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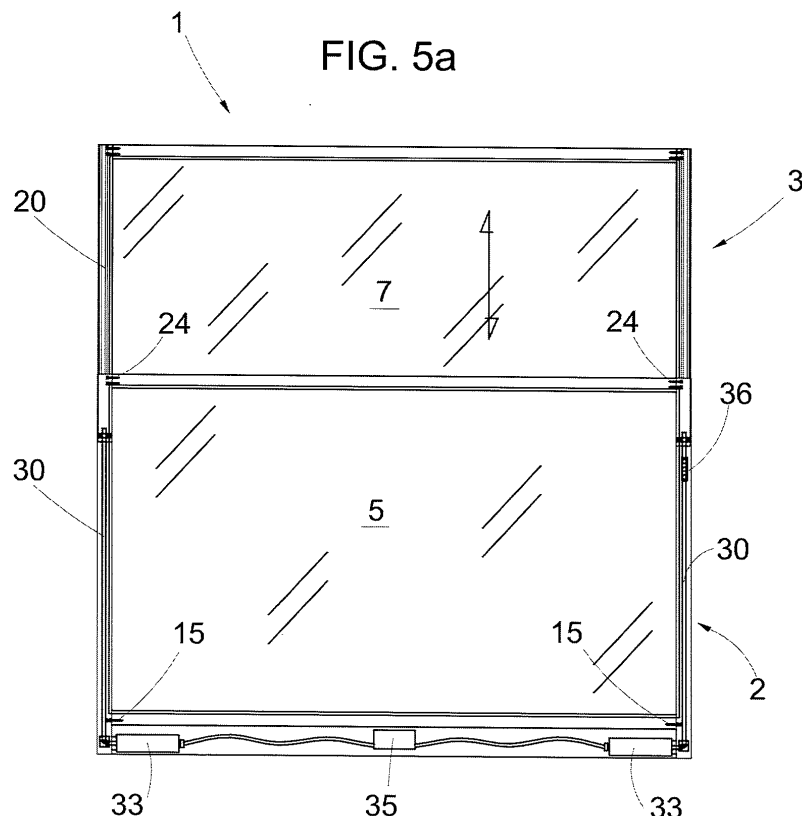
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(54) Modular screen element provided with an upper motorised panel

(57) A description is given of a modular screen element (1) for a modular structure for defining outside spaces, comprising a lower base element (2) and an upper element (3), each one constituted by a respective frame (4, 6) enclosing a corresponding panel (5, 7), the frame

(20) of the upper element (3) being housed in seats (13) of the frame (10) of the lower element (2), so as to be able to slide vertically with the aid of electromechanical actuation means (30, 31, 32, 33, 33', 34).



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Description

[0001] The present invention relates to motorised screen panels used in modular systems for defining outdoor spaces, in particular for defining and enclosing the public outdoor space of bars, restaurants, terraces, etc.

[0002] Known screen panels are normally made in a single element consisting of a transparent sheet and/or laminate.

[0003] The screen panels of this type, in order to be really effective and provide real protection from the wind, should be sized according to the seasons, but for practical reasons they are not. For this reason, during the dry season, these panels are presented oversized, offering excessive heating of the enclosed space both due to the greenhouse effect, produced by the transparent sheet, and because of poor air circulation, produced by the panel itself which acts as mechanical obstacle. During the summer season it is therefore necessary to completely remove the entire system of demarcation formed by the screen panels and reinstall it at the beginning of the windy seasons, which is obviously inconvenient.

[0004] To obviate this disadvantage at least in part, a screen panel has been proposed in the art consisting of a substantially fixed base element and an upper element, interchangeable according to the weather conditions. See for example European patent EP 1452671, in the name of the same Applicant.

[0005] Even this solution requires, however, a partial disassembly and subsequent reassembly of the structure.

[0006] To avoid disassembly and reassembly of part of the structure "sash" type products have been proposed on the market, using side pulley systems and with very bulky counterweights which, with considerable manual effort by the user, allow the height of the panel to be lowered. In this case it is not a question of actual screens but of walls framed on the four sides, which are made to slide vertically one over the other, by the aforesaid means.

[0007] The patent application EP 2395167, in the name of the Applicant, describes a modular screen element comprising a fixed base element and a movable upper element, each constituted by a respective frame enclosing a corresponding panel, wherein the frame of the upper element is housed in seats of the frame of the lower element, so as to be able to slide vertically with the aid of or in contrast to gas springs housed in said seats.

[0008] However in this type of panel it was found that a certain effort by the user is required in order to compress the panel downwards, in particular when it is large in size. Moreover, the maintaining of the upper sheet in an intermediate position between the end ones is not found to be stable.

