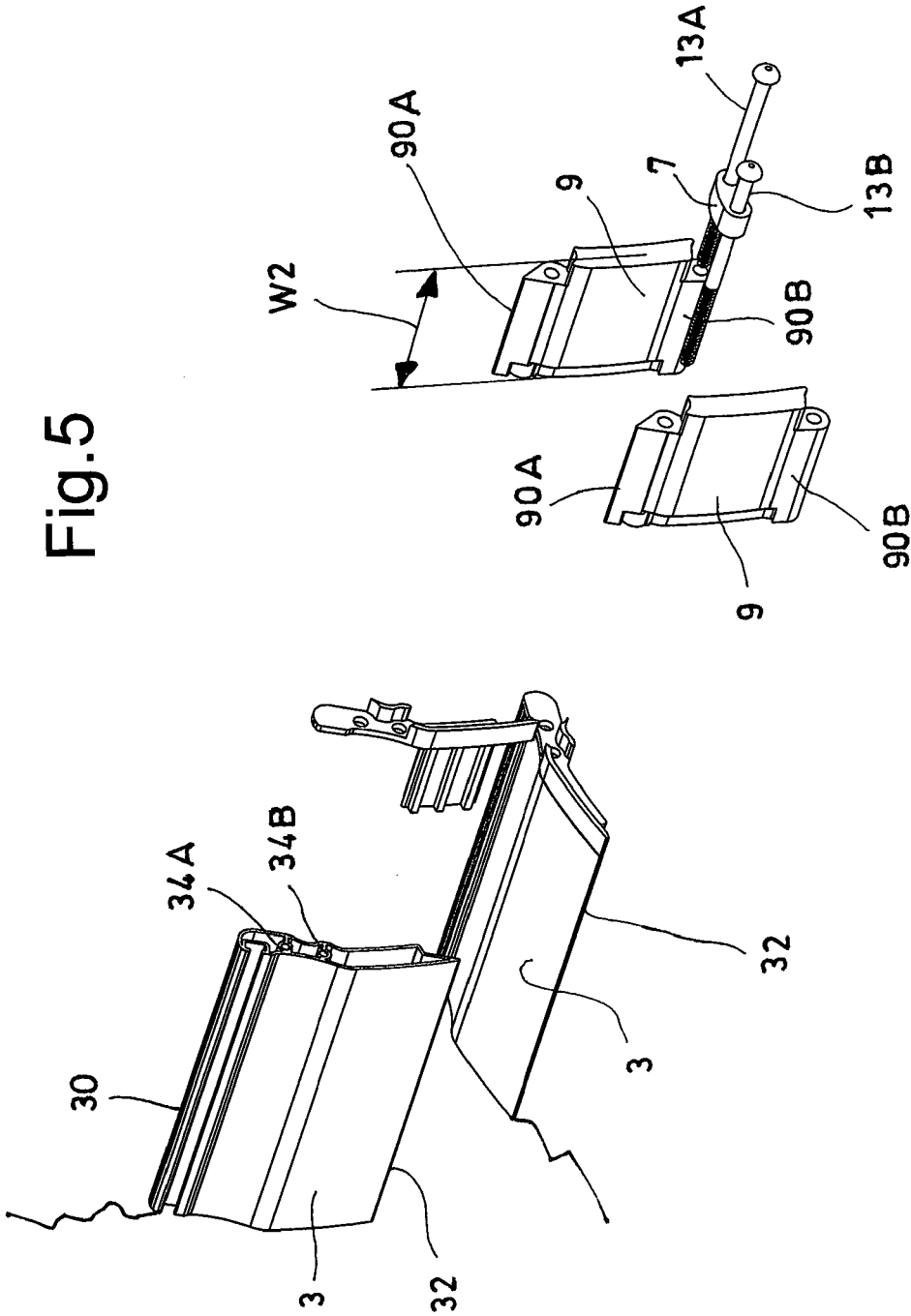


Fig.4

Fig.5





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Application Number
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Place of search Munich		Date of completion of the search 27 October 2014	Examiner Weißbach, Mark
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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