[0009] The main object of the present invention is, therefore, that of eliminating the disadvantages of the screens of the prior art illustrated above and to provide a screen element of easier use, cancelling out the effort

by the user, with the possibility of adjusting the height quickly and easily, in the various desired positions, which also does not require disassembly and reassembly of parts as weather conditions change.

[0010] Another object of the invention is that of providing such a screen element which is simple and economical to produce, easy to install and which allows easy maintenance and rapid possible replacement of the means which allow the adjustment thereof.

[0011] These and other objects are achieved by the screen element according to the invention which has the features of the annexed independent claim 1.

[0012] Advantageous embodiments of the invention are disclosed by the dependent claims. Substantially, the screen element according to the invention comprises, once mounted, a lower panel enclosed in a fixed frame and an upper panel sliding with respect to the lower panel in suitable runners provided in the profile sections of the uprights of the fixed frame where the upper panel slides under the action of electromechanical actuation means.

[0013] The presence of electromechanical actuation means, such as for example electric motors associated with worm screws whereon respective screw nuts or lead screws slide, allows the upper panel to be lowered and raised without effort, but above all to lower it without any effort of compression. This is greatly advantageous in that the panel, normally consisting of a sheet of glass, can reach the weight of about 20 kg, for example if it has a height of about 100 cm and a width of about 200 cm.

[0014] Moreover, such a system for lowering/raising allows the upper sheet to be placed not only in the two end positions, raised and lowered, but in any intermediate position between the two remaining, if necessary, in this position.

[0015] Further features of the invention will be made clearer by the following detailed description, referred to a purely non-limiting example thereof, illustrated in the accompanying drawings in which:

Figures 1a and 1b are schematic front views showing a screen element according to the invention in two opposite configurations;

Figure 2 is a front view of only the upper element of the screen element of Figure 1;

Figure 3 is a front view of only the lower element or base element of the screen element of Figure 1;

Figure 4 is an enlarged section taken along plane IV-IV of Figure 1b;


Figures 5a and 5b are schematic front views showing a second screen element according to the invention in two opposite configurations illustrating the housing of the electromechanical actuation means in the frame of the structure;

Figure 6 is an enlarged and partially interrupted view of the detail denoted by A in Fig. 5b;

Figure 7 is a plan and sectioned view of a structure of screen panels obtained from the composition of modular elements according to the invention.

[0016] Referring to Figures 1a and 1b, the modular screen element according to the invention, denoted as a whole by reference numeral 1, comprises a base or lower element 2 and an upper element 3, coupled to the base element 2, and which can be positioned at different heights with respect thereto in the manner to be mentioned here below.

[0017] As illustrated in Figures 2 and 3, the base element 2 is constituted by a support frame 4 of rectangular shape inside whereof a panel 5 of laminate or other transparent or opaque material is placed, in particular a sheet of glass or plastic.

[0018] The upper element 3 instead comprises a frame 6 which has the shape of a , which contains in its interior a panel 7, preferably a transparent sheet of glass or plastic.

[0019] The frames 4 and 6 are made from metal or plastic profile sections and each comprise a pair of uprights, respectively, 10 and 20, and a pair of crosspieces, respectively, 11 and 21.

[0020] As can be seen in Figure 4, the profile section of each upright 10 of the frame 4 of the base element 2 comprises two tubular members 12 joined one to the other so as to determine a seat 13 suitably shaped and open towards the interior in the direction of the opposite upright.

[0021] The panel 5 that is fixed is mounted in a cavity 14 adjacent to the tubular member 12 and attached by screws 15, as schematically shown in Figure 4.

[0022] The profile sections of the uprights 20 of the frame 6 of the upper member 3 are constituted by a tubular member 22, whose outer profile matches perfectly the internal profile of the seat 13 provided in the upright 10, so that the upright 20 can be inserted in the upright 10 as shown in Figure 4, and can slide vertically with respect thereto, as shown in Figs. 5a and 5b.

[0023] The panel 7 of the upper element 3, which instead is mobile, is mounted in a cavity 23 adjacent to the tubular member 22 and attached by means of screws 24.

[0024] Inside each seat 13 of each upright 10 of the lower frame 4 a respective worm screw 30 is placed which, at its lower conical end 31, is suitable for meshing with a bevel pinion 32 integral with the drive shaft 33' of a respective electric motor 33 (bevel gear 31, 32).

[0025] Each of said worm screws 30 is attached to the respective upright 10, in a manner in itself known, so as to be able to rotate without translating.

[0026] The two electric motors 33, independent one of the other, are positioned instead on the bottom of the lower crosspiece 11 of the lower frame 4 and rotate simultaneously making the two opposite worm screws 30 rotate.

[0027] Each of said worm screws 30 is coupled, at its upper end, to a corresponding screw nut or lead screw 34, attached in the lower part of the upright 20 of the upper profile 6 in aluminium which frames the sliding glass 7.

[0028] Each of said worm screws 30, by rotating, goes to mesh with the relative screw nut 34 so that the rotation of the worm screw 30, coupled to the shaft of the motor, is converted into a linear vertical movement of the respective screw nut 34 which will move the sliding glass 7 axially.

[0029] In fact said screw nuts 34, being attached integrally to the upper frame 6 which carries the upper glass 7, will rise and descend along the respective worm screw 30 accompanying the glass 7 all the way up, all the way down, or into any other position.

[0030] In practice, the uprights 20 of the upper element 3 which are housed slidably in the corresponding uprights 10 of the lower element 2 are driven by the electromechanical actuation means formed by the elements 30, 31, 32, 33, 33' and 34.

[0031] It is to be understood that the aforesaid electromechanical actuation system, which provides for the coupling of an electric motor with a linear actuator formed by a worm screw whereon a screw nut slides, can be replaced by other systems of electromechanical actuation where the electric motor can be coupled to other mechanical linear actuators which can be coupled to a motor, such as for example:

- cogged wheel/linear axle (by rotating the wheel, the axle performs a linear movement of the pinion/rack type);
- cam: by rotating the cam (which has an eccentric shape) a linear movement is obtained, albeit with limited stroke.

[0032] As electric motor various types of motors can be used for a linear system, the choice whereof will depend on the application requirements and on the loads required, for example DC motors with or without brushes, BLDC (brushless DC motors), induction motors or stepper motors.

[0033] The management of the contemporary rotation of the electric motors 33 (synchronism of the two electric motors) is obtained by the application of an electronic card 35, located in the lower crosspiece 11 of the lower frame 4, which in addition to having such a function is engaged to block the motors in the case of high absorption, as also the crushing of foreign bodies during the ascent of the pane of glass 7.

[0034] The system of actuation of the movable glass 7 is also equipped with one or more limit switches (not shown) that will automatically stop the sliding glass 7 in its highest or lowest position if the stop button is not pressed.

[0035] Only in the phase of rising, an overload (such as crushing of a hand) blocks the system and reverses the rotation of the motors, making the glass descend slightly for a certain distance, for example 5 cm.

[0036] A pushbutton panel 36 is also provided, applied externally on one of two uprights 10 of the lower frame 4 of the lower element 2, suitable for managing the as-

cent, descent and stopping in any vertical position of the upper panel 7.

[0037] The general operating voltage is 24V.

[0038] The worm screws 30 are conveniently arranged in each upright 10 and their provision allows the upper element 3 of the screen element 1 according to the invention to be raised and lowered without any effort, and to position it at the height required. Normally in the windy periods or seasons the upper element 3 is positioned at the maximum height as shown in Figure 5a, while in the non-windy periods or seasons it is placed in the lowest position, remaining completely covered by the base panel 2, as shown in Figure 5b, without detriment to the fact that it can be set to any intermediate position between the two.

[0039] As can be seen from the section of Figure 4, the upper element 3 slides completely inside the uprights 10 of the lower element 2, without creating therefore any projection with respect to the lower element 2.

[0040] Figure 7 shows partly in a plan view a possible structure which can be obtained with the modular screen element according to the invention.

[0041] In particular, the right side of the Figure shows a linear coupling of two screen elements 1, while the left side of the Figure shows a right-angled coupling between these elements.

[0042] Also shown in the Figure are covering elements, both internal and external, of the uprights, of the linear 40 and angular type 41, 42, attached by means of screws 43.

[0043] Numerous detailed changes and modifications may be made to the embodiment of the invention described above within the reach of a person skilled in the art, coming however within the scope of the invention expressed by the appended claims.

Claims

1. Modular screen element (1) for a modular system of defining outdoor spaces, comprising
 - a base element (2) suitable for maintaining in upright position the screen element (1), and consisting of a frame (4) with two uprights (10) and two crosspieces (11) enclosing a first panel (5), and
 - an upper element (3) which can be raised and lowered with respect to the base (2), and consisting of a frame (6) with two uprights (20) and two crosspieces (21) enclosing a second panel (7),
 - each of said uprights (20) of the upper element (3) being constituted by a profile section (22) whose external profile perfectly matches the inner profile of a corresponding seat (13) provided in the respective upright (10) of the lower element (2) developing parallel to a cavity (14) for the housing of said panel (5) and open towards the interior, in the direction of the other upright (10),
 - said screen element being **characterised in that**

said uprights (20) of the upper element (3), which are housed slidably in the corresponding uprights (10) of the lower element (2), are actuated by electromechanical actuation means (30, 31, 32, 33, 33', 34).

2. Screen element according to claim 1, wherein said electromechanical actuation means (30, 31, 32, 33, 33', 34) comprise worm screws (30) placed inside the corresponding seats (13) provided in the respective uprights (10) of the lower element (2), engaging in corresponding screw nuts (34) integral with the respective uprights (20) of the upper element (3).
3. Screen element according to claim 2, wherein said worm screws (30) are actuated by respective electric motors (33) via respective bevel gears (31, 32).
4. Screen element according to claim 3, wherein said electric motors (33) are placed in the lower crosspiece (11) of the lower frame (4) of the lower element (2).
5. Screen element according to claim 3 or 4 wherein said electric motors (33) are managed, in synchronism, by an electronic card (35) also placed in said lower crosspiece (11).
6. Screen element according to any one of the preceding claims 2 to 5, further comprising a pushbutton panel (36) placed on one of the uprights (10) of the lower frame (4) of the lower element (2), suitable for managing the rise, the descent and the stopping in any vertical position of the upper panel (7).
7. Screen element according to any one of the preceding claims, wherein said profile section (22) of the upright (20) is a tubular member adjacent where to a cavity (23) is provided, intended to house said panel (7).
8. Screen element according to any one of the preceding claims, wherein said seat (13) of the upright (10) is comprised between two tubular profile sections (12) joined one to the other, adjacent to one of said tubular members (12), said cavity (14) being provided, intended to house said panel (5).
9. Screen element according to any one of the preceding claims, wherein said panels (5, 7) are made in laminate or another transparent or opaque material, preferably in glass or plastic.
10. Modular structure of screen elements for defining outdoor spaces comprising a plurality of screen elements (1) according to any one of the preceding claims, joined one to the other linearly and/or angled.

11. Modular structure according to claim 10, comprising internal and external covering elements (40, 41, 42) of the uprights (10, 20) of said frames (4, 6).

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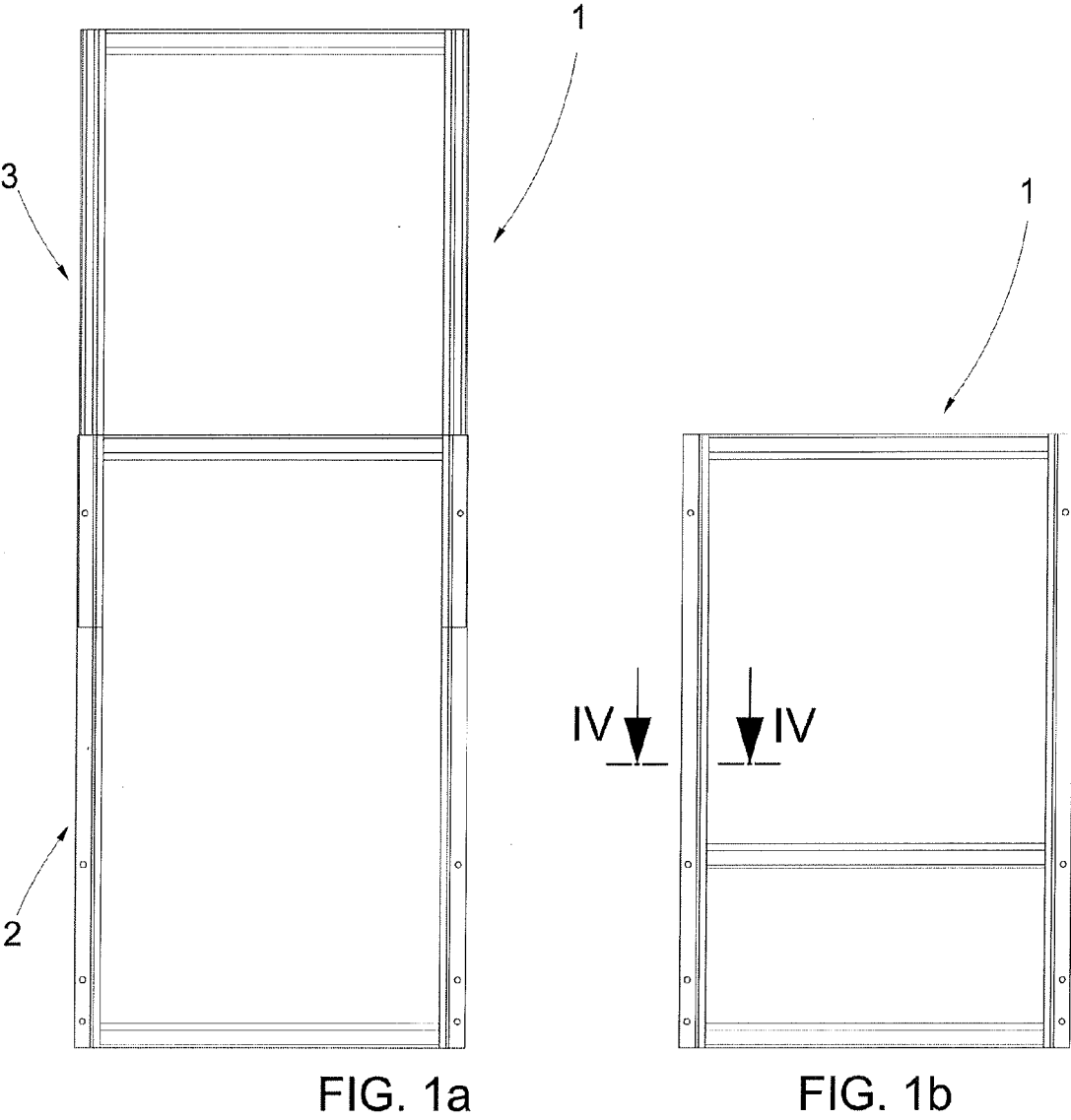
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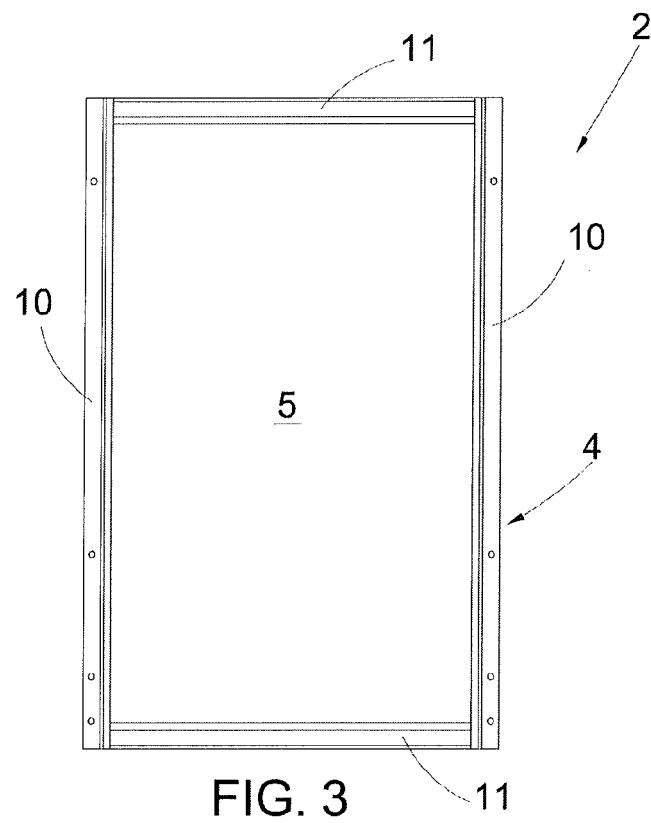
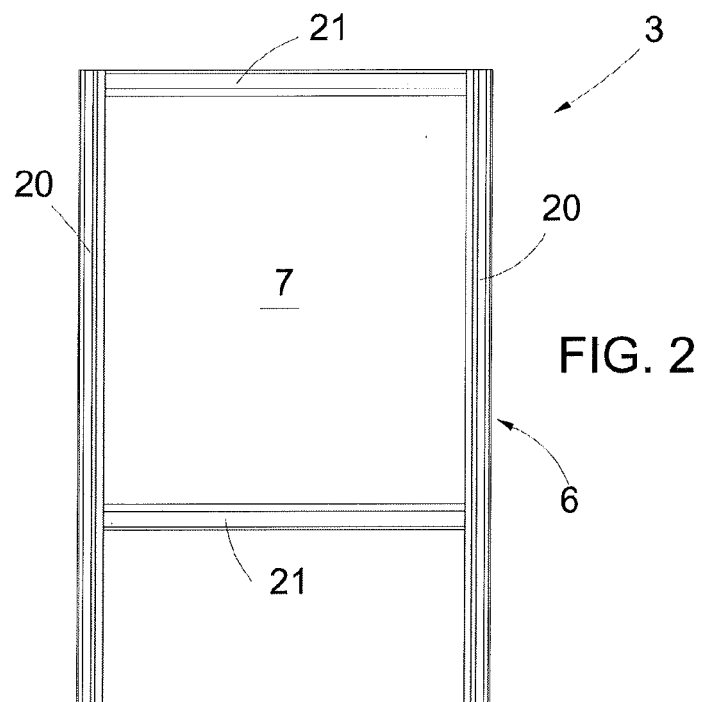
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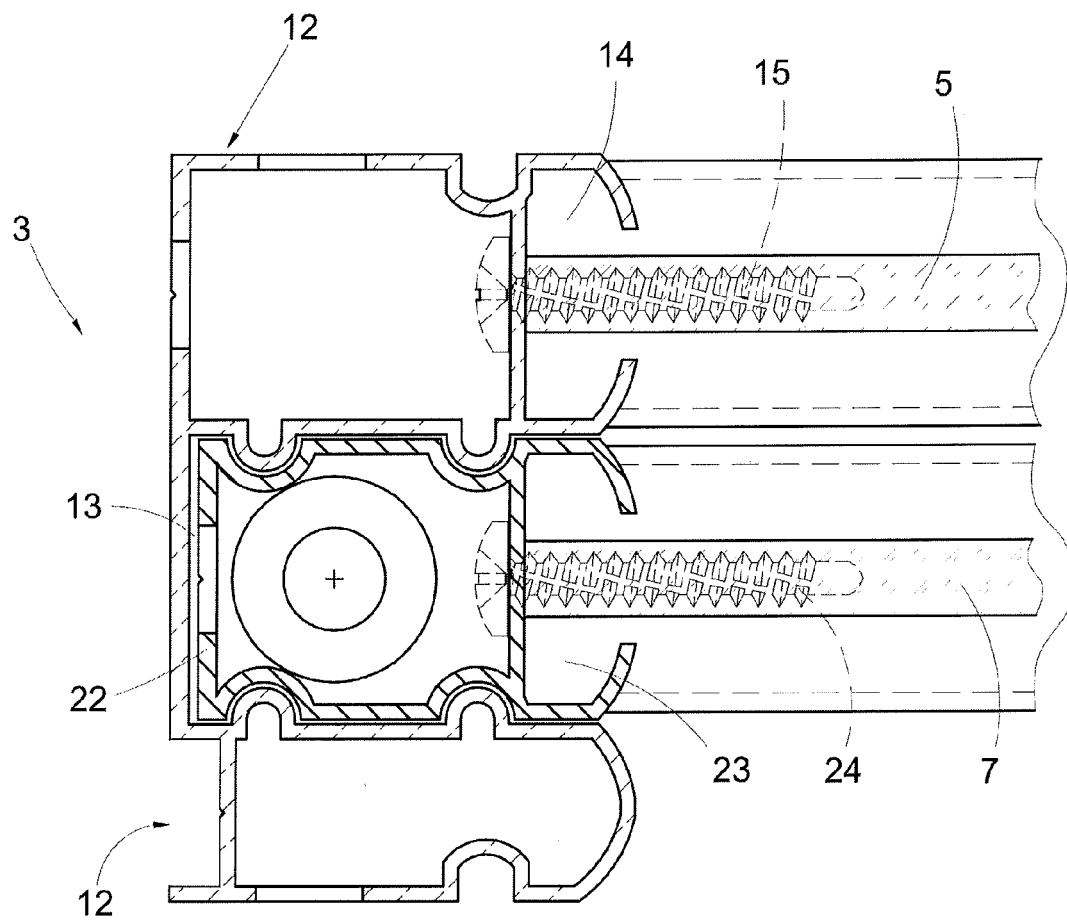


FIG. 4

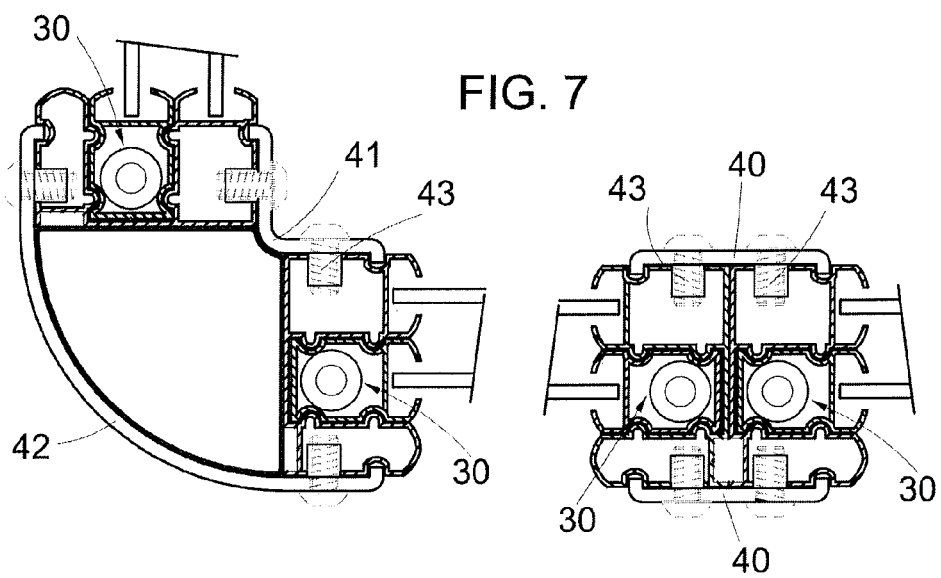


FIG. 7

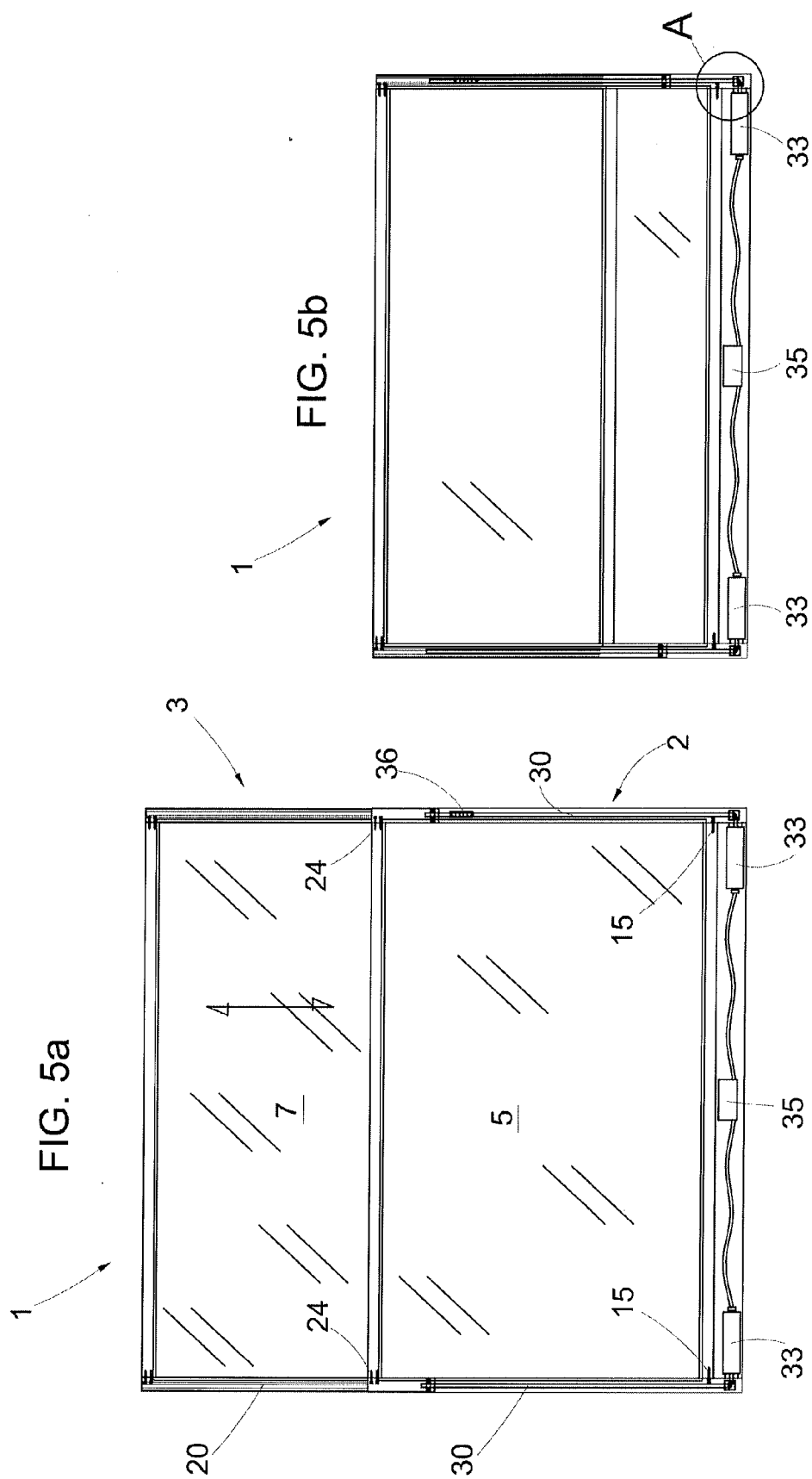
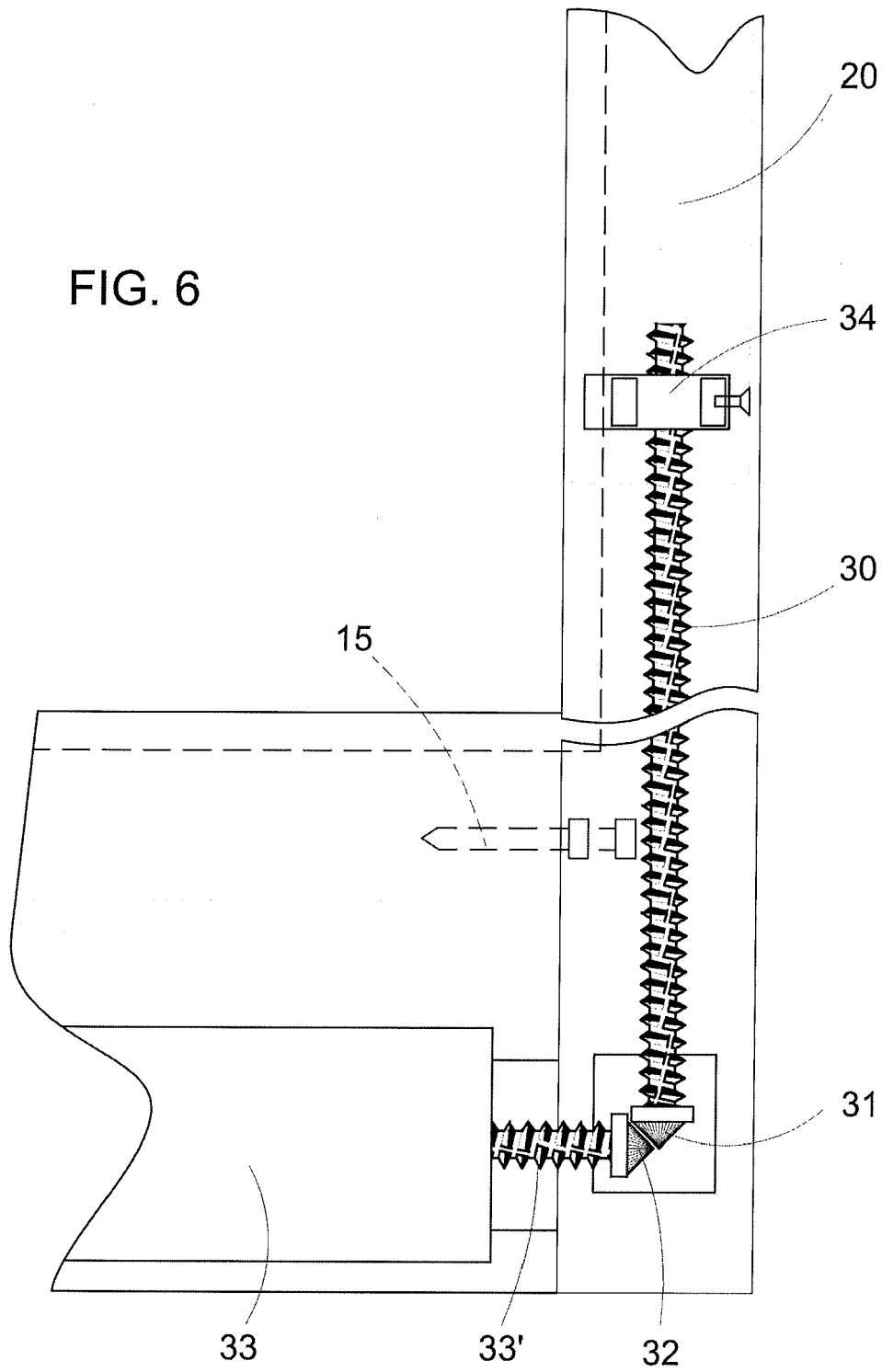


FIG. 6





EUROPEAN SEARCH REPORT

Application Number
EP 13 18 7336

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 January 2014	Examiner Melhem, Charbel
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